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The British Aircraft Industry Post-1989: Threats And
Opportunities On The Institutional Merry-Go-Round

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To my parents, with love

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GLOSSARY

AASC	Aerospace Applications Studies Committee
ACE	Allied Command Europe
AGARD	Advisory Group for Aerospace Research and Development
AH	Attack Helicopter
AI	Airbus Industrie
AMF	ACE Mobile Force
AMT	Advanced Manufacturing Technologies
APQ	Armaments Planning Questionnaire
ARRC	ACE Rapid Reaction Corps
ASW	Anti-Submarine Warfare
ATC	Air Traffic Control
ATM	Air Traffic Management
ATTU	Atlantic to the Urals, geographical scope of the CFE Treaty
BaE	British Aerospace Plc
BIH	British International Helicopters
BRAG	Breathing Regulator with Anti-G valve
BSI	British Standards Institution
CAD	Computer Aided Design
CAM	Computer Aided Manufacture
CAPS	Conventional Armaments Planning System
CARAD	Civil Aircraft Research And Demonstration (Programme)
CEAC	Committee for European Airspace Coordination
CER	Controller of Establishments and Research
CFE	Conventional Forces in Europe (Treaty)
CFSP	Common Foreign and Security Policy
C ³ I	Command, control, communications and intelligence
CIS	Commonwealth of Independent States
CNAD	Conference of National Armaments Directors
CNI	Communications, Navigation and Identification
COCOM	Co-ordinating Committee for Multilateral Export Controls
CoQ	Cost of Quality
CRAF	Civil Reserve Air Fleet
CSCE	Conference on Security and Cooperation in Europe
CST	Critical Systems Thinking
CTPs	Common Technology Projects
DASA	Deutsche Aerospace
DESO	Defence Export Services Organization
DGA	Delegation Generale pour l'Armement (France)
DMA	Defence Manufacturers Association
DOD	Department of Defense (USA)
DPC	Defence Planning Committee
DRA	Defence Research Agency
DRG	Defence Research Group
DTI	Department of Trade and Industry
EAIC	European Aerospace Industry Council
EAP	Experimental Aircraft Programme
EAPA	European Armament Procurement Agency
EC	European Community
ECAC	European Civil Aviation Conference
ECGD	Export Credit Guarantees Department
ECU	European Currency Unit
EDAB	European Defence Analysis Bureau
EDEM	European Defence Equipment Market
EDIG	European Defence Industries Group
EDIP	European Defence Improvement Programme

EDU	European Defence Union
EEIG	European Economic Interest Grouping
EFA	European Fighter Aircraft (Eurofighter 2000)
EMU	European Monetary Union
EP	European Parliament
EPC	European Political Cooperation
EPU	European Political Union
ESA	European Space Agency
ETW	European Transonic Windtunnel
EU	European Union
EUCLID	European Collaboration Long Term in Defence
EUROCORPS	Franco-German corps, comprising 35,000 troops
EUROFLAG	European consortium developing the Future Large Aircraft.
EUROGROUP	Acronym used for informal group of NATO-European Defence Ministers
FCO	Foreign and Commonwealth Office
FDP	Fluid Dynamics Panel
FEFA	Future European Fighter Aircraft
FHI	Fuji Heavy Industries
FLA	Future Large Aircraft
FMP	Flight Mechanics Panel
GATT	General Agreement on Tariffs and Trade
GPS	Global Positioning System
HLWG	High Level Working Group
HoQ	House of Quality
HMG	Her Majesty's Government
HST	Hard Systems Thinking
ICAO	International Civil Aviation Organization
ICBM	Intercontinental Ballistic Missile
IEPG	Independent European Programme Group
IGC	Inter-Governmental Conference
IISS	International Institute for Strategic Studies
IMS	Integrated Military Structure
IMS	International Military Staff
INF	Intermediate-Range Nuclear Forces
IR	International Relations
IS	International Staff
JCG	Joint Consultative Group
KA	Korean Air
KHI	Kawasaki Heavy Industries
LTCs	Long-Term Costings
LTDP	Long-Term Defence Programme
MAS	Military Agency for Standardization
MC	Military Committee
MCR	Merger Control Regulation
MDF	Main Defence Force
MDHC	McDonnell Douglas Helicopter Company
MHI	Mitsubishi Heavy Industries
MNC	Major NATO Commander
MoD	Ministry of Defence
MoD(PE)	Ministry of Defence (Procurement Executive)
MOU	Memorandum of Understanding
MPA	Maritime Patrol Aircraft
NAA	North Atlantic Assembly
NAAG	NATO Army Armaments Group
NAC	North Atlantic Council
NACC	North Atlantic Cooperation Council
NADC	NATO Air Defence Committee
NAFAG	NATO Air Force Armaments Group

NAHEMA	NATO Helicopter (NH90) Design, Development, Production and Logistics Organization
NAPR	NATO Armaments Programming Review
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NCARC	NATO Conventional Armaments Review Committee
NDB	National Delegates Board
NGL	Normalair-Garrett Limited
NIAG	NATO Industrial Advisory Group
NNAG	NATO Naval Armaments Group
NSC	New Strategic Concept (NATO)
NSG	NATO Standardization Group
NSP	NATO Standardization Programme
NSTAP	National Strategic Technology Acquisition Plan
NSWTO	Non-Soviet Warsaw Treaty Organization
NVA	Non-Value Added
OBOG	On-Board Oxygen Generator
OEST	Outline European Staff Target
ONERA	Office national d'études et de recherches aérospatiales (National Office of Aerospace Studies and Research, France)
OOA	Out-Of-Area
OR	Operational Research
PAC	Public Accounts Committee
PAD	Preliminary Analysis Document
PAPS	Phased Armaments Programming System
PES	Public Expenditure Survey
PGMs	Precision-Guided Munitions
PMS	Package Management System
QFD	Quality Function Deployment
R&D	Research and Development
RAF	Royal Air Force
REVISE	Research Vehicle for In-Flight Submunition Ejection
RN	Royal Navy
ROE	Rules of Engagement
RRC	Rapid Reaction Corps
RSI	Rationalization, Standardization and Interoperability
RTD	Research and Technological Development
RTPs	Research and Technology Projects
RUSI	Royal United Services Institute
SAC	Standing Armaments Committee
SACEUR	Supreme Allied Commander Europe
SACLANT	Supreme Allied Commander Atlantic
SBAC	Society of British Aerospace Companies
SC	Science Committee
SDI	Strategic Defence Initiative
SEA	Single European Act
SHAPE	Supreme Headquarters Allied Powers Europe
SIPRI	Stockholm International Peace Research Institute
SPC	Statistical Process Control
SST	Soft Systems Thinking
STANAG	Standardization Agreement
STC	SHAPE Technical Centre
SUNI	Shared Usage of NATO Infrastructure
TLE	Treaty Limited Equipment
TQC	Total Quality Control
TQM	Total Quality Management
TSGCEE	Tri-Service Group on Communications and Electronic Equipment
TSI	Total Systems Intervention
UN	United Nations

UNGA	United Nations General Assembly
USAF	United States Air Force
USN	United States Navy
UTC	United Technologies Corporation
VFM	Value For Money
VSM	Viable Systems Model
WAL	Westland Aerospace Limited
WEU	Western European Union
WHL	Westland Helicopters Limited
WP	Warsaw Pact
WTO	Warsaw Treaty Organization

INTRODUCTION

In the hardworking realities of research, we must be grateful if we are fortunate enough to be able to discover or invent tools of analysis that will be best for the special purposes we have in mind, always trying to broaden the scope of insight and understanding that a theory will give us but content if it can do well what it is designed to do.¹

1. BACKGROUND

1.1 A New Playground, But Will There Be New Toys ?

The Cold War is over.

As the curtain fell at the end of this long production, and predictability finally left the stage, the "fall-out" from the outbreak of peace soon began to torment both national and institutional actors in the complex customer-supplier network of defence aerospace procurement.

Whilst a few of the contours of the new geo-strategic landscape are evident - such as the emergence of new independent states following the USSR's dissolution, and the former Eastern Bloc "dabbling" with democracy - there is, as Helmut Schmidt² highlights, an absence of a coherently structured new order, offering a predictable framework for international intercourse. It is apparent that the immense difficulties associated with identifying the sources of future security threats, will create major problems for governments - anxious to maintain adequate security structures - and for defence companies, who no longer know what equipment they should be manufacturing. Thus, in the 1990s, as the various institutional construction teams continue working on transforming the new security playground, the defence companies await instructions on what will be required for refurbishment purposes. There are immense risks and opportunities ahead for aerospace companies in Britain and these are explored in this thesis.

1.2 Research Origins

This research project was conceptualized in the late 1980s, during my employment in the aerospace industry in Britain, working for Westland Helicopters Ltd (WHL) in Yeovil, as a Strategic Marketing Analyst. Building upon solid academic foundation stones in the security area, a layer of practical "hands-on" experience of defence industrial marketing was added, providing me with a holistic picture of the industry. In this period, as East-West tension eased, and the demand for military equipment was predicted to fall - with increasing pressures on governments to maximize the "peace dividend" - defence companies were desperately trying to minimize the "peace deficit". The outbreak of the Gulf War soon re-focused politicians' minds on the fragility of "peace" and "stability", and of the need for maintaining - if at all possible - an indigenous defence industrial capability. I saw the helicopter industry in a time of peace and I also saw it in a time of war. I witnessed at first-hand an industry battling for its existence, but one which would inevitably survive, emerging leaner and meaner to provide a service which would always be in demand.

As various defence analysts, academics, and consultants jumped on the defence industry bandwagon, ringing the deathknells for the industry, I preferred to look at the opportunities ahead. Rather than focusing on the negative side - the end of large, profitable military markets, and efforts at achieving defence diversification and civilianization - I wished to consider the positive dimension, and to examine the industry's position vis-a-vis provision of the same service in a new era, as affected by institutional initiatives in key policy areas. Whilst recognizing that events at the national level are still of great importance, the locus of power and influence in certain sectors has undoubtedly shifted from the national to the international and institutional level. An analysis of institutional initiatives thus seemed most appropriate in the circumstances, and also the most challenging.

1.3 The Mission

An examination of the institutional responses of the North Atlantic Treaty Organization (NATO), the European Community (EC), and the Western European Union (WEU)-Independent European Programme Group (IEPG) to fluctuations in the defence industrial base - at the end of the Cold War, specifically 1989-1993 - and their implications for the British aircraft industry.

1.4 Research Parameters

In this section research parameters are defined, and an explanation provided of the reasoning behind their selection. The four institutions were chosen because of their defence competency, either through constituting pillars of Europe's security architecture, or through their involvement in European defence industrial matters, or in some instances both. The transfer of the IEPG's functions to the WEU, and the eventual subsuming of the organization into the WEU, reduced the number of institutions under examination by one: this was of great significance, for it highlighted the existence of Euro-institutional rationalization, which somewhat ironically mirrored the rationalization that was taking place within Europe's defence industries. The institutions' responses to one given variable - fluctuations in the defence industrial base - are examined, via policy analysis in four key areas - procurement, research & development and technology, the military-operational dimension, and defence aerospace trade - for I wished to highlight the importance of recognizing the existence of a multi-dimensional defence aerospace environment, the specific character of this customer-supplier network, and the significance of an institutional action in one policy area vis-a-vis other areas and the institution's overall provision of quality output. Fluctuations in defence expenditure affect all the policy areas highlighted above, and in the post-Cold War era, where justification of any increases will become more difficult, other policy initiatives and developments will also be restricted. The specific timeframe for this research, post-1989 to January 1993, was chosen because the end of the 1980s witnessed disintegration in the East - the rapid easing of tension in East-West relations, the dissolution of the WTO, and fragmentation of the USSR - whilst in sharp contrast, the cut-off date of January 1993, was billed as the advent of greater West European integration, in the context of the advent of the "Single Market".

The Case-Study focuses on the British aircraft industry, and assesses the impact of the institutions' multifarious initiatives in the policy areas enumerated above. It is important to recognize that the British aviation industry is not a nationalized concern, but instead comprises various private, independent companies. This Case-Study targets two airframe manufacturing companies: a fixed-wing player (British Aerospace Plc), and a rotary-wing player (Westland Helicopters Ltd), which enhances its validity in terms of providing a representative sample of aircraft manufacturing. My justification for an aircraft Case-Study is based on four main grounds: first, that the aircraft industry is a microcosm of Britain's defence industry, arguably its most successful, and a useful

barometer vis-a-vis the current defence contracting climate; second, I believe that (and hope to illustrate that) this industry also constitutes a microcosm of Europe's aerospace industry; third, extending the study to other defence industry sectors would result in a large, unmanageable project that ultimately was plagued by generality; and fourth, I have first-hand experience and knowledge of the aircraft industry, gained whilst I was working in a strategic planning capacity at Westland Helicopters. With regard to terminology, I wish to stress two important points: first, the terms aircraft and aviation are interchangeable in this thesis; and second, this thesis specifically addresses the impact of the institutions' responses upon the aircraft industry, and not the aerospace industry: aerospace is the all-embracing, all-encompassing term which includes aircraft and missile and space technologies. Broadening the study to include missiles and space technologies would only present the same problems as highlighted in point three above.

In terms of this Case-Study's external validity, it is a logical assumption, given the fact that the aircraft industry is a microcosm of Britain's defence industries, that the implications of certain institutional responses for aircraft companies would be equally applicable for contractors in the other defence sectors. However, it is important to recognize the advantage the aircraft industry has over the tank industry, for example, in that aeroplanes do have civil applications. Caution is urged over making too many trans-national comparisons - although many of the problems confronting British companies are also experienced by their European competitors, thus making certain conclusions equally valid - for there are marked national industrial differences: the British aircraft companies are not state-owned or state-controlled; the British contractors are market- and customer-responsive; and they are accountable to shareholders.

1.5 Thesis Format

This thesis comprises three major parts. Part I provides information on the geo-strategic environment, and includes Chapter One - Context. Part II constitutes the central section, comprising Chapters Two through to Five, each addressing a specific policy area: Procurement and the Regulatory Environment; the Research & Development and Technology Dimension; Sky Wars: Battle For Aircraft Exports; and the Military-Operational Dimension. The Case-Study on the British aircraft industry is provided in Chapter Six, which forms Part III. In employing a thematic approach in Chapters Two to Five, a structured examination of the institutions' manoeuvres is facilitated, in addition to providing a solid analysis of the multi-dimensional defence market-place in which the

companies operate. Each chapter follows the same format: organizational background and structural data, followed by information on each of the institution's initiatives, or responses to developments, in the policy areas. To avoid repetition of background data on the institutions in each chapter, such information is provided once only, in the thematic chapter where the institution - as the whole or through one of its agencies - is first mentioned for conducting its business.

2. RESEARCH METHODOLOGY

2.1 Background to Methods and Strategy

The overall aim of Section 2 is to define my methodology, and to provide an explanation of its selection. The foundation of my approach is a traditional method of policy analysis, which is enhanced by an overlay of selected tenets of Total Quality Management (TQM)³, derived from systems thinking. Through employing the "Customer" and "Cost of Quality" (CoQ) concepts (discussed below), this analysis considers the complex customer-supplier network within the defence aerospace procurement regime, in addition to focusing attention on institutional efforts to deliver a "quality" output. In TQM terms, a quality output is defined as meeting a customer requirement first and every time. TQM emphasizes the importance of relationships, and of the need for the effective management of these relationships at all levels, at all times, on all issues. TQM is discussed in detail in 2.4 below.

Whilst I am adopting TQM as a weapon in my methodological armoury, I wish to make two points clear from the outset pertaining to what this thesis is not. Firstly, this is not a management systems thesis: it is an examination of political behaviour which is enhanced by a TQM approach; furthermore, since my academic background is in Political Science, I lack the expertise to write a management thesis, and would not claim to be able to write one. Secondly, the methodological and conceptual approach employed in this research should not be viewed as illustrative of a "systems-driven approach": admittedly, the method has its origins in systems thinking - hence the examination of the systems-TQM linkage - but it is important to recognize that TQM is used as a policy analysis enhancer. There are various approaches which can be employed for examining the institutional variables, each asking different questions and setting very different agendas. My preference - because of its "customer-orientation" - was for a TQM-based approach.

2.2 Background to Systems Thinking: The Hard and Soft Systems Merry-Go-Round

Before examining the role of systems thinking in political science research, and the applicability of Total Quality Management to this thesis, it is necessary to define systems thinking, to refer briefly to its origins, and also to examine the four main strands of modern systems thinking, for this will provide both the background and the justification for the methodology adopted.

The key to systems thinking is "synthesis" - or putting things together - distinguishing it from what has been referred to as the traditional "Machine-Age"⁴ mode of thinking, where the key was "analysis" - involving taking things apart. Machine-Age thinking was characterized by a three-stage analytical approach: a) decomposition of that which was to be explained; b) explanation of the behaviour or properties of the parts taken separately; and c) aggregating these explanations into an explanation of the whole.⁵ Systems thinking reverses this approach: thus the synthesis precedes the analysis. The three-step systems approach, as enumerated by Russell Ackoff⁶ is:

- a) Identify a containing whole (system) of which the thing to be examined is a part;
- b) Explain the behaviour or properties of the containing whole;
- c) Then explain the behaviour or properties of the thing to be explained in terms of its role(s) or function(s) within its containing whole.

Whereas in analytical thinking, the entity to be explained is treated as a whole to be taken apart, synthetic thinking, in contrast, views the thing to be explained as part of a containing whole. It is true to say that the former approach reduces the focus of the researcher or investigator, whilst the latter expands it. Ackoff sums it up succinctly:

Analysis focuses on structure; it reveals how things work.
Synthesis focuses on function; it reveals why things operate as they do. Therefore analysis yields knowledge; synthesis yields understanding.⁷

Although it is clear that analysis involves looking into things, whilst synthesis looks out, it is important to recognize that the two approaches are complementary,

Systems ideas, as Robert Flood⁸ highlights were first popularized in the biological sciences as a response to the mechanistic vision of nature: the inevitable consequence was that systems thinking was led down the garden path where the belief was held that everything could be viewed in organic terms. Systems thinking initially adopted the view that all organizations were groups of interacting functional units, which the organic metaphor would suggest. Over the years, systems thinking has evolved into something much more sophisticated, increasing its own marketability in the research domain once taken out of a traditional biological setting. A general conception of a "system" is a set of richly interacting elements that imports and transforms inputs, and has outputs.⁹ A boundary distinguishes it from an external environment. The elements of communication and control interface with each other and the environment providing the information medium in which control mechanisms can be brought to bear. A system can therefore be regarded as a complex communication and control network. An additional two concepts help to explain the systems idea: these are "hierarchy" and "emergence".

Hierarchy means that each system is also a sub-system of another system and a suprasystem comprising other systems. This is a very important concept to remember as this thesis unfolds, for sub-systems and systems provide an insight into many of the institutions' responses - executed by the multifarious agencies and committees - which are being examined here in the context of defence aerospace. As David Easton¹⁰ argued in the 1960s, international affairs can be conceptualized as a system of behaviour: the international system with numerous sub-systems ranging from functional organization of members drawn from national units, to organizations of such groups as NATO and the UN, as well as the national systems themselves. With regard to the concept of emergence (unique to systems thinking), it powerfully characterizes an important phenomenon. Robert Flood's¹¹ explanation: as we pass up a hierarchy we find that each new whole is greater than the sum of its parts - there is emergence. The example of an aircraft illustrates the point: parts of an aeroplane do not fly on their own, but when brought together they can fly.¹² In order to understand the "whole", it is necessary to abandon a "reductionist" approach, since that suffers a major deficiency: it ultimately only shows aggregates whose sum is equal to the sum of the parts. For our purposes, it is necessary to have a "systemic" approach, facilitating our understanding of the whole, through its capacity "to discriminate between richly and weakly interacting parts".¹³ Through excluding aggregates, and displaying systems as interacting parts of networks, it re-focuses our way of thinking, creating a new picture.

As alluded to above, there are four main strands of modern systems thinking and these are discussed briefly below.

a) Hard Systems Thinking (HST)

HST predominated in the 1950s and 1960s and embraces such methodologies as classical operational research (OR) and systems analysis. These are all, as Peter Checkland contends,

based upon the assumption that the problem task they tackle is to select an efficient means of achieving a known and defined end.¹⁴

Having specified this end, the problem of concern could then be formulated. The system in which the problem is located is then represented in a quantitative model. Experiments carried out on the model are used to identify an optimal solution which can be implemented in the ideal world. According to Michael Jackson:

hard methodologies seek to employ systemic and rational procedures to optimize the efficient functioning of systems, thus maximizing their performance.¹⁵

Critics¹⁶ of HST highlight, amongst other things, that the search for logic and order is unrealistic in a disorderly world.

b) Organizational Cybernetics

In organizational cybernetics, the emphasis is upon the design of organizations to be self-regulating and self-organizing systems. The works of Stafford Beer¹⁷ may be taken as exemplar. Beer developed a "viable systems model" (VSM) which can be used to diagnose the operational effectiveness of any existing or proposed organizational design. Beer argues that if a system is capable of responding to environmental changes, even if those changes could not have been foreseen at the time the system was designed, then it is viable. The important relationship and linkage between VSM and TQM is highlighted by Robert Flood.¹⁸ He contends that viability is the result of two unique ideas in management: first, a well-crafted approach to organizing five main management functions¹⁹ as a viable systems focus; second, the employment of recursion, a special

form of hierarchy.²⁰ It is important to note that many of the essential issues vital to quality management are catered for in VSM: recursion promotes autonomy, allowing for participation and creativity; viable systems thinking also enables an organization to satisfy customer requirements.

c) Soft Systems Thinking (SST)

During the 1970s-1980s, the limitations of OR and HST came to be recognized and, particularly through the works of C. West Churchman²¹, Russell Ackoff²² and Peter Checkland²³, SST emerged, later challenging the harder approaches for hegemony. Within SST, the emphasis focuses on how to cope with ill-structured problems. Instead of attempting to reduce the complexity of the problem - so that it can be modelled mathematically or cybernetically - soft systems thinkers seek to explore them, by working with the different perceptions of them that exist in people's minds. Criticisms levelled at SST tend to come, as Jackson²⁴ suggests, from an advanced critically modernist stance: soft systems thinkers are concerned primarily with understanding and facilitating order and cohesion, and are seeking to preserve the status quo rather than going beyond it. It is arguable that because of this it is unable to deal with issues of power and social change.

Figure 1. below highlights the essential differences between SST and HST.²⁵

School of Thought	Essential Conception	Theory	Focus	Activity
HARD	Rational	Positivist	Quantitative	Optimisation
SOFT	Accepts irrationality	Interpretivist	Qualitative	Management

Figure 1. Contrasting Hard and Soft Systems Thinking

d) Critical Systems Thinking (CST)

CST emerged in the 1980s and owes much to the works of Werner Ulrich,²⁶ Michael Jackson²⁷ and Robert Flood.²⁸ It embraces five commitments²⁹: critical awareness, social awareness, a dedication to human emancipation, the complementary and informed use of systems methodologies, and finally the complementary and informed development of all varieties of systems approaches. The main principles of CST have been encapsulated in a new approach to planning, designing, problem-solving and evaluation, termed "Total Systems Intervention" (TSI).³⁰ It is important to recognize the

TSI-TQM link: TQM methods are systems-based, and therefore have to be considered as part of the TSI armoury.³¹

2.3 Systems Thinking and Political Analysis

This section proposes to examine developments in systems thinking and political analysis. It is important to note from the outset, however, that this is not an exhaustive study of systems thinking and political science: the intention here is to highlight the fact that "systems" are not new to the domain of political science, and to identify certain fundamentals - such as "holism" and wholeness³² - appropriate for discussion in this study.

In general, as D. Phillips³³ has pointed out, the field of political analysis has been marred by an absence of agreement on terminology and on which concepts best assist the formation of explanatory theories. In the 1960s, David Easton³⁴ argued that systems theory could provide a unifying framework within which theorists could proceed towards the development of a body of empirical theory. Easton argued that it was productive to treat any political system as an open system, having inputs, interactions, outputs and feedback loops.³⁵ Whilst it is important to recognize Easton's adoption of a systems approach, it is equally important to acknowledge that this is not synonymous with a blanket acceptance of systems thinking and a "holistic" view. From examining Easton's books, it is apparent that he finds the model of political life as a system with inputs et al to be useful, but it is also clear that he has abandoned some central features of systems theory. His adoption of a systems approach appears to be because it provides a convenient framework and is a fruitful model; not because of its holistic features. In fact, as Phillips³⁶ highlights, it is these which he either specifically rejects or refuses to utilize. The following comment provides an insight into Easton's attitude:

No one way of conceptualizing any major area of human behaviour will do full justice to all its variety and complexity. Each type of theoretical orientation brings to the surface a different set of problems, provides unique insights and emphases, and thereby makes it possible for alternative and even competing theories to be equally and simultaneously useful, although often for quite different purposes. The conceptual orientation that I am proposing - systems analysis - is one that stems from the fundamental decision to view political life as a system of behaviour.³⁷

In his discussion of how a system can usefully be selected for study among all the interrelated parts of nature, Easton's dismissal of the utility of holistic elements is apparent.³⁸ He considers two ways in which the question of a system's selection can be answered. First, "[W]e might hold that whether or not a set of interactions constitutes a system will depend upon the extent to which they naturally cohere." (From this perspective, systems are given in nature). Second, "all systems are constructs of the mind", thus making it pointless to attempt to distinguish so-called natural from non-natural or non-existent systems. Easton puts all his eggs in the second basket, thus breaking away from holism. He provides a three-fold explanation³⁹ of why the natural systems idea serves little theoretically useful purpose:

a) even if systems are regarded as naturally occurring entities, we would not be any further down the road towards solving the practical problem of actually locating such systems;

b) whilst there is little problem in distinguishing a natural system when its components are "tightly connected", difficulties arise when it possesses "loosely associated" components, with the result that "a considerable change in one has negligible or no discernible effects on the other."⁴⁰ (In such instances, where is the line to be drawn between members and non-members of the system ?);

c) The third argument Easton uses, is based upon the fact that not all covariance between components would "intuitively meet the criteria of the system": often two entities appear to be related, but no explanation of the relation can be offered. (Thus, depending on the subjective judgement of two different observers, the same variables would constitute a member of the two mutually exclusive sets, systems and non-systems, at least until evidence was adduced to demonstrate the genuineness of the interdependence.⁴¹

From a methodological point of view, Easton concludes that it appears "sensible" to abandon the notion that political systems are given in nature. He contends that problems of analysis can be simplified greatly - without violating the data in any way - by postulating that any set of variables selected for description and explanation can be considered "a system of behaviour."⁴² Easton critically analyzes his approach: he suggests that the following question could be asked:

What is there to prevent us from stating that everything in the world is related to everything else, thereby combining all social life into one grand system ?⁴³

His answer, which Phillips⁴⁴ refers to as "most un-Hegelian", is that "Although there is no logical reason why this could not be done, it is most significant to point out that there is no positive reason for doing so." ⁴⁵

Easton's systems approach offers a new way of thinking, which subsequent political scientists have drawn upon in addressing old issues with new tools. It draws us away from a discussion of the way in which the political pie is divided and how it happens to get cut-up in one way rather than the other.⁴⁶ Easton highlights the need for a theoretical framework that facilitates an understanding of how the very pie itself comes into existence and alters its basic content and structure.⁴⁷ Systems, according to Easton,

offer a context in which partial theories of allocation may obtain greater meaning and significance without in the least seeking to deny the independent value of each in particular.⁴⁸

Easton later suggests that systems analysis is more than signaling the dynamics of a system: the interesting and theoretically vital consideration about political life is that it does work, and we can discover this by recognizing that through its "output" it may find a way to persist in, what he calls, a "potentially stressful environment".⁴⁹

Easton clearly articulates his view of systems in the world. He does not claim that it fully explains the functioning of political systems; neither does he claim that it offers a fire-proof set of concepts for achieving those ends. For Easton, the approach, hopefully takes us one step nearer towards achieving that end: it provides a useful framework for research; more so than a reductionist approach.

In a similar vein to David Easton, Kenneth Waltz⁵⁰ - writing in the 1970s - similarly rejects reductionist theories, favouring a systems-based approach, whilst at the same time, highlighting systems' deficiencies. Waltz contends that international politics cannot be understood by reductionist theories: with a reductionist approach, "the whole is understood by knowing the attributes and the interactions of its parts"⁵¹ - international outcomes are explained through elements and combinations of elements located at national or subnational levels⁵² - but such an approach is inappropriate and deficient when "outcomes are affected not only by the properties and interconnections of variables but also by the way in which they are organized."⁵³ If the organization of units affects their

behaviour and their interactions, then it follows that we cannot predict outcomes or understand them merely by knowing the characteristics, purposes, and interactions of a system's units. It seems logical therefore to adopt a systems approach. Waltz sets about conceiving political systems in ways compatible with usage in systems theory and in cybernetics.⁵⁴ There is a systems level and a unit level: at the unit level is the subject of conventional enquiry - the state and its interactions - and at the systems level is the social structure of the system. The mission of systems theory is to show how the two levels operate and interact, and that requires them marking off from each other.⁵⁵ For any approach or theory to be accurately termed "systemic", it must demonstrate how the systems level, or structure, is distinct from the level of interacting units: definitions of structure must omit the attributes and the relations of units, because it is only through doing this that we can distinguish changes of structure from changes that occur within it.⁵⁶ However, as Waltz later points out, "to say what is left out does not indicate what is to be put in."⁵⁷

Whilst Waltz concludes that international-political outcomes cannot be explained reductively, he also highlights how general systemic approaches mingle and confuse systems-level with unit-level causes. Both Waltz and Easton are aware of the deficiencies and limitations of a general systems approach, but they have also shown how useful it can be in terms of facilitating a deeper understanding of political behaviour. Within political science, there is not a vast array of literature on systems thinking, compared with the mass of literature on other concepts and approaches; however, it is important to recognize that ever since Morton Kaplan⁵⁸ used systems concepts in IR, there has been a growing interest in the contribution systems science could make to international politics. Interestingly enough, as Robert Flood and Ewart Carson point out, "the methodological changes in systems thinking" from HST to SST - as highlighted above - "have been reflected in IR", leading some researchers "to consider behaviour rather than structure".⁵⁹

2.4 The Total Quality Management Dimension

The above sections have highlighted the valuable contribution systems thinking can make to our understanding of political science. We have also examined TQM's origin, and discovered that it is derived from systems thinking. This section focuses on TQM and the concepts selected as methodological tools.

TQM is a means of managing an organization (institution) so that all its

mechanisms are market-responsive: customer-orientation is its primary organizational focus. "Quality" is meeting customer requirements every time, and it has wide implications since the customer demands may include availability, delivery, reliability, maintainability and cost-effectiveness. TQM is essentially a way of planning, organizing and understanding each organizational activity and recognizing that every individual has a part to play.

Quality matters. It permeates every part of organizational life, every process. A "process" or transaction is a transformation of a set of inputs - which can include actions and methods - into outputs, that satisfy customer demands, in the form of products, services or information. Everything we do is a process. The output from a process is that which is transferred to somewhere or to someone: the next customer. In order to produce an output (supply the service) which satisfies customer requirements, it is necessary to define, maintain and control the inputs to the process, which in turn may be supplied as output from an earlier process.⁶⁰ At each customer-supplier interface a "transformation" process occurs (Figure 2.), and every single task executed within the organization must be viewed as a process in this way. Quality is a means to an end: it is not a means in itself. The end, as Helga Drummond argues, is "continued viability".⁶¹

TQM comprises a number of concepts, and the two selected for this analysis are enumerated below:

Concept 1: "The Next Customer"

The above section highlighted the importance of the "customer". To achieve "quality" every member in the quality chain must identify and satisfy internal and external customer relationships. In the TQM context the term "customer" has a much wider significance than simply being an externality to a particular organization: customers are all those receiving the benefit of the work, action, activity of others⁶², and thus we are all customers and suppliers. Within TQM, it is generally agreed that customers can be divided into three standard groupings: internal and external customers, and end-users. It is important to recognize that although one can differentiate between the groups, there should be no discrimination in levels of service provided to them.

The "Transformation Process"

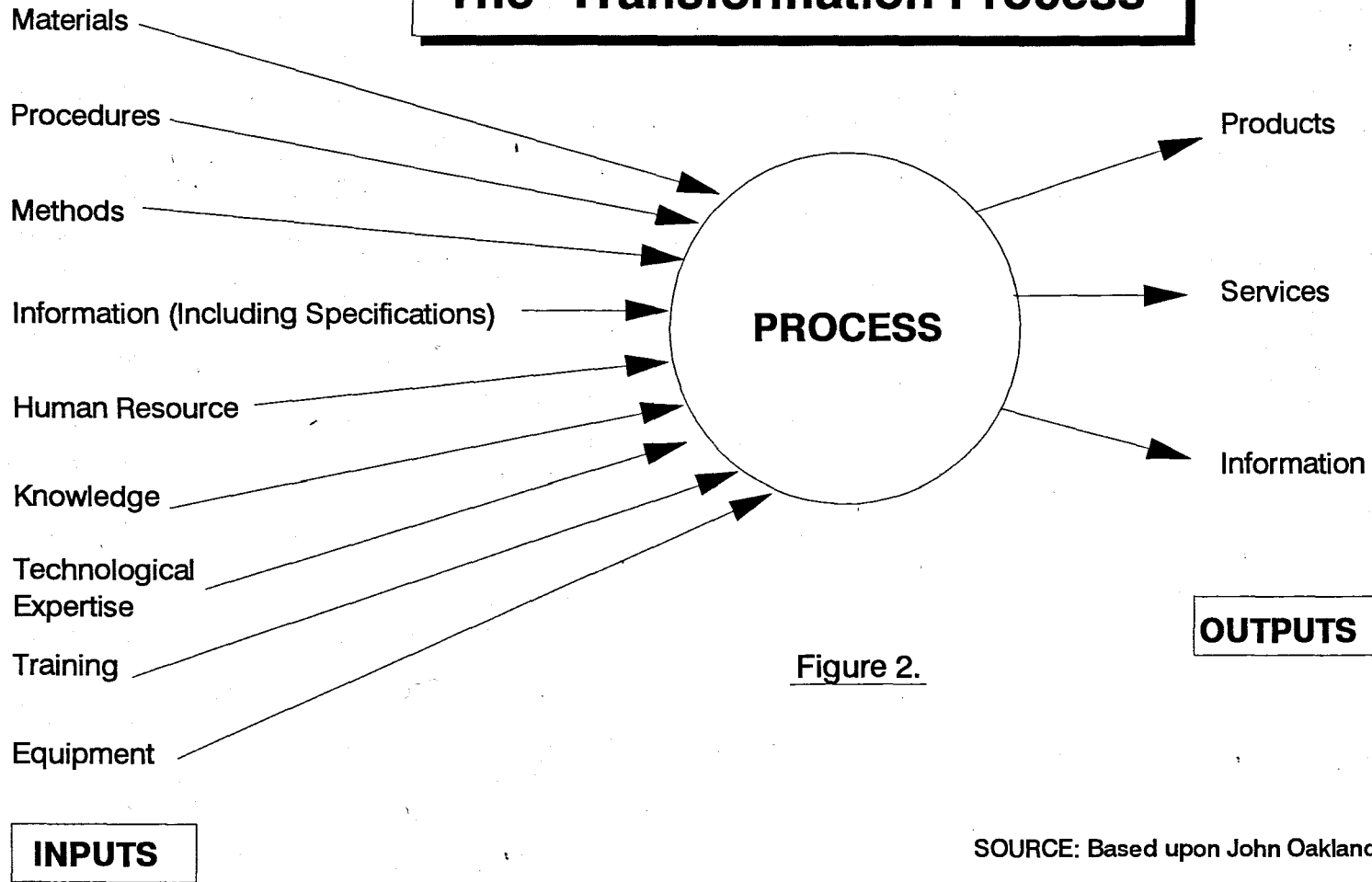


Figure 2.

SOURCE: Based upon John Oakland, op.cit.p.14.

a) Internal Customer

When the supplier-customer relationship is scrutinized, if both parties belong to the same organization - and share the same mission or vision statement - then they are defined as internal customers. Internal customers benefit from the "process" received from a fellow internal customer - and seek a temporary use of that output, until it has been successfully incorporated into their work, and is then passed on to the next customer. For the purposes of my research, the internal customers are all those agencies and committees within the institutions, whose competency includes procurement, regulatory mechanisms, defence trade, arms control, research & development, technology, and military-operational issues.

b) External Customers

These are individuals and entities outside the originating organization who obtain the benefit of its processes and transactions. They do not share the same mission or vision statement as the other customers they supply, or are supplied by. From the institutional perspective, the external customers can be sub-divided into three categories: national governments, and all parts of the governmental apparatus; other institutions with whom a particular organization conducts its business; and British aircraft companies.

c) End-Users

When TQM is employed in its more familiar territory - companies and improving the delivery of hardware outputs - it is generally argued that the "end-users" are the most ignorant people in the customer-supplier chain. It is contended that these people only buy solutions to problems, and are more concerned with the problem/need than with how it is achieved. It is also argued that the end-users do not always know what they want, and are thus unable to define their requirements adequately. However, in this analysis of the institutions' responses to the contracting defence industrial base - where defence and security issues are involved - we are dealing with an increasingly sophisticated and intelligent customer-base. Thus for example, in the military-operational chapter, the end-users are the Armed Forces - since they are the ultimate recipients of the military hardware - and they should certainly (in theory) be aware of what is operationally required, since they are more of an "expert customer". This is however also subject to debate, since they too can misread situations. Furthermore, given the increasing level of sophistication of modern weaponry, another problem arises, that of only the defence companies and their technical experts being equipped to operate, maintain and support

a piece of hardware. It was interesting to note that during the Gulf War, large numbers of defence company personnel were out in the field alongside military personnel, keeping equipment operational.

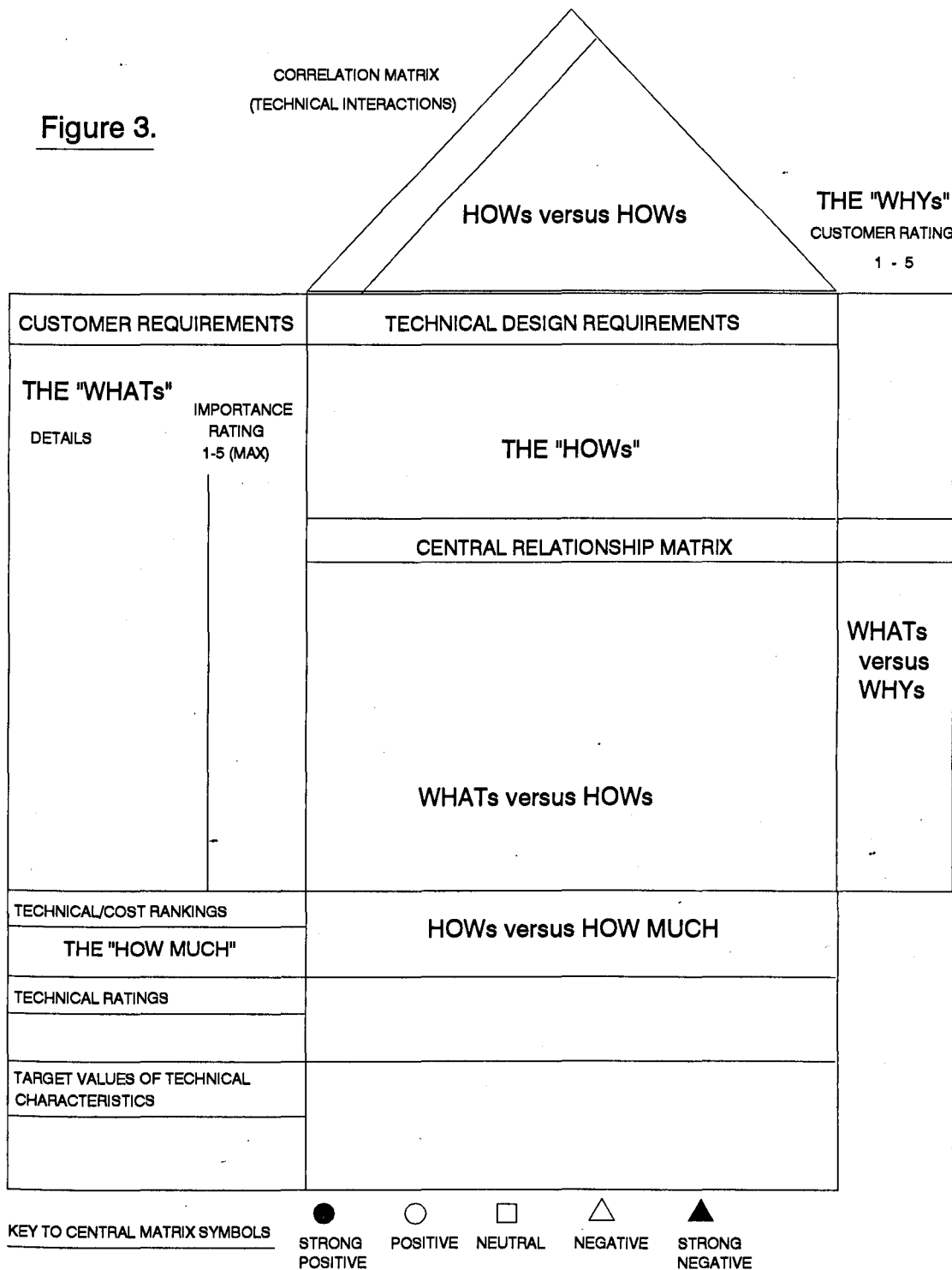
Customers, Quality Function Deployment and the "House of Quality"

From the above section, it is apparent that customer requirements have to be properly understood by supplier-organizations, and that certain technical demands are therefore placed upon the supplier. Quality Function Deployment (QFD) is a system for designing a production service, based upon customer demands, with the participation of all members of all functions of a supplier organization.⁶³ QFD involves asking key "Who?", "What?" and "How?" questions as part of the process of translating customer requirements into technical requirements. The initial stages in QFD lead to consideration of the service or product as a whole, and subsequent steps consider individual components. Each of the sub-services will also have a set of customer demands, and all of these obviously need to be compatible with the primary service provided.

The "House of Quality" (HoQ) (Figure 3. below) is the framework of QFD decision management.⁶⁴ It provides structure to the design and development cycle, and is often likened to the construction of a house because of the "whole" formed by matrices slotted together. The key to building the house is the focus on customer requirements (the "Whats"): these demands should drive the design and development processes, rather than innovation and technology imposing a certain product on the customer. The customer's requirements are placed on the left-hand side of the house, ranked in order of importance. To the right of the central matrix appears the customer's perception of the service, in relation to another supplier-organizations' service provision. The Customer's demands (the "Whats") are next converted into "Hows" - the technical design requirements - and are placed immediately above the central matrix. The central relationship matrix is, as John Oakland⁶⁵ describes it, the "working core" of the HoQ diagram: this is where the "Whats" are matched with the "Hows", and where each customer demand is systematically assessed against each design requirement. The nature of any relationship - strong positive, positive, neutral, negative and strong negative - is shown by the symbols (see Figure 3.) in the matrix.

Quality Function Deployment: The "House of Quality"

Figure 3.



The HoQ's roof indicates the interactions between the technical design requirements. Each characteristic is matched against the others, and the diagonal format allows the relationships to be displayed. It will become clear from the central matrix if there is more than one way to satisfy a particular customer demand, and the roof matrix will highlight if the technical requirements to achieve one customer requirement will have a negative effect on another technical issue. The very bottom of the HoQ shows the target values of the technical characteristics, which are expressed in physical terms

The HoQ will provide a useful device for ascertaining the correlation between customer demands and supplier capabilities. It will help us to identify structural and procedural inadequacies of the institutions as they strive to deliver a "quality" output. It should prove to be particularly useful in the military-operational domain, since the provision of a "defence" service is probably the most important function provided by the institutions. Through using a HoQ diagram, we will be able to establish the technical design requirements (the supplier traits necessary to provide the service), and ascertain which organizations would be incapable of delivering the "defence" service through inappropriate mechanisms. Even if a whole house is not constructed for each policy area under examination, it is apparent that the method and direction of enquiry used in the HoQ process will enhance greatly our understanding of institutional behaviour.

Concept 2: The "Cost of Quality" (CoQ)

At the heart of managing any institution or organization, as Witcher⁶⁶ highlights, is the question of how to co-ordinate all its resources - parts and people - so that they work together to achieve a common purpose. Of course, every part of an organization affects other parts, and is in turn affected by others. When an error is made, it is likely to multiply as the particular process moves on to the next stage, with increasingly dire consequences. Thus, in the military-operational environment, for example, catastrophic results can be produced, with the loss of lives and equipment. Within any organization, the CoQ is the shorthand formula for the accumulated costs incurred in achieving a quality product or service.

For the purposes of this research, Jon Choppin's five-step approach (Figure 4.) to classifying "Quality" costs⁶⁷ is used.

- 1) Differentiate between the direct costs of achieving Quality from the indirect, or consequential costs associated with failure.
(Quality Costs = Direct Costs + Indirect Costs)
- 2) Separate the costs of "getting it right" from the costs of "getting it wrong".
(Direct Quality Costs = Cost of Conformance + Cost of Non-Conformance) Explanation below.
- 3) Identify whether costs are incurred before, during or after the transaction or process. The cost of activities that take place during/after the process are called "appraisal" costs. Those costs occurring before, are referred to as "prevention" costs.
(Cost of Conformance = Prevention Costs + Appraisal Costs)
- 4) Separate the costs incurred before the particular process moves on to the next phase (the "internal failure" costs) from those failures which reach the customer ("external failure" costs).
(Cost of Non-Conformance = Internal Failure Costs + External Failure Costs)
- 5) Break down the indirect costs into such areas as lost opportunity costs, loss of prestige, and costs associated with loss of influence.

Figure 4. Understanding the Cost of Quality

To summarize, it is clear from the above that, the three main areas of cost to be identified, measured and improved are the Cost of Conformance, Cost of Non-Conformance and Cost of Lost Opportunities.

The Cost of Conformance comprises "prevention" costs - cost of activities that prevent failure from occurring - and includes planning and training. It also comprises "appraisal" costs (costs incurred in determining conformance with quality standards) which include inspecting, auditing and expediting because reports or parts are not delivered on time.

The Cost of Non-Conformance is an amalgam of "internal failure" costs - the cost of correcting services or products which do not meet quality standards prior to delivery to the customer - such as any form of re-work, with "external failure" costs - costs incurred when correcting a process after delivery of output to customer - such as installation of field retrofits and unplanned field service costs. It arguably also includes the costs of exceeding customer requirements: this is the cost incurred in providing information or services which are unnecessary or unimportant, and classic examples

include reports which are not read, and detailed analyses when estimates would suffice.

The Cost of Lost Opportunities - and its associated loss of prestige and influence - is, as John Bank⁶⁸ argues, perhaps the most difficult cost of quality to quantify. All result from an erosion of the existing customer base, and an inability to sustain growth levels, because of a failure to meet required quality standards. Thus for example, for an institution such as NATO - which represents both North American and European interests - an inability to deliver a quality output to its Euro-membership (national governments) could result in the European contingent looking to transfer functions to a distinctive Euro-agency instead. In that instance, there would be a diminished role for NATO in the international arena.

Taken together, the above quality costs can drain an organization of 20-30% of its revenue or turnover, and greatly affect its overall efficiency. The goal of TQM is to reduce the "Cost of Quality" by 50% and then to halve it over and over again. John Bank⁶⁹ raises an interesting question about terminology in the TQM domain. It is arguable whether these costs would be better classified as the "Cost of Poor Quality" or even as the "Cost of Non-Conformance". Whilst on the other hand, there is a valid argument for referring to the cost of poor quality, there are much stronger arguments for using the CoQ as the all-embracing category. Logically, quality costs include "prevention", which is not a cost of poor quality; on the contrary, prevention costs are incurred in getting it right first time. Therefore, the CoQ is the more accurate term of the three.

2.5 The Justification For a TQM-based Strategy

There are a number of reasons for my decision to employ TQM as a policy analysis "enhancer", and these reasons or assertions will be on trial during the examination of institutional behaviour. The five assertions are enumerated below:

- a) I perceived a requirement for an approach that enabled me to assess the "quality" of institutional decision-making, which was flexible enough to target internal processes and procedures and also specific actors. I contend that TQM will satisfy that requirement, through facilitating a study of the degree of communication and liaison at an inter- and intra-institutional level;

- b) TQM will emphasize the important role institutional relationships play in our understanding of institutional output. Through emphasizing the need for effective management of these relationships at all levels on all issues, TQM will set a new agenda of questions;
- c) TQM will play an evaluative role, highlighting deficiencies in institutional philosophies, procedures and processes;
- d) I believe that TQM will also provide a prescriptive element - specifically via the CoQ vehicle - identifying and prioritizing "processes" (activities) which require improvement;
- e) I contend that this "unique" utilization of TQM concepts as methodological tools will also provide us with an insight into the nature of TQM itself, highlighting strengths, weaknesses and limitations.

In addition to the above claims, it should also be recognized that - given the dramatic changes in the international arena - there is a case for arguing that non-traditional tools such as TQM are most suitable for this type of research, since they add a degree of dynamism, flexibility and fluidity to the more common approaches which are often imbued with traditional perspectives and biases.

This research has an innovative quality, in that it is seeking to integrate a study of the British aircraft (defence) procurement process with selected tenets of TQM. It represents a novel and exciting application of TQM as an enhancement of established political science methods. It facilitates a broader study of the institutional mechanisms and the multifarious customer-supplier networks that exist. It will provide us with a detailed examination of institutional relationships and a better understanding of the merits of TQM in inter-disciplinary research.

2.6 Hypothesis

Having outlined above the methodological and conceptual approaches that will be employed in this examination of institutional behaviour, I wish to focus here on my hypothesis. There are two major reasons why I am discussing this after the TQM section. Firstly, on the substantive level - the institutional and defence aerospace level - TQM will set its own unique agenda in terms of the line of questioning and directional indicators it provides. Secondly, because I believe that through applying TQM in such an analytical manner, my research may in fact tell us something about the nature of TQM itself, highlighting deficiencies within the approach - specifically its promotion of "continuous

improvement" and "internal customerization"⁷⁰ - and perhaps the need to go beyond it. Regarding the substantive part of my research, there are a number of pressing questions which will be addressed, and these are centred on the extent to which the institutional behaviour has changed in the post-Cold War era - in the realm of defence aerospace - and to what extent institutional initiatives/responses can be classified as "quality" output? Through examining inputs and considering the structural composition of the institutions and their sub-systems, we should be able to ascertain whether these institutions are capable of producing a "quality" output. It is a central contention of this thesis that, based upon our understanding of systems thinking, the overall performance of the organizations under scrutiny will amount to more (in some instances less) than the sum of its parts; instead being the interaction of its parts. Another major contention is that the existence of institutional proliferation in the post-Cold War security arena could in fact lead to a decline in the provision of "quality" output in the international arena, due to the problems of institutional bickering, confrontation, and duplication of effort and resource at the systems and sub-systems level.

2.7 Data Collection

In the social sciences it is generally acknowledged that data is obtained in either formal or informal settings, and involves either verbal (oral and written) or non-verbal responses.⁷¹ There are four major forms of data collection: observational methods; survey research; secondary data analysis and qualitative research. In recognition of the fact that there is a certain degree of "method specificity"⁷² in each of the above forms, and that consequently there are advantages in "triangulating" methods, whenever feasible - that is: using more than one form of data collection - I decided to employ a combination of survey methods and secondary data analysis, juxtaposed with earlier field work - qualitative research - experience gained whilst working in the defence aerospace industry.

Regarding survey research, I refrained from using questionnaires, because of their inherent deficiencies: lower response rates and the inflexibility of questioning. Whilst questionnaires undoubtedly have some advantages, standardization, for example, I considered that my research project lent itself best to interviews, since I wanted the opportunity to follow-up questions with penetrating supplementaries. Consequently, I opted for focused non-schedule-structured interviews, which was attractive in that it offered flexibility in the questioning process (opportunities to probe), provided me with control of the interview situation and the higher response rate (less opportunities to avoid

questions). In order to maximize the effectiveness of the interview, I interviewed across a broad spectrum of organizations, including senior personnel from the security institutions, defence manufacturers' associations, and aerospace companies. A full list of interviewees is provided in the Bibliography. Whilst I accept that the lack of standardization in this particular form of data collection does make interviewing more vulnerable to interviewer bias, it is hoped that the following safeguards which I built-in to the process will combine to militate against unwelcome excesses of subjectivity: the phraseology of questions posed, interview technique (enhanced by research interview training), and the fact that attributable material and my analyzes from the interviews will be approved by the interviewees prior to submission of the thesis.

Secondary data analysis supplemented my primary data analysis of institutional documentation. Government reports and those commissioned by defence companies and defence manufacturers's associations were all examined.

2.8 Literature Review

An extensive literature review was conducted within the first six months of this project and due to the burgeoning literature on institutions/defence industries, it became an on-going exercise.

Regarding "primary" materials, British official papers, such as Statements On The Defence Estimates (1990-1994), Defence Committee Reports, Trade and Industry Committee Reports on the "British Aerospace Industry" (1993, 563-I and II) and DTI Reports on CARAD (1990-1993) were all examined. Comprehensive use was made of institutional documentation including EC Commission Reports and European Parliament Working Documents (1975-1992), NATO unclassified documents including the recently agreed "Code of Conduct", reports and communique from the WEU/IEPG (1987-1993). In addition, reports and documentation from the British aircraft sector were also used extensively, including company Annual Reports, specialist in-house materials and trade association documentation.

Regarding "secondary" materials, there are, as alluded to above, a multiplicity of theoretical approaches/models for use in conducting research in Politics/IR and for examining institutional behaviour, which is thus reflected in the established literature. To name but a few, there is the power politics school (those seeking additional information should see, for example, H.J. Morgenthau, **Politics Among Nations**, 1948), decision-making theory and the "bureaucratic politics" model (see for example works by G.T. Allison and M.T. Halperin), communications theory (K. Deutsch), and those based upon the concept of "clubs" and collective benefits. Each approach has its respective strengths and weaknesses. Each has a specific focus or orientation. My preference was for traditional policy analysis with TQM (a systems-based approach) which necessitated an examination of systems thinking in politics. The works of David Easton (specifically **A Framework For Political Analysis** and **A Systems Analysis Of Political Life**, both 1965) were examined. Additionally, I consulted extensively the TQM literature including definitive works by "Quality Gurus", such as W. Edwards Deming (**Out Of The Crisis: Quality, Productivity And Competitive Position**, 1982).

For secondary materials relating to the institutions, defence and the aircraft

industry, a number of sources were used, such as papers from the Royal United Services Institute and materials from SIPRI. Those interested in works on the history of the British aircraft industry may find the following useful: Charles Gardner's **British Aircraft Corporation** (London: B.T. Batsford Ltd, 1981); Bill Gunston, **Plane Speaking** (Yeovil, Somerset: Patrick Stevens Limited, 1991); Keith Hayward, **The World Aerospace Industry - Collaboration And Competition** (London: Gerald Duckworth & Co. Ltd/RUSI, 1994) and Arthur Reed, **Britain's Aircraft Industry - What Went Right ? What Went Wrong ?** (London: J.M. Dent & Sons Limited, 1973). Those seeking information on the the defence economics dimension are advised to see especially the Vol.4, No.2, (1993) issue of **Defence Economics**, edited by Sue Willett, which is a special issue on the European Defence Industry.

From the existing literature surveyed, it is apparent that whilst there is indeed material on institutions, defence or aerospace, there is nothing which constitutes an integrated study of post-Cold War institutional behaviour with aerospace procurement and selected tenets of Total Quality Management. It is therefore arguable that my research, which is based upon traditional policy analysis with a systems orientation, provides something new - a "different" insight into systems and sub-systems in the international arena than the current literature provides.

INTRODUCTION ENDNOTES

1. David Easton, **A SYSTEMS ANALYSIS OF POLITICAL LIFE**, (New York: John Wiley & Sons, Inc., 1965), p.472.
2. Helmut Schmidt, *"The Search for Global Order: The Problems of Survival"*, **SECURITY DIALOGUE**, Vol.23, No.3, September 1992, p.41.
3. The origin of TQM is usually ascribed to the Japanese quest for quality improvements in the 1950s, and the advice they received from W.E.Deming (see Deming, **OUT OF THE CRISIS: QUALITY, PRODUCTIVITY AND COMPETITIVE POSITION**, Massachusetts: MIT Center for Advanced Engineering, 1982), and J.Juran (see Juran and Gryna, Jr., **QUALITY PLANNING AND ANALYSIS**, New York: McGraw Hill Book Company, 1980, 2nd ed., and also see Juran, **JURAN ON LEADERSHIP FOR QUALITY**, New York: Free Press, 1989), who are regarded as the "founding fathers" of Quality Management. Their advice became known as "Total Quality Control" (TQC), and was later chronicled by K.Ishikawa (see K. Ishikawa, **WHAT IS TOTAL QUALITY CONTROL ? THE JAPANESE WAY**, Translated by D.J.Lu, New Jersey: Prentice-Hall Inc., 1985), and A.Feigenbaum (see Feigenbaum, **TOTAL QUALITY CONTROL**, New York: McGraw-Hill Book Company Inc., 1961), to name but a few authors. As a management tool, quality control has produced outstanding improvements in product quality and design, and substantial reductions in operating costs and losses in a number of firms. In the 1980s, quality control evolved into Total Quality Management, with a wider remit, and with a strong commitment to customer-orientation.
4. A term used by Russell Ackoff, **CREATING THE CORPORATE FUTURE**, (New York: John Wiley & Sons, Inc., 1981), pp.8-10.
5. As cited in Russell Ackoff, *ibid.* p.16.
6. *ibid.*
7. *ibid.* p.17.
8. Robert Flood, **BEYOND TQM**, (Chichester: John Wiley & Sons Ltd., 1993), p.87. For a succinct account of organicism and biology, see D.C.Phillips, **HOLISTIC THOUGHT IN SOCIAL SCIENCE**, (London: The Macmillan Press Ltd., 1977), pp.22-29.
9. Robert Flood, *ibid.* p.88.
10. David Easton, *op.cit.* p.485.
11. Robert Flood, *op.cit.* p.88.
12. *ibid.*
13. *ibid.*
14. Peter Checkland, *"The origin and nature of "hard" systems thinking"*, **JOURNAL OF APPLIED SYSTEMS ANALYSIS**, (Lancaster: University of Lancaster, Department of Systems), Vol.5, No.2, May 1978, p.109.
15. Michael Jackson, *"Modernism, Post-Modernism and Contemporary Systems Thinking"*, in Robert Flood and Michael Jackson (eds), **CRITICAL SYSTEMS THINKING: DIRECTED READINGS**, (Chichester: John Wiley & Sons Ltd., 1991), pp.293-294.
16. As highlighted by Michael Jackson, *ibid.* p.294.
17. See Stafford Beer, **THE HEART OF ENTERPRISE**, (Chichester: John Wiley & Sons Ltd., 1979); and also see Stafford Beer, **DIAGNOSING THE SYSTEM FOR ORGANIZATIONS**, (Chichester: John Wiley & Sons Ltd., 1988 Reprint).
18. See Robert Flood, *op.cit.* pp.111-126.
19. The process of management has five main functions: "implementation", what the system is doing; "co-ordination", co-operation between the parts for the benefit of the whole; "control", achieving a guarantee of internal stability; "intelligence", details opportunities and constraints in the external environment; and "policy", creative strategic decisions about viability and quality are made. See Robert Flood, *ibid.* pp.111-114.
20. *ibid.* p.111.
21. See C.West Churchman, **THE SYSTEMS APPROACH**, (New York: Dell, 1979, 2nd ed.).

22. See Russell Ackoff, **CREATING THE CORPORATE FUTURE**, op.cit.
23. See Peter Checkland, **SYSTEMS THINKING, SYSTEMS PRACTICE**, (Chichester: John Wiley & Sons Ltd., 1981); and also see Peter Checkland and Jim Scholes, **SOFT SYSTEMS METHODOLOGY IN ACTION**, (Chichester: John Wiley & Sons Ltd., 1990).
24. Michael Jackson, op.cit.p.297.
25. The source for Figure 1. is Table 1. in Robert Flood and Michael Jackson (eds), **CRITICAL SYSTEMS THINKING**, op.cit.p.17.
26. See Werner Ulrich, **CRITICAL HEURISTICS OF SOCIAL PLANNING: A NEW APPROACH TO PRACTICAL PHILOSOPHY**, (Bern: Haupt, 1983).
27. See for example, Michael Jackson, **SYSTEMS METHODOLOGY FOR THE MANAGEMENT SCIENCES**, (New York: Plenum, 1991).
28. See Robert Flood, **LIBERATING SYSTEMS THEORY**, (New York: Plenum, 1990); and also see Robert Flood and Michael Jackson, **CREATIVE PROBLEM SOLVING: TOTAL SYSTEMS INTERVENTION**, (Chichester: John Wiley & Sons Ltd., 1991).
29. These are enumerated and discussed succinctly by Michael Jackson, in Robert Flood and Michael Jackson (eds), **CRITICAL SYSTEMS THINKING**, op.cit.p.298.
30. For details see Robert Flood and Michael Jackson, **CREATIVE PROBLEM SOLVING**, op.cit.
31. Robert Flood, **BEYOND TQM**, op.cit.p.96.
32. Ramses Fuenmayor, "*Between Systems Thinking and Systems Practice*", in Robert Flood and Michael Jackson (eds), **CRITICAL SYSTEMS THINKING**, op.cit.pp.229-230, points out that the very presence of the intuition of "wholeness" gives rise to 2 different strands of meaning and intention: pragmatic and cogitative. He explains that in a pragmatic context, the intuition of wholeness means that changes impinging upon the parts could have an overall effect very different from that which they have on the parts by themselves - improvement of the functioning of the parts does not necessarily mean functional improvement of the whole. (p.229) For our analytical purposes, it is very important to recognize this fact, for in TQM, there is occasionally a tendency to concentrate on improvements in sections of an organization, in the hope of improving the overall capacity of the organization. Regarding the second strand, the cogitative meaning and intention, fundamental questions arise, such as "What is wholeness ?", and "How is it possible that the whole transcends its parts ?". In this cogitative ground, we find ourselves questioning and theorizing, and not necessarily finding any answers.
33. D.C.Phillips, op.cit.p.75.
34. David Easton, **A FRAMEWORK FOR POLITICAL ANALYSIS**, (New Jersey: Prentice Hall, Inc., 1965).
35. *ibid.*
36. D.C.Phillips, op.cit.p.76.
37. David Easton, **A FRAMEWORK FOR POLITICAL ANALYSIS**, op.cit.p.23.
38. *ibid.p.27.*
39. *ibid.pp.29-30.*
40. *ibid.p.29.*
41. *ibid.p.30.*
42. *ibid.*
43. *ibid.p.31.*
44. D.C.Phillips, op.cit.p.78.
45. David Easton, **A FRAMEWORK FOR POLITICAL ANALYSIS**, op.cit.p.31.
46. David Easton, **A SYSTEMS ANALYSIS OF POLITICAL LIFE**, op.cit.p.475.
47. *ibid.*
48. *ibid.p.476.*
49. *ibid.p.477.*

50. Kenneth Waltz, **THEORY OF INTERNATIONAL POLITICS**, (New York: McGraw-Hill Inc., 1979).
51. *ibid.* p.18.
52. *ibid.* p.60.
53. *ibid.* p.39.
54. It is important to recognize that Waltz is not the first to value the cybernetics' dimension: Karl Deutsch, in **THE NERVES OF GOVERNMENT**, (New York: Free Press, 1963), applied cybernetic concepts to political behaviour. Deutsch's work made a significant contribution to systems and IR in that it represented an original attempt to discuss IR from a non-state-centric power perspective: Deutsch discards the "divide" between politics within states and international relations between states, in favour of a systemic approach.
55. Kenneth Waltz, *op.cit.* p.40.
56. *ibid.*
57. *ibid.* p.80.
58. See Morton Kaplan, **SYSTEMS AND PROCESS IN INTERNATIONAL POLITICS**, (New York: John Wiley & Sons Inc., 1957).
59. Robert Flood and Ewart Carson, **DEALING WITH COMPLEXITY: AN INTRODUCTION TO THE THEORY AND APPLICATION OF SYSTEMS SCIENCE**, (New York: Plenum, 1988), p.167.
60. See John Oakland, **TOTAL QUALITY MANAGEMENT: THE ROUTE TO IMPROVING PERFORMANCE**, (Oxford: Butterworth-Heinemann Ltd., 1993, 2nd ed.), p.14.
61. Helga Drummond, **THE QUALITY MOVEMENT: WHAT TOTAL QUALITY MANAGEMENT IS REALLY ALL ABOUT ?**, (London: Kogan Page Limited, 1993 Reprint), p.15.
62. See for example, Jon Choppin, **QUALITY THROUGH PEOPLE: A BLUEPRINT FOR PROACTIVE QUALITY MANAGEMENT**, (Bedford: IFS Publications, UK, 1991), p.291.
63. See John Oakland, *op.cit.* p.46.
64. This originated in Japan in 1972 at Mitsubishi's Kobe shipyard, but it has been developed in various ways by Toyota and its suppliers, and also by many other organizations; see John Oakland, *ibid.* p.45.
65. *ibid.* pp.49-50.
66. B.Witcher, **THE ROLE OF TOTAL QUALITY MANAGEMENT IN THE CREATION OF MARKET RESPONSIVE ORGANISATION**, (Durham: Durham University Business School, 1990), Occasional Paper 9173, p.5.
67. Jon Choppin, *op.cit.* pp.271-273.
68. See John Bank, **THE ESSENCE OF TOTAL QUALITY MANAGEMENT**, (New York: Prentice-Hall, 1992).
69. *ibid.* pp.28-29.
70. "Internal Customerization" is a term I coined for describing the situation in organizations where the "internal customer" ethos has been so religiously applied - too bureaucratic, and comprising too many committees and agencies whose sole purpose is to serve other committees and agencies - that it becomes too distant from the "external customer", and has consequently lost sight of its external focus.
71. Chava Frankfort-Nachmias and David Nachmias, **RESEARCH METHODS IN THE SOCIAL SCIENCES**, (London: Edward Arnold/St. Martin's Press, 1992, 4th ed.), p.198.
72. *ibid.* p.197.

Part I

GEO-STRATEGIC ENVIRONMENT

CHAPTER ONE

CONTEXT

There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of a thing...(Machiavelli, THE PRINCE)

INTRODUCTION

The 1989 revolutions in Eastern Europe presaged a series of events, which saw the collapse of the Communist regimes, the reunification of Germany, and the eventual dissolution of the USSR. Although these events heralded the dawn of a new era in European security, they also fundamentally attacked the premises upon which Western security arrangements had developed since the Second World War. They subsequently became the catalyst for driving a review of potential re-configurations of Europe's institutional geometry. Prior to the fragmentation of the USSR, the existence of a more "open" Soviet approach to international diplomacy, under Premier Gorbachev, facilitated great strides in arms reduction negotiations leading to the conclusion of the Conventional Forces in Europe (CFE) agreement in November 1990, discussed in Chapter Five.

The central aim of this chapter is to provide background information on the post-1989 geo-strategic environment, thus facilitating understanding of the opportunities and risks confronting institutional and aviation industrial actors. Section 1 focuses on initial institutional challenges and developments. In section 2, the significance of threat perception is examined. Section 3 assesses defence expenditure and increasing national budgetary pressures. Section 4 provides an overview of the aerospace industry highlighting developments within civil and military aviation, in addition to examining corporate re-structuring. Background information on the fixed-wing and rotary-wing aircraft industry is provided in section 5. Section 6 focuses on British aerospace collaboration examining ventures with European and American partners. In section 7, the

aerospace and socio-economic dimension is discussed.

1. THE POST-COLD WAR ENVIRONMENT: INSTITUTIONAL FIRST STEPS

1.1 The North Atlantic Treaty Organization

The uncertainty and vacuum that followed the break up of the USSR and Warsaw Treaty Organization (WTO) presented both risks and opportunities to NATO. At their London meeting, on 5-6 July 1990, Alliance heads of state and government were concerned primarily with initiatives to help discard the "Cold War" image -so as to gain Soviet acceptance of German membership in a revamped NATO - and to launch an extensive review of Alliance strategy and force structure appropriate for the changing environment. Evidence of the success of NATO's strategy can be seen in the fact that within two weeks of the summit, Chancellor Kohl and President Gorbachev had reached an agreement on the future military status of Germany.¹

Although NATO's London Declaration lacked substance vis-a-vis the respective American and NATO-European roles in the future security framework, it did - largely due to French insistence - recognize that EC developments towards political union,

including the development of a European identity in the domain of security, will also contribute to Atlantic solidarity and to the establishment of a just and lasting peace throughout the whole of Europe.²

In December, whilst the EC was heavily engaged in discussions on a foreign and security policy, the North Atlantic Council (NAC), concluded that:

The adaptation of [the] alliance to new circumstances will include enhancing the role of the European allies with a view to ensuring a full and equitable sharing of leadership and responsibilities between Europe and North America.³

Whilst the communique made reference to the European integration process and the development of European security co-operation, it did not, as Catherine Guicherd⁴ highlights, spell out what the allies thought the framework for European defence co-operation should be. This is hardly surprising given the uncertainty in the post-Cold War environment, affecting all institutions in terms of remit and future strategy.

1.2 The European Community

As 1989-90 saw the disintegration of Eastern Europe, those Western European passengers on the EC train were busying themselves with efforts towards greater Western integration, which would culminate in the successful fulfilment of the ambitious "1992 Single Market" programme. Of course, the events in the East had a direct impact upon the "deepening" and "widening" polemic within the Community, and the EC soon found itself embroiled in a major factional debate. One side, led by then British Prime Minister, Margaret Thatcher - strongly supported by Germany and Denmark - contended that the EC should refrain from measures that would prevent membership at the earliest opportunity of other European nations, including the EFTA⁵ members and the newly-emerging democratic nations of the East. However, this was a minority view. The majority of the governments - as well as the Commission - argued that the best way to cope with change was to accelerate integration within the existing EC membership, in order to develop a unified and consistent response to the new situation. Cynics argued that the EC was merely playing for time.

When German Chancellor Kohl announced his ten-point plan for German reunification on 28 November 1989 - without consulting any other European government - it became blatantly obvious to the EC that they lacked the power to stem the process of change. The only option left, as Catherine Guicherd⁶ highlights, was for the Community to give themselves the institutional means to manage the situation in order to minimize, at best avoid, potentially damaging consequences. Germany's partners feared two possible scenarios: either being overwhelmed by the ascendancy of an economic giant in the centre of Europe, or the new Germany severing its Western ties for a new partnership with its Eastern neighbours.

Commission President Delors argued that a political dimension was needed to sustain European integration and to cope with the pressures imposed on the EC by the rapid changes in Eastern Europe.⁷ The necessity of accelerating European integration became apparent for most EC governments after the results of the East German elections, in March 1990, in which Kohl's plan for early unification received an unambiguous boost.

As the EC furthered its integration efforts - attempting to re-organize itself to cope with the changing face of Europe - Iraq invaded Kuwait on 2 August 1990, creating

additional problems for institutions already under immense strain. The operational aspects and the role of institutions such as the WEU are discussed below. Although the Community denounced the invasion by Saddam Hussein's forces - and supported the trade embargo against Iraq - it failed to develop a joint diplomatic approach to the conflict. Furthermore, its mandate prevented consideration of military action. Whilst there was a last-minute EC attempt to hammer out a diplomatic solution before the United Nations' mandated deadline of 15 January 1991, this was ignored by Iraq, and coalition forces mobilized under another umbrella.

From a TQM perspective, a number of issues and searching questions arise from the inability of the Europeans to agree on a common response to the Gulf War. Firstly, consideration has to be given to the EC's machinery: can it be blamed for failing to act effectively in a particular sphere, if it was created in such a form that in reality inhibits action? In TQM terms, we are referring to a built-in cost of non-conformance. In other words, apart from the EC's mandate acting as a restraining mechanism, the fact that the Community was born out of economic agreements - arguably weaker foundation stones than a hard security threat - meant that it could never perform effectively in the security field. The Europeans, faced with a serious challenge - outside of the NATO treaty area - had reacted in a typically "national" fashion. For the British, and her Trans-Atlantic cousins, the EC's ineptitude exposed the fallacy of the dream of European Political Union (EPU), at least the foreign and security policy aspect. Additional factors which contributed towards the non-appearance of the EC as a coherent international actor, were Belgium's refusal to sell ammunition to the British Army,⁸ and by the fact that only the British and French were prepared to commit themselves fully to military action. The EC debacle was seen by many in Britain and America as evidence of how illogical a move it would be to hand over defence and security to an institution which seemed unable to reconcile powerful differences of national interests.

The second issue requiring investigation, which is linked to the above EC failure, is the extent to which the EC's near absence in the conflict should be interpreted not so much as a setback to European integration, but rather as a powerful incentive to accelerate it. The argument was powerfully reflected in Delors' address to the IISS, who argued that the creation of a European security and defence identity was now more important than ever.⁹ The good performance of the WEU, however, firstly in the trade embargo, and later in the co-ordination between EC and WEU ministerial meetings gave

a welcome boost to the idea of a European security identity. It is arguable that the EC's inability to act in this area as a single player was an "external failure cost" passed on to its members which, somewhat ironically, had the effect of encouraging Euro-defence identity seekers rather than condemning them and their aspirations, once and for all, to the annals of history.

1.3 The Western European Union

As alluded to above, the WEU enjoyed operational successes in the international arena in the 1980s, after years of being dormant. Its revitalization owes much to the failure of plans to give the EC a military-security face at that time.

Although the 1987 mine-hunting operations in the Gulf had a limited scope - in terms of the level of participation of member-countries, and in the missions performed - perhaps of greater importance was their significant symbolic value: it was the first coordinated WEU military activity; and it also laid the foundation stones for a greater involvement in the military enforcement of the arms embargo against Iraq in 1990. On 21 August 1990, WEU Foreign and Defence Ministers met in Paris, with the express objective of defining co-operation guidelines in the Gulf. One week later, meeting for the first time in WEU history, the institution's Chiefs of Defence Staff translated these guidelines into practical measures. It is estimated that by 27 January 1991, the WEU member-countries were responsible for 70% of all embargo actions against Iraq.¹⁰

A major consequence of the Gulf War was that it not only opened up significantly the discussions on interlocking institutions, but also rekindled the debate on NATO's "Out of Area" (OOA) capacity. NATO was not involved as such in the Gulf War, except through a small air component of its multinational Allied Mobile Force (AMF)¹¹ sent to Turkey. The Gulf experience demonstrated that the WEU could assume operational responsibilities. It also focused attention on the EC-WEU relationship. Between 6-7 October 1990, EC Foreign Ministers, meeting in Venice, debated the military options to be undertaken under WEU auspices in the Gulf. When the UN deadline for the use of force against Iraq expired on 15 January 1991, WEU and EC foreign Ministers met in sequence on 17 January, reinforcing the view that the WEU could become the embryo of a future European defence and security organization. The working relationship between the two organizations strengthened in April 1991, when EC Foreign Ministers decided to entrust the WEU with the coordination of the EC's humanitarian aid to the Kurdish

refugees.¹²

2. THE SIGNIFICANCE OF THREAT PERCEPTION

2.1 Introduction

During the Cold War, the USSR's expansionist tendencies were veiled in the form of a nation surrounded by aggressive Western forces: threat (mis)perception of a hostile Western alliance was an important tool used by the WP leadership to justify increasingly higher levels of military expenditure. These increases came at a time when in real terms Western expenditure on defence was decreasing, apart from occasional rises which are examined below. It is estimated that at least 70% of global military expenditure during this period related to WP and NATO countries, but by far the largest share was that of the former USSR and its satellites.¹³

The collapse of Communism signified the exit of the monolithic Soviet threat, but it is arguable that this is not the final exit since there are no guarantees against the future appearance of an aggressive Russia led by extremists. The section below provides a brief "snap-shot" of the new international arena, in terms of assessing how changes in threat-perception will, and are, influencing changes in "thinking" at the Alliance and British level.

2.2 An Alliance Without Enemies ?

Since NATO's foundation in 1949 the evolution of Alliance strategic doctrine has been driven by one essential aim: safeguarding the freedom and security of its members by political and military means, in accordance with the principles of the United Nations Charter. NATO is a purely defensive organization, and its primary mission always has been to deter aggression. For most of its existence, the overwhelming threat to its members' security emanated from the WTO. Consequently, most of NATO's time was spent monitoring threats from the East, conventional force levels (high imbalance, favouring the WTO), and nuclear weapons, to name but a few areas. As soon as this threat disappeared, NATO immediately began a review process.

NATO's fundamental review of strategy commenced at the London Summit in July 1990, and was successfully completed at the Rome Meeting, November 1991, at which NATO's "New Strategic Concept" (NSC) was adopted. Whilst reflecting changes

in the international environment, it also re-affirmed NATO's pledge to deter aggression against its members and its commitment to peace:

The Alliance is purely defensive in purpose: none of its weapons will ever be used except in self-defence, and it does not consider itself to be anyone's adversary.¹⁴

Although the former USSR no longer represents a military threat to NATO, the continued existence of global "risks" necessitates the maintenance of a NATO-type structure adapting to the challenges of the post-Cold War environment. In a world full of crises, where history is occasionally forgotten all too quickly, and uncertainty and unpredictability dominate, NATO remains solid, serving its main strategic purpose: to maintain the common defence and security of its member-countries. In the words of Manfred Worner:

NATO serves as the insurance policy against the remaining risks and new dangers. Once dissolved an effective Alliance could not be recreated overnight.¹⁵

2.3 The United Kingdom and Threat Perception

Britain's defence posture has to be viewed within the NATO context, but it is important to recognize that British policy has not been geared to combatting one threat alone. However, this does not detract from the fact that for over forty years, the main threat perceived was from the Soviet Union.

As the Communist regimes in the East fell, the obvious security concerns with perceived risks of a return to the status quo ante, were shared by all NATO members, which resulted in words of caution in the West accompanying the euphoria of the East. In January 1990, the British Defence Secretary, Tom King, was reported as saying that whilst Britain welcomed developments in Eastern Europe that change was not irreversible.¹⁶ The government's 1990 Defence White Paper re-inforced the need for caution in approaching the remarkable changes, largely unleashed by President Gorbachev,

especially since political shifts can happen - or be reversed - much faster than defence provision can be changed, run down or rebuilt.¹⁷

These were perfectly logical statements to make, since the West was still trying to assess the impact of, and likely sustainability of, the dramatic changes in the East.

In the 1992 Statement On The Defence Estimates, the government acknowledged that the possibility of the kind of East-West conflict that threatened Europe in the past has disappeared, but stressed that allowance should be made for uncertainty over future developments in the former USSR, should their reform processes not proceed well:

an enormous concentration of conventional, nuclear and chemical warfare capabilities ... could again come under the control of one or more Governments either not well-disposed or hostile to the West.¹⁸

In view of the risks of ethnic and territorial conflicts in Central and Eastern Europe - as epitomized by the bloodbath in the Balkans - it is clear that the world has not become a conflict-free zone following the Cold War's conclusion. There are dangers to Britain and her allies from a number of sources: the proliferation of ballistic weapons, weapons of mass destruction, and increasingly sophisticated conventional weapons from outside Europe.¹⁹ Defence structures need to be flexible enough to meet the various risks that exist today, and potentially exist tomorrow. However, given the fact that defence spending is under heavy budgetary pressures (discussed below), any reductions will affect the capability of our forces to perform the increasing number, and range, of missions required of them in the new environment.

3. DEFENCE EXPENDITURE AND BUDGETARY PRESSURES

3.1 Introduction

The beginning of the 1980s witnessed a significant increase in military expenditure, as international tensions intensified.²⁰ In the latter part of the 1980s, defence expenditure declined as East-West relations improved, and there was a renewed political impetus behind nuclear and conventional force reductions.²¹ Figure 5. provides information on UK and NATO defence expenditure.

Defence Expenditure as Percentage of GDP

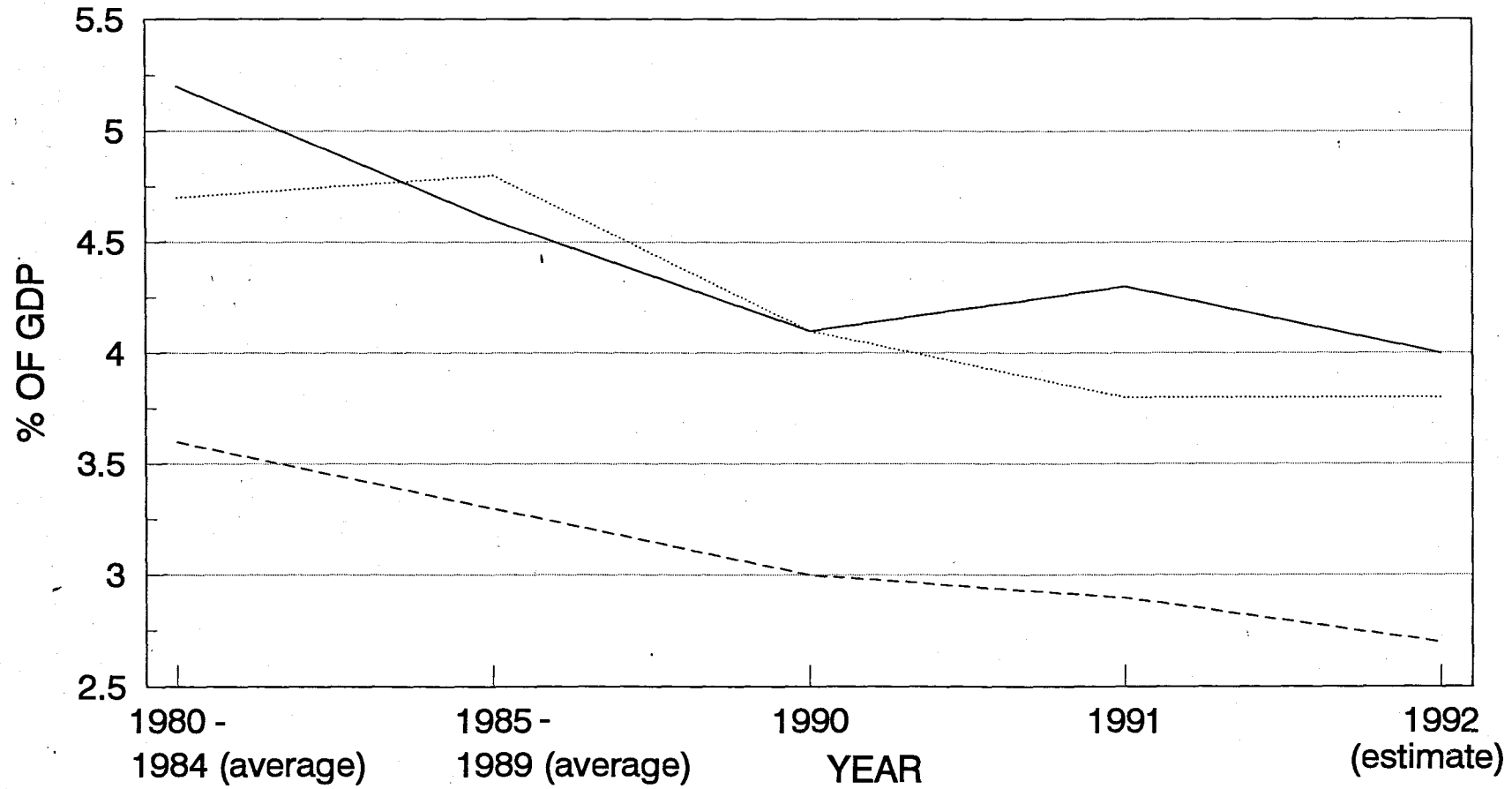


Figure 5.

Source: NATO REVIEW, Feb 1993.

UNITED KINGDOM NATO EUROPE NATO TOTAL

3.2 The United Kingdom and Defence Expenditure

In the 1990s, there have been increasing pressures on the government to continue cutting defence expenditure, in order to re-direct funds to sectors such as education and health. In 1993/94, Britain will spend some £23.5bn on defence. In the last financial year, defence spending accounted for just under 10% of general government expenditure, which by sector placed it fourth behind social security, health and education.²² However, the Treasury has been pushing for further cuts over the next few years.

In October 1992, the Treasury announced that an extra £1.05 billion would have to be taken out of the defence budget over the next two financial years.²³ In view of that decision, it is likely that there will be more swingeing cuts, following already in the wake of "Options For Change". Since our forces are already over-stretched - resulting from performing new missions - "having to do more with less" will severely test our forces. The Army is particularly over-stretched, with commitments in Northern Ireland and now peace-keeping in Bosnia. Consequently, further cuts are likely to fall more heavily on the other Services.²⁴

The first quarter of 1993 was dominated by bitter battles fought out at the MoD over which Service need is greater: the Royal Air Force (RAF) with its £9 billion Eurofighter 2000 and exotic missiles, or the Royal Navy (RN) with its £10 billion independent nuclear submarines and three new amphibious ships.²⁵ Additional information on defence procurement is provided in Chapter Two.

4. AEROSPACE INDUSTRY OVERVIEW

4.1 Introduction

Ever since the USSR's collapse, the global defence industries have been fighting for their survival. Although the post-Cold War world can hardly be described as "conflict-free", the hard reality confronting defence contractors is that there is simply too much capacity chasing too little work. Current military supply requirements are insufficient to sustain the levels of expenditure enjoyed during the Cold War peak. The aerospace industry suffers particularly badly, because projects are investment-intensive. With increasing budgetary pressures on governments to reduce military expenditure, less money is directed into aerospace R&D - an issue discussed in Chapter Three.

4.2 Military Aerospace

In the post-Cold War environment - an environment characterized by uncertainty in defence planning and certainty in the existence of tougher budgetary constraints - an increasing number of questions are being asked about the numbers, specifications, timing, and even the continued viability of certain military aircraft programmes. The "dog fight" has commenced between American and European defence contractors, desperate to secure vital export orders in dwindling traditional markets, and in the perceived growth areas of the Middle East and Asia-Pacific regions. Chapter Four provides detailed information on the defence aerospace trade.

Following the Gulf War, most of the major military aircraft orders have gone to the USA, at the expense of European companies. McDonnell Douglas, for example, recently secured a deal with Finland for sixty-four F/A-18 fighters, valued at between \$2-3 billion, and matched by industrial offsets to the full value of the sale.²⁶ As David White²⁷ points out, this order was a politically significant breakthrough in a neutral country.

Overall sales of front-line combat jets are expected to decline as the F-15/F-16 generation comes to an end. However, the market for light fighters such as the Hawk and Italian-Brazilian AMX is expected to increase. BAe has been involved in successful negotiations with Indonesia over Hawk sales.²⁸

Hopes for the Tornado aircraft - except for the Saudi deal underway since 1986 (discussed below) - have been unfulfilled. Provisional deals with Jordan, Oman, and Malaysia have fallen through. Fortunately for Britain's BAe, in the cases of Oman and Malaysia, the anticipated Tornado sales were substituted by Hawk fighter/trainers.²⁹

France's Rafale - developed by Dassault for Navy and Air Force use - has suffered a revision since the French experience with single-seat Jaguar ground-attack fighters in the Gulf conflict. The French Air Force has switched its emphasis to two-seat versions, and has consequently put back delivery plans. Changing customer requirements in the wake of combat experiences cannot always be foreseen by defence contractors.

Although Dassault withdrew from the (former) European Fighter Aircraft programme, they have agreed with BAe to undertake joint research on the follow-on

generation of aircraft, planned for around the year 2020.³⁰

Regarding helicopters, military orders continue to form the industry's backbone on both sides of the Atlantic. The helicopter demonstrated its worth on the modern battlefield during the land-campaign to recover Kuwait in August 1991. Furthermore, with force re-structuring taking place, the role of the helicopter should be secure as it is the most effective asset for moving troops rapidly. However, notwithstanding the above - and also the increasing demand from some developing countries - industry analysts still predict that there will be a fall in demand in the short term.³¹ Excluding the former Communist countries, deliveries have been running at a rate of 500-600 a year, but it is most unlikely that this level could be sustained in the current depressed climate.

Post-Cold War difficulties in defining operational-role requirements are confirmed by the shift in thinking concerning the attack helicopter (AH): from primarily being perceived as an anti-armour asset, the AH now is viewed as a multi-purpose platform for combat-support and escort, in addition to its anti-armour role.³² British, Dutch and German requirements have moved a little closer together, which have implications for procurement decisions in the helicopter sector. Following a meeting in Cologne in April 1993, the French Defence Ministry moved closer to the German Army Aviation's view that the *Unterstützungs-hubschrauber* (UHU) or utility variant of the "Tiger" helicopter, is more relevant to NATO's current intervention and crisis reaction needs. The Germans favour the UHU rather than the PAH-2 (anti-tank) helicopter, because they consider anti-armour to be increasingly irrelevant in this new era.³³ The British Army appears to have changed its view of the future AH, seeking a solution that can destroy the latest armour but also has the range to perform long endurance escort tasks under a UN mandate.³⁴ The British AH programme is for approximately 100 aircraft, and they are expected to enter service around 1998 at a total cost of around £2 billion (\$3.14 billion).³⁵ Five contractors declared an interest in the UK competition: Italy's Agusta (A129 Mangusta); the USA's Boeing-Sikorsky (Commanche); BAe (Eurocopter Tiger); GEC-Marconi Avionics (Bell Cobra Venom); and the Westland (McDonnell Douglas) Apache built under licence.³⁶

It is also useful to focus briefly on American developments, in order to have a better understanding of the overall helicopter scene. The leading American attack helicopter, the Apache, built by the McDonnell Douglas Helicopter Company (MDHC), is currently undergoing modernization, in the wake of recent force structure reviews. The

Longbow radar and missile upgrade are among the key programmes to enhance the capability of the U.S. Army's helicopters.³⁷ The first delivery of Longbow Apache is set for April 1997, but until then, MDHC could face a twenty month gap in Apache work if no other contracts are forthcoming.³⁸ As mentioned above, MDHC are competing in the British AH competition, and currently await the outcome. Until then, the American market dominates their orders. MDHC is to deliver a total of 811 Apaches to the U.S. Army; however, the total operational fleet will be 755 aircraft, because thirty-two have been lost in mishaps and twenty-four are to be withdrawn for delivery to Israel late-1993.³⁹

Regarding other outstanding AH requirements (and export opportunities) they include: China and Pakistan (both are thought to be interested in South Africa's Atlas Aviation Rooivalk); Japan (believed to be planning an advanced helicopter to fit in with the OH-X scout helicopter); Malaysia (possibly considering Russia's Kamov Ka-50); India (currently operating the Mil Mi-35 export version of the Mil Mi-24 "Hind", is believed to be looking at the Mil Mi-28 "Havoc"); and Bahrain and Kuwait in the Gulf, who may opt for the Apache.⁴⁰

Aside from AH requirements, there is a growing demand for naval helicopters, particularly from the Asia-Pacific region. The success of the Westland Lynx in the Gulf has encouraged several nations to consider on-shore and embarked helicopters. South Korea has already acquired twelve Super Lynx (Mk99) for its Sumner and Gearing class destroyers. It is also possible that a further batch of GEC-Ferranti Sea Spray Mk3 radar-equipped Super Lynx could be acquired.⁴¹ In the longer term, the Royal Malaysian Navy is likely to acquire the Lynx to replace existing Wasps.⁴² The naval variant of the EH Industries EH101 "Merlin" helicopter, developed jointly by Westland and Italy's Agusta is also expected to figure prominently in future sales, since it is the ideal Sea King replacement.⁴³

4.3 Civil Aerospace Plummeting ?

Historically, prosperity in the commercial aerospace industry has always been cyclical, but the current down-cycle has been particularly savage. Its severity is evident, when aerospace is viewed in recent historical context. During the period 1987-1989, a record number of new aircraft orders were placed by airlines, which included a total of \$90 billion worth of new jet orders in 1989 alone.⁴⁴ An unprecedented series of events

then combined to launch the aerospace industry into a great period of turbulence and uncertainty. Firstly, most of America and Europe was beleaguered by an economic recession, which had the inevitable impact on airline profits and new aircraft orders. Secondly, the Gulf War compounded existing problems, and air travel declined dramatically in 1990-1991.⁴⁵ In the midst of this turmoil, the Cold War ended, thereby putting an additional strain on aerospace manufacturers, as military sales declined.

Within the commercial aerospace sector, the regional and commercial aircraft industry has been the most severely affected by the current climate. For the smaller regional jet makers, this has been exacerbated by the presence of three large commercial aircraft manufacturers: the USA's Boeing and McDonnell Douglas, and the Airbus consortium in Europe, at the upper end of the market. This has led to corporate restructuring, which is discussed below. There is some confidence in sector-growth: the Asia-Pacific region is viewed as a solid market for smaller jets, and demand is also expected to rise in the industrialized countries as airline industry continues to develop hub and spoke route networks.⁴⁶

In the civil helicopter market sales pre-1991 were approximately 1,000 a year, including approximately 400 light helicopters. The trend in the small helicopter sector is a move towards twin-engined rather than single-engined models,⁴⁷ and in the offshore industry sector, the trend is towards larger helicopters. WHL has been in detailed negotiations with North Sea operators to push the EH101 as an offshore industry workhorse.⁴⁸ Since 1991-1992, however, the civil helicopter market has been virtually flat, and it is expected to grow only slowly for the next two years.⁴⁹

4.4 Corporate Re-Structuring and Consolidation

A logical consequence of the new climate has been a shake-up of the airframe industry in Europe and the USA. Consolidation in the business jet sector saw Bombardier of Canada acquiring Learjet of the USA in 1990, and in March 1992, General Dynamics sold its Cessna civil aircraft division to Textron.⁵⁰ In other aerospace sectors, Daimler Benz created Deutsche Aerospace (DASA) out of MBB, Dornier and MTU; in 1992, DASA finally bought out the Dutch government's 32% holding in Fokker; and MBB and France's Aerospatiale merged their helicopter businesses to form Eurocopter.⁵¹ In 1993 Raytheon of the USA bought BAe Corporate Jets.⁵² Figure 6. provides details of the leading aerospace industry cross-border mergers and acquisitions.

Target Company	Country	Deal	Buyer/Partner	Country	Date	Value(\$M)
MBB	Germany	Merger	Aerospatiale	France	1992	e1,196
Fokker	Holland	51% stake	Deutsche Aerospace	Germany	1993	412
BAe Corporate Jets	UK	Acquired	Raytheon	USA	1993	375
Philips Defence	Holland	Acquired	Thomson-CSF	France	1989	328

Source: Based upon OC&C data; as cited in FLIGHT INTERNATIONAL, 2-8 February 1994, p.35.

Figure 6. Leading Cross-Border Aerospace Industry Mergers and Acquisitions 1989-1993

Corporate links, as Ron Smith⁵³ highlights, have proliferated through extensive sub-contracting, offset, cross-holding of shares, research co-operation and joint ventures, often with European as well as North American companies.

Whilst companies on both sides of the Atlantic have decided to exit from the defence sector, others have seen the depressed market conditions as an ideal opportunity to either "cannibalize" the smaller concerns, or the perfect time to buy companies at bargain prices. For example, the American company, Martin Marietta made what was reported to be the biggest defence acquisition ever when it paid \$3 billion (ECU 2.5 billion) for the aerospace business of General Electric of the USA.⁵⁴

4.5 New Players, New Problems, New Partnerships ?

The emergence of new - or relatively new - players, all competing for a share of a smaller aerospace pie, compounds the problems confronting Europe's aerospace contractors. New players represent new commercial threats; threats are now posed from Japan, South Korea, Indonesia, Brazil and Taiwan, to name but a few. These governments see aerospace as a strategic investment for the next century, but this may prove to be a chimera: an expensive lesson in misguided industrial policy.⁵⁵

Of the newer players, South Korea has actively promoted its aerospace industry for over fifteen years, spearheaded by the country's flag-carrier airline, Korean Air (KA). In 1976, KA established an aerospace division, concentrating its efforts on the manufacture and assembly of the McDonnell Douglas helicopter, the 500D, for home and export markets. Since then, Daewoo and Samsung have climbed aboard the aero-bandwagon, complementing KA's contracts. Daewoo has been producing wing and fuselage parts for a range of Boeing aircraft. Samsung has been responsible for engine components for the USA's F-16 fighter aircraft: this work is part of an offset agreement linked to South Korea's 1991 purchase of \$5billion of F-16s from the USA.⁵⁶

In view of the increasing rise in the funding needed to sustain the new generation of aircraft in the late 1940s-1950s, it was perhaps inevitable that the government would take a firmer grip on the shape and direction of the industry. However, few in industry realized the extent to which their destiny could be affected by government until Duncan Sandys issued his Defence White Paper in April 1957. This Paper predicted that there would be no long-range bombers after the "V" bomber and no high performance fighters beyond the Lightning. Guided missiles were expected largely to replace manned combat aircraft. This had a devastating effect on morale in the aircraft industry as programmes were cancelled. The Paper killed all the major projects and some of their engines, including the Gyron and RB106 that would have powered them. During this period Britain also missed out on building what was in effect a more advanced Mirage (the Hawker FD2 fighter).

Additional damage was caused to an already weakened industry when the Labour Government axed the TSR2 (Tactical Strike and Reconnaissance Bomber) in 1965. It is important to recognize that there was export interest in the programme: the Royal Australian Air Force (RAAF) had been interested since the late 1950s and the TSR2 would have suited their bomber requirements. There is little doubt, as Charles Gardner argues in his history of the "British Aircraft Corporation", that if it had not been Mountbatten (Chief of Defence Staff) promoting the Buccaneer, the Australians would have probably ordered the TSR2, and thus the programme would have survived. As Gardner writes:

Mountbatten...so hammered away about the cost-effective superiority of the Buccaneer (which was of nil interest to the Australians) that the Australian Defence Chiefs, and then the politicians, became completely convinced (as they were meant to be) that TSR2 would never be built.

The axing of the TSR2 and earlier effects of Sandys, juxtaposed with the Labour Government's cancellation of the HS 681 V/STOL transport and Hawker P1154 supersonic jet lift V/STOL multi-role fighter, was devastating news for the industry. Since new technology areas were not exploited nor key projects followed, there was a high CoQ to be borne by the British industry in terms of an absence of marketable export aircraft. It provides a good explanation of why there is no British Mirage-type aircraft.

In November 1962, Britain and France signed a treaty to build Concorde. The two governments bore the cost of development, and financed its entry into service. Economically, Ivan Rendall⁶² argues, Concorde was an absurdity: the production lines were shut down in 1979, after producing a total of only sixteen aircraft. However, Concorde did revitalize European civil aviation. It also demonstrated that the only means by which the Europeans could meet the Americans on level terms was by co-operation.

Current civil prospects are riding on the Airbus programme, which may also have a military application.⁶³ Participation in the Airbus project is a triumph for the foresight of Sir Arnold Hall (of Hawker Siddeley), who invested his company's money in the programme when the Labour Government pulled out in the late 1960s.⁶⁴ Without his boldness, as Michael Heseltine⁶⁵ argues, subsequent British Governments would have been denied the opportunity to participate in the only non-American manufacture of large passenger aircraft in the West.

5.2 The Fixed-Wing Aircraft Industry Today

In Britain, the major airframe manufacturer is British Aerospace, although it should not be forgotten that Shorts in Northern Ireland (now owned by Canada's Bombardier) also produce fixed-wing aircraft, such as the Tucano. As mentioned earlier, this thesis focuses on BAe only. BAe possesses a broad aircraft product range, which includes the Hawk family of advanced trainers and light attack aircraft, the Harrier, Tornado, Airbus, the BAe 146 regional jet, and 125-1000 series of aircraft.⁶⁶

Through its involvement in many collaborative ventures, from Airbus to Eurofighter 2000, BAe has developed close links with its European partners, particularly with the avionics and electronics industries in France. In terms of the future strategic direction the company takes vis-a-vis collaboration, European and American partners, as well as ventures with new players in the Asia-Pacific region, are all viable possibilities. In 1992 BAe was reportedly discussing a possible partnership with Japan's heavyweights

Kawasaki Heavy Industries (KHI), Fuji Heavy Industries (FHI) and Mitsubishi Heavy Industries (MHI) in BAe's 146 regional jet programme.⁶⁷

5.3 Background to the Helicopter Industry

Today, the name "Westland" is synonymous with helicopters, but the origins of the company are firmly rooted in aircraft. Born as a subsidiary of Petters, a farm machinery company, Westland Aircraft Works, opened at Yeovil, Somerset, in 1915, first manufacturing sea-planes for the Admiralty during the First World War, and later producing Spitfires under sub-contract during the Second World War. In 1946, following a successful meeting with American company, Sikorsky, Westland bought a license to make Sikorsky's S-51 Dragonfly helicopter, and secured permission to modify it to suit its own markets. Over the next twenty years, a number of Sikorsky variants were made, including the Whirlwind and the Wessex.⁶⁸

Between 1959-1960 Westland swallowed its three helicopter rivals: Saunders Roe (1959), the helicopter division of Bristol (1960), and the British aviation interests of Fairey (1960). After purchasing a license for Sikorsky's S-3D, Westland used MoD money to develop the highly successful Sea King helicopter, in close consultation with the Royal Navy - its main customer. From a TQM perspective, the existence of a constructive dialogue between the major customers - the supplier (Westland) and ultimate end-user (Navy) - contributed towards lowering the CoQ, since there was a reduced likelihood of specifications not being met, or customers failing to identify their requirements to the company, since they possessed specialist expertise.

The late 1950s and 1960s were boom years for the helicopter. The British Government, under Wilson, negotiated a "package deal" with the French in the late 1960s, whereby three types of helicopter would be built: the French company, Aerospatiale, would be the prime contractor for the Gazelle and Puma helicopters, whilst Westland would design and build a new machine, the Lynx. The manufacture of all three aircraft was to be shared out between the two companies, strictly according to the numbers the governments proposed to purchase. All did not run smoothly, however, and this foray into Anglo-French collaboration left a legacy of bitterness, which is discussed below in the aerospace collaboration section.

Whilst the 1960s were boom years for the helicopter, the bubble burst in the

1970s due largely to the multiple impacts of three factors: a) the panic-buying surges driven by the Korean and Vietnam Wars had long disappeared; b) the recession which destroyed sales prospects to off-shore oil operators; and c) most governments, or at least those with money, had already bought all the helicopters they believed they needed. In Britain, with Labour in power and talking of nationalization and defence cuts, these were anxious times for Westland. The company was determined not to be nationalized or rationalized, and after an impassioned campaign by the workforce, the 1974 Labour government left the firm independent, excluding it from its plan to create British Aerospace.

In 1978, British Defence Minister Fred Mulley signed the "Declaration of Principles" with his French, German and Italian counterparts. This document stated that the helicopter companies of Europe would sit down with their respective governments to develop "families" of Euro-helicopters that would be marketable to all. The three projects which emerged were for: a) a large naval helicopter to replace the Sea King (the French and the Germans refused to join, and Westland teamed up with Agusta of Italy to develop the EH101); b) an agile battlefield helicopter (Europe again split into two camps); and c) a medium-sized transport helicopter, the NH90. The long-term nature of these grandiose schemes would not of course fill Westland's order books in the short-term, and the company thus made the decision to "go-it-alone" on a new helicopter, the Westland 30 (W30).⁶⁹¹

5.4 The Helicopter Industry Today

Westland Helicopters Limited (WHL), part of the Westland Group,⁷⁰ is Britain's sole helicopter manufacturer. Since the turbulent mid-1980s, when Westland came close to collapse, the company has enjoyed a remarkable turn-around. In the late 1980s-early 1990s, it has reported rising profits, and it already has enough orders to secure its future until the late 1990s.⁷¹ Through improving efficiency, and pushing hard for upgrade work, the company has managed to bridge its order gap and earn decent margins. Additionally, sterling's devaluation has handed WHL an extra competitive edge in its bid for the MoD's AH contract.

Westland has a potential rival in the form of BAe, since in recent years, BAe has expressed an interest in having an "involvement" in the helicopter sector: in 1990 it established a confidential study-group to examine possible entry into helicopter business.⁷²

In 1991, it competed unsuccessfully with GEC to be prime contractor for the Royal Navy's EH101 "Merlin" helicopter,⁷³ with the contract eventually won by the Westland/IBM partnership. More recently, BAe has teamed up with the Franco-German "Eurocopter" consortium, to bid for the MoD's £700 million contract for approximately 100 attack helicopters.⁷⁴ Apart from BAe's AH competition, Westland are also concerned by the actions of key shareholder GKN. There are rumblings that Westland could be a takeover target again.⁷⁵

6. THE UNITED KINGDOM AND AEROSPACE COLLABORATION

6.1 Background to Collaboration

Few industries traverse national and continental boundaries to the same extent as aerospace. The industry has always had a global dimension: the first international manufacturing contract was signed in 1909, when Ireland's Short Brothers agreed to manufacture six bi-planes for the Wright Brothers.⁷⁶ Since then, Britain has enjoyed (occasionally endured) participation in a number of collaborative programmes, with European and American partners. Arguably, as Mary Kaldor⁷⁷ contends, it was British and French efforts which brought a change in the nature, and extent, of (European) collaboration, since they saw it as a means of maintaining their independent capacity in the face of rising resource requirements. For the British, joint collaboration was only seriously considered in the wake of the crisis that racked the aircraft industry in 1965, after the cancellation of the TSR-2 project. Alastair Buchan has commented that:

Britain, which was in many ways the most unco-operative of the major European powers, has learnt the bitter lesson about the folly of embarking unilaterally on projects with such a high R&D content that they can only be produced at a competitive cost if the assured market is considerably larger than the requirement of her own services.⁷⁸

Through co-operation, European industries have been able to match and, in some sectors, to challenge American dominance in the global aerospace industry.⁷⁹ In the aerospace industry, where scale of production and size of initial markets are decisive in conveying competitive advantage, even domestic consolidation in industry was at best only a partial solution to the strength of American contractors. However, neither was Trans-Atlantic co-operation an entirely satisfactory prospect. Thus, for most European

companies, collaboration tended to be on an ad hoc programme-by-programme basis.

The special British-American relationship has provided the opportunity for Britain both to manufacture under licence, and to absorb American technological expertise into her defence industrial base. Additionally, in the absence of suitable European partners for a particular project, the answer has often been found in the USA, as with the AV-8B, which is discussed below.

6.2 The Trans-Atlantic Dimension

a) British Aerospace and the Harrier II (AV-8B)

The special relationship Britain enjoys with the USA provided, in the case of the AV-8B advanced Harrier jumpjet, the opportunity to develop jointly an aircraft incorporating advanced British and American technologies which the U.K. could not have afforded to undertake alone, and for which a European partnership was not in prospect. The Harrier II was designed by McDonnell Douglas and BAe, to produce an advanced Harrier with major improvements to the payload and range performance over the GR Mk.3/AV-8A aircraft. The AV-8B is the American Marine Corps variant.

It is interesting to note that aircraft capability and quality of technology were not the main issues at stake in this particular project: of greater significance was the issue of inter-service rivalry, for the Marines specifically wanted AV-8B aircraft to safeguard a special niche for themselves, in terms of role and responsibility, fearing a possible "challenge" from the Air Force. From a TQM perspective, all organizations and companies must have customer-orientation as their primary focus, and must meet customer requirements first time. In this instance, the company supplied the customer with the aircraft requested, so in strict TQM terms it was a "quality" output. However, since the customer's reasoning was not based primarily upon the aircraft's attributes (capability, for example) and specifications, but instead on the basis of preserving a niche for the Marines, and restricting usage, it is quite possible that a high cost of quality could eventually be borne by the customers, in terms of not necessarily possessing the most appropriate equipment for future missions.

b) British Aerospace and the T-45A Goshawk Trainer

In November 1981, the United States Navy (USN) selected a joint BAe/McDonnell Douglas development of BAe's Hawk for its VTX-TS training system,

and assigned it the T-45A Goshawk.⁸⁰ In a programme which includes comprehensive ground-based training systems, McDonnell Douglas is the prime contractor, and BAe a principal sub-contractor.⁸¹ At present, the USN plans to procure some 300 T-45As. The British company builds all of the airframe, except the forward fuselage, and the American company is responsible for final assembly, flight testing, and systems integration.⁸²

c) Westland Helicopters and the Sea King

Westland's ability to adopt, develop and improve upon designs originally licensed is clearly evident with the success of the Sea King helicopter, which began life as the SH-3D. The American SH-3D was in fact nearing the end of its production at Sikorsky, when construction of the first machine commenced in Yeovil in 1967. Having adopted the design, and modified it with Sikorsky support, a further 313 have since been made.⁸³ The new generation Advanced Sea King is arguably the most complete tactical maritime helicopter in the world.

d) Westland Helicopters and the Black Hawk (WS70)

The "Westland Crisis"⁸⁴ is probably remembered as a bizarre political drama that led to the resignation of two British Cabinet Ministers: Michael Heseltine resigned as Defence Secretary on 9 January 1986, and Leon Brittan left Trade and Industry on 24 January 1986. It is important, for the purpose of this analysis, to avoid re-visiting all the old complexities surrounding the affair, and instead, to focus merely on its result: the Sikorsky (United Technologies Corporation - UTC - is the parent company) and Italian Fiat Group proposal ("rescue package") was eventually adopted by the Westland Board, resulting in the Yeovil firm building Black Hawk (WS70) helicopters under licence. Since then, Westland and Sikorsky have been working together to develop and improve the aircraft's performance across the board. The number of versions now being offered by Westland in the market-place demonstrates the ability of the British company "to engineer specific, highly advanced role fits, to meet the particular needs of the customer."⁸⁵ In TQM terms, this custom-approach to customer needs is to be welcomed, for it contributes towards lowering the cost of quality (CoQ), since tailored requirements generally have the effect of bringing customers back to you, for successor machines. Consequently, the company has reduced lost opportunity costs, part of external failure costs.

Although European defence industrial collaboration was seen as being dealt a heavy blow when Westland opted for the American UTC solution, it is important to

recognize, as Lawrence Freedman⁸⁶ contends, that over the longer term, the Black Hawk has represented a genuine addition to Westland's product range, whereas all the Euro-consortium could offer was a greater commitment to existing projects, and the promise of continued work on the Super Puma helicopter, which itself had large questionmarks hanging over its future. At least now Westland has a highly marketable machine, which it is in fact actively promoting in a number of Middle East countries, and of course WS70 helicopters are an important element of the Al Yamamah programme, of which BAe is the prime contractor.⁸⁷

6.3 The European Dimension

a) British Aerospace and the Tornado

The Tornado, which involves Britain, Germany and Italy, has been a resounding industrial and military success. The GR1 aircraft has been in RAF service for over ten years. The management structure of the Tornado programme was used as the model for the former-European Fighter Aircraft (now Eurofighter 2000) project. Farooq Hussain⁸⁸ contends that the model of collaborative development actually preferred by the British is that established for the Tornado aircraft, which involved the formation of large international organizations and staffs to manage the programme. It is argued that British industry favours the joint international staffing and development approach, because it allows manufacturers with greater expertise, to maintain a dominant role behind the international management agency.⁸⁹

Critics, however, as Keith Hartley⁹⁰ indicates, have alleged that the Tornado project resulted in a net transfer of technology from Britain to Germany - valuable avionics experience - so enabling the Germans to establish a competitive, rival, aircraft industry. Although certain technological benefits inevitably transfer to parties in collaborative ventures, there is also a strong case for arguing that these flows are "balanced". Indeed, this view is surely substantiated by the fact that the Tornado programme is supported by the continued voluntary participation of the original partner-nations.

b) British Aerospace and Eurofighter 2000 (ex-EFA)

Before examining the Eurofighter, it is useful to consider its forerunner, the Experimental Aircraft Programme (EAP), itself a collaborative venture. With money from Britain, Germany and Italy, it was a most useful exercise in international co-

operation. One wing was made in the United Kingdom, and one made in Italy: they did match. It is interesting to note the truly European nature of the programme, for the Italian wing used a French CAD-CAM system. As a technological demonstrator, EAP has already made an invaluable contribution towards future projects. By 1992, some thirty-six specific to EFA trials had been conducted on the aircraft, and EAP had flown at over twice the speed of sound and completed 259 sorties.⁹¹

In December 1983 the air forces of Britain, France, Germany, Italy, and Spain, signed an "Outline European Staff Target" (OEST), which triggered pre-feasibility studies for what was then termed the "Future European Fighter Aircraft" (FEFA). As the months passed, it became apparent that France - with its requirement for a land-based and maritime fighter - could not agree with the majority view that a 9.5 tonne basic mass empty weight for FEFA should prevail. Events came to a head in August 1985, with the British, Germans and Italians reaching an agreement, which the French found to be unsatisfactory: as a consequence they withdrew. Spain joined the tri-nation group one month later, and EFA was born. In June 1986, the Eurofighter consortium was formed by BAe, Germany's MBB (now DASA), Italy's Alenia and Spain's CASA. In September 1987, the four Air Staffs approved the EFA design put forward by the consortium for development.⁹²

Since then, the programme has been plagued by fears that Germany would withdraw: it was only at the end of 1992 that the other partners felt re-assured that Germany was going to continue with the project. On 10 December 1992, the Defence Ministers finally agreed on the essential elements of a political, economic and strategic approach to a new fighter aircraft, Eurofighter 2000, originally conceived as EFA in 1983. At the 1992 meeting, Ministers also agreed that the service entry date for the RAF and Italian Air Force would be the year 2000, with delivery of the Spanish and German models starting the following two years.⁹³

In TQM terms, specifically focusing on the "customer" concept, the Eurofighter project is a fascinating one to examine. The RAF, the end-user customer group, presented the following challenge to industry: to provide the force commander in a single package, both a multi-role day/night all-weather air superiority fighter, and a poor weather day/night ground attack fighter-bomber. However, as Ned Frith⁹⁴ rightly points out, it is axiomatic that a good fighter cannot be made from a bomber, whereas examples

are plentiful of fighters been turned into successful bombers. Different role requirements present suppliers with a major problem, in terms of delivering a quality output, but the Eurofighter partners have managed to create a very special aircraft. Although within its design, the multi-role aircraft fighter is optimised for air superiority, its ground attack performance should not be under-estimated: it will carry about 50% more ordnance than Jaguar over a slightly greater radius of action and has the additional advantage of being more readily able to defend itself with missiles and guns.⁹⁵ The aircraft can out-turn the F-15, F-16 and F-18 in both supersonic and subsonic flight, and will accelerate and climb from runway alert to more than Mach 1.5 above 35,000 feet in less than 2.5 minutes.⁹⁶ Furthermore, comprehensive operational studies, including manned simulation, have pitted Eurofighter against potential opposition from expected upgrades of the MiG-29 Fulcrum⁹⁷ and the Su-27 Flanker⁹⁸ and - although information is obviously classified - we can deduce from the public material available that the Eurofighter is capable of fulfilling customer requirements, and delivering an excellent performance to end-users in the field of operations.⁹⁹

c) British Aerospace and Airbus

Airbus Industrie (AI) is a government-backed consortium of companies from Britain (BAe), France (Aerospatiale), Germany (Deutsche Airbus) and Spain (CASA). BAe holds a 20% stake in the consortium, and is responsible for designing and building all the wings. Keith Hayward¹⁰⁰ contends that Airbus is arguably the most important - and in most respects the most successful - example of European (civil) aerospace collaboration. It has successfully challenged American dominance of the civil aerospace market. However, despite AI's successes, it is still widely perceived by the Americans to be selling a subsidized product. An increasingly acrimonious dispute has raged in recent years between the USA and the European Airbus countries, specifically over the legitimacy of European state aid to the Airbus programme.¹⁰¹ Chapter Four provides additional details.

Since the mid-1970s, according to AI,¹⁰² the consortium's industrial decisions and commercial decisions have been based on commercial criteria, and industry has played an important role in driving the programme. However, although industry has managed to maintain a distance from government, they are not totally immune from political wrangling: this was evident in the Franco-German dispute over the A321, which centred on a row over the location of the final assembly of the A321 and the A320 aircraft.¹⁰³

The fact that the Airbus partners have worked together for over twenty years on a "family" of aircraft has doubtlessly contributed to the success of the programme. In building-up an extensive network of personal contacts and relationships, the prime contractors have an excellent understanding of internal and external customer requirements. Consequently, the Airbus team can be viewed, in some respects, as a single national firm, rather than as an ad hoc collaborative venture. However, there are limits to the industrial efficiency of traditional collaboration based loosely on the principle of *juste retour*. As Keith Hayward¹⁰⁴ highlights, transfer prices are still based on bargaining between the partners. The first Financial Director's resignation, after only eight months in office - because the partners were resisting his efforts to obtain vital costing information - indicates that translating Airbus into a fully commercial entity will be a long and frustrating process.¹⁰⁵

The sheer scale of the Airbus programme necessitates a more radical approach to cost control and managerial responsibilities. Furthermore, the position of the US dollar also affects Europe's industry: Europe's aircraft industry is particularly dependent on the dollar exchange rate, because its sales are expressed in dollars, whereas most of the costs are expressed in national European currencies.¹⁰⁶ In recent years, this situation has greatly favoured American manufacturers, such as Boeing, to the detriment of Airbus. For companies like BAe they have little protection against the weakness of the dollar. The only practical solution appears to be improvements to manufacturing efficiency and cost control, which could entail having a much stronger central management system.

7. AEROSPACE AND THE SOCIO-ECONOMIC DIMENSION

7.1 Introduction

According to a 1993 SIPRI report,¹⁰⁷ there are about fifteen million people employed in defence industries worldwide, which constitutes a one million reduction from the peak in the mid-1980s. SIPRI estimate that 3-4 million jobs in the defence industry could be lost over the next five years. According to Herbert Wulf, about one million workers in the former USSR are on the verge of unemployment, as plans to convert military into civilian production have largely failed.¹⁰⁸ Of these defence industry totals, aerospace represents a significant proportion, but exact figures are hard to gauge, since in the aircraft industry - with civil and military production taking place - it is difficult to determine how many people are directly employed on defence contracts alone.

7.2 United Kingdom Aerospace Employment

In 1989, about 194,000 persons were employed in the British aerospace industry. Since then, the industry has lost nearly 25% of its jobs in three years.¹⁰⁹ Unlike previous down-turns, there are growing concerns expressed by organizations such as the Society of British Aerospace Companies (SBAC) - the industry's trade association - that the current malaise will reduce Britain's long term capability. The SBAC was particularly alarmed to discover from some British companies that over 30% of their job losses were amongst engineering and technical staff.¹¹⁰

BAe - the vanguard of U.K. defence interests - shed over 10,000 jobs in two years, but it is important to acknowledge that even before the ending of the Cold War, the company had recognized that they were over-staffed, and had begun implementing a rationalization plan. However, the number of aerospace job cuts continues unabated. On 12 February 1992, BAe announced 2,350 job losses, of which the military aircraft division would take the larger share of the cuts, losing 1,450 in total.¹¹¹ The average number of people (including Directors) employed by the Westland Group and its subsidiary undertakings during 1992 was 8,766, a fall of 575 employees since 1991.¹¹² Figure 7. provides details of aerospace job losses at BAe and Westland between October 1990 and February 1992.

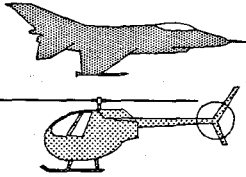
Redundancies are having a devastating social and economic effect at both a local and national level. The effect of these cuts is not evenly distributed in Britain, since most aircraft manufacturing is concentrated in particular areas, such as the North West and South West, where the economic base is much narrower.

7.3 United Kingdom Aerospace Site Closures

Since 1989, there have been major site closures by Westland and BAe. In 1990, WHL's site at Milton Keynes was closed, and in 1992, BAe's Military Aircraft Division at Kingston-upon-Thames closed.¹¹³ It is however, important to recognize, as highlighted above, that some post-1989 site closures in the defence industry were part of company rationalization plans, devised long before the end of the Cold War. Arguably, the Cold War's conclusion merely quickened the site closures, and jeopardized the future of more sites.

Figure 7.

Selected U.K. Civil/Military Aerospace Job Losses, October 1990 - February 1992

 AEROSPACE COMPANY	DATE	OCTOBER	DECEMBER	MARCH	JULY	FEBRUARY
	SITE	1990	1990	1991	1991	1992
Westland Group Helicopters (WHL)	Milton Keynes	212				
	Yeovil					350
British Aerospace Military Aircraft	Brough					550
	Kingston		2,000			350
	Preston Warton		3,000			550
Civil Aircraft	Hatfield					830
	Woodford					70
Guided Weapons	Bristol			1,300		20
	Lostock			620		130
	Stevenage			300		300

SOURCES: National Press 1990-1992

CONCLUSION

This chapter has provided background information on the post-Cold War geo-strategic environment, facilitating understanding of the institutional initiatives and institutional (in)abilities to deliver a quality output. A number of preliminary conclusions can be drawn from the above analysis, and these are discussed below. The first point concerns the reality of institutional disarray: the institutions are in a state of flux. The absence of the monolithic Soviet threat, as discussed above, has forced a re-assessment of European security arrangements. In fact, throughout most of 1991, the institutions were conducting major reviews vis-a-vis their future role in Europe's security framework, and assessing the impact of various geometric alternatives.

Whilst the EC considered West European integration-East European disintegration, and the WEU's "bridge-like" qualities were being tested vis-a-vis future institutional relationships, it was business as usual for NATO: various political and operational missions to perform including peacekeeping. Evidence of the importance of maintaining NATO was first provided by the Gulf War: without NATO's logistics and infrastructure, it would have been impossible to transfer units based in Western Europe and America to the Gulf. Furthermore, NATO's capacity for reaching political consensus on the large-scale deployment of forces away from the Alliance area illustrated clearly the flexibility and adaptability of NATO structures. This is not something to be dismantled because the Communist military threat has receded. Since multi-dimensional risks now confront NATO-Europe, it is essential to possess "crisis management" tools, which can best be developed within a revamped Alliance-type framework. The limitation of European capabilities is a powerful argument for closer co-ordination of WEU operations and those of the other NATO allies.

For Alliance members, the "costs" of the Cold War's conclusion are escalating. These include the inevitable reduction of forces and military infrastructure rationalization, which all affect the defence industrial base. As alluded to above, resource allocation vis-a-vis the defence procurement sector continues to decline: defence procurement spending by NATO's EC members fell by 15% in real terms between 1989-1991.¹¹⁴ This decline is driving a dramatic rationalization of the defence industrial base in Europe and North America. If it leads to a drastic reduction in our defence industrial capability, the CoQ would indeed be high, for the "external failure costs" - the costs passed on to the

customers - in the future, would be a reduction in military capability, and a further erosion of our R&D and technological base. These are issues which affect the long-term security of the customer base and are examined below in subsequent chapters.

CHAPTER ONE ENDNOTES

1. Catherine Guicherd, **A EUROPEAN DEFENSE IDENTITY: CHALLENGE AND OPPORTUNITY FOR NATO**, (Congressional Research Service: CRS Report, 12 June 1991), p.8.
2. North Atlantic Treaty Organization, *"London Declaration on a Transformed North Atlantic Alliance"*, issued by the Heads of State and Government, North Atlantic Council Meeting, (London, 5-6 July 1990); as cited in **NATO REVIEW**, Vol.38, No.4, August 1990, p.32.
3. North Atlantic Treaty Organization, North Atlantic Council Ministerial Communique, *"Moving Forward from the London Declaration"*, 18 December 1990; as cited in **NATO REVIEW**, Vol.38, No.6, December 1990, p.22.
4. Catherine Guicherd, op.cit.p.9.
5. The EFTA members are: Iceland and Norway from NATO, and also Austria, Finland, Sweden and Switzerland.
6. Catherine Guicherd, op.cit.p.10.
7. *"Delors Sees 'Increasingly Integrated EC' "*, in **FBIS**, Daily Report West Europe, 1990, No.017A, 25 January 1990, pp.1-2; as quoted in Catherine Guicherd, op.cit.p.11.
8. See Michael Spicer, **A TREATY TOO FAR: A NEW POLICY FOR EUROPE**, (London: Fourth Estate, 1992), p.129.
9. See EC President Delors' address to the IISS, *"European Integration and Security"*, Alastair Buchan Memorial Lecture, (London, 7 March 1991), reprinted in **SURVIVAL**, Vol.XXXIII, No.2, March/April 1991, pp.99-109.
10. As highlighted by Catherine Guicherd, op.cit.p.14.
11. The AMF comprises a naval and an air mobile multi-national force of approx 5,000 troops drawn from American, Belgian, British, Canadian, Dutch, German and Italian units.
12. See *"France one, Holland nil"*, **THE ECONOMIST**, Vol.319, No.7702, 13 April 1991, p.52.
13. See Peter Southwood, **THE UK DEFENCE INDUSTRY AT THE CROSSROADS**, (Chippenham, Wiltshire: Enterprise for Defence and Disarmament, 1990), p.13.
14. As cited in the **STATEMENT ON THE DEFENCE ESTIMATES 1992**, Cm 1981, (London: HMSO, 1992), p.11.
15. Manfred Worner, scheduled address to the Inaugural Conference of The Atlantic Council of the United Kingdom, Queen Elizabeth-II Conference Centre, London, 26 November 1993, (Text read by Sir John Weston in Manfred Worner's absence), (London: Text published by The Atlantic Council of the United Kingdom, Text 140), p.3.
16. As reported in **THE FINANCIAL TIMES**, 1 February 1990.
17. **STATEMENT ON THE DEFENCE ESTIMATES 1990**, Cm 1022-I, (London: HMSO, 1990), p.17.
18. **STATEMENT ON THE DEFENCE ESTIMATES 1992**, Cm 1981, op.cit.p.8.
19. *ibid.*
20. For an interesting account on developments, see Peter Southwood, op.cit., and also see Peter Southwood, **THE UK DEFENCE INDUSTRY: A CASE OF SEVERE NEGLECT...WITH WORSE TO COME ?**, (University of Bradford: Department of Peace Studies, March 1992), Peace Research Report Number 28.
21. Peter Southwood, **THE UK DEFENCE INDUSTRY: A CASE OF SEVERE NEGLECT...**, op.cit.p.6.
22. Moray Stewart, *"Future Resource Management In Defence"*, **RUSI JOURNAL**, Vol.138, No.2, April 1993, p.73.
23. See David White, *"Defence factions fight for cash in 'review by stealth' "*, **THE FINANCIAL TIMES**, 8 March 1993, p.9.
24. See Peter Almond, *"Britain's forces stand by for further cuts"*, **THE DAILY TELEGRAPH**, 13 April 1993, p.4.

25. *ibid.*
26. See David White, "*The dog fight gets dirty*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), Section III, 2 September 1992, p.VI.
27. *ibid.*
28. See Ross Tieman, "*BAe announces £500m Hawk contract with Indonesia*", **THE TIMES**, 11 June 1993, p.24; and also see David White, "*BAe wins £500m order from Indonesia*", **THE FINANCIAL TIMES**, 11 June 1993, p.14.
29. David White, "*The dog fight gets dirty*", *op.cit.*p.VI.
30. See JAC Lewis, "*UK, France plan EFA successor*", **JANE'S DEFENCE WEEKLY**, Vol.17, No.9, 29 February 1992, p.337; and see David White, *ibid.*
31. See David White, "*Gulf war set a new pattern*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), *op.cit.*p.V.
32. One of the major reasons for the trend towards multi-role capability is the realization that attack helicopters should have an anti-air capability, at least in self-defence. Whereas for most fixed-wing aircraft, the best form of defence against airborne and ground threats is to spend as little time as possible in the "threat zone", using terrain and onboard measures, for helicopters, whilst possessing the same options, they are unable to make a quick attack: a helicopter needs to loiter in the "threat zone", and that makes it vulnerable. For an excellent overall assessment of AHs, specifically operating in an anti-tank capacity, see Cockpit Films, **IN THE COCKPIT 2: TARGET TANK**, 60 mins, Castle Hendring/Parkfield Entertainment, 1989, videocassette.
33. See Charles Bickers and Paul Beaver, "*Turning talons to new talents*", (SPECIAL REPORT: ATTACK HELICOPTERS), **JANE'S DEFENCE WEEKLY**, Vol.19, No.20, 15 May 1993, p.19.
34. *ibid.*
35. *ibid.*p.20. For additional information on the British AH requirement, see Susan P. Allmark, "*The Helicopter Britain Needs*", **PARLIAMENTARY BRIEF**, Vol.2, No.9, June/July 1994, pp.60-63.
36. See *ibid.*; Paul Betts, "*BAe to join forces in helicopter bid*", **THE FINANCIAL TIMES**, 26 February 1992, p.8; and also David White, "*Gulf war set a new pattern*", *op.cit.*p.V.
37. John Boatman, "*US Army rebuilds its fleet*", (SPECIAL REPORT: ATTACK HELICOPTERS), **JANE'S DEFENCE WEEKLY**, Vol.19, No.20, 15 May 1993, p.22.
38. *ibid.*p.23.
39. *ibid.*p.22.
40. Charles Bickers and Paul Beaver, *op.cit.*p.20.
41. See Paul Beaver, "*MARKET-SURVEY: HELICOPTER AIRFRAMES*", **JANE'S DEFENCE WEEKLY**, Vol.17, No.9, 29 February 1992, p.366.
42. *ibid.* It should be noted that the Lynx helicopter is not included in the Anglo-Malaysian MOU, which thus leaves unclear any future decision.
43. See David White, "*Westland's rise to £13m better than expected*", **THE FINANCIAL TIMES**, 2 June 1993, p.21.
44. See Paul Betts, "*Hopeful signs on the radar screen*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), *op.cit.*p.II.
45. For an interesting article on the subject, see Paul Betts, "*Price-cutting war becomes fiercer*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), *op.cit.*p.II.
46. Paul Betts, "*Too many choices*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), *op.cit.*p.II.
47. See David White, "*Gulf war set a new pattern*", *op.cit.*
48. See Simon Beavis, "*Choppy days still hover for Westland*", **THE GUARDIAN**, 2 June 1993, p.13.
49. See Julian Moxon, "*Down, But Not Out*", **FLIGHT INTERNATIONAL**, Vol.145, No.4405, 26 January-1 February 1994, p.25.
50. See David Boggis, "*Consolidation is the key to economy and progress*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), *op.cit.*p.XIII.

51. See Michael Kenward, "*Learning to Live With Peace*", **INTERNATIONAL MANAGEMENT**, May 1993, p.40.
52. See "*Raytheon acquires BAe corporate jets*", **AVIATION WEEK & SPACE TECHNOLOGY**, Vol.138, No.23, 7 June 1993, p.46.
53. Ron Smith, "*Defence Procurement: A European Identity*", **RUSI JOURNAL**, Vol.137, No.1, February 1992, p.46.
54. Michael Kenward, op.cit.p.41.
55. Keith Hayward, "*The World Aerospace Industry In Transition*", in **RUSI, DEFENCE PROCUREMENT: TRENDS AND DEVELOPMENTS**, (Royal United Services Institute, Whitehall Papers No.18, 1993), p.65.
56. See Luisetta Mudie, "*So many willing hands*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), op.cit.p.XIII.
57. *ibid.*
58. I am indebted to David Howell, WHL's Head of Strategic Planning whilst I was at the company, who was a great source of inspiration to me. He highlighted the importance of recognizing that threats and risks can be converted to opportunities, and emphasized the need for understanding customer-relationships within the geo-strategic environment.
59. Arthur Reed, **BRITAIN'S AIRCRAFT INDUSTRY: WHAT WENT RIGHT ? WHAT WENT WRONG ?**, (London: J.M. Dent & Sons Ltd., 1973), p.1.
60. Geoffrey Pattie, **IS THERE A FUTURE FOR THE BRITISH AEROSPACE INDUSTRY ?**, (London: The Bow Group, 1975), p.4.
61. Arthur Reed, *inter alia*.
62. Ivan Rendall, **REACHING FOR THE SKIES**, (New York: Orion Books, 1989), p.284.
63. See "*Airbus studies military A340*", **JANE'S DEFENCE WEEKLY**, Vol.16, No.18, 2 November 1991, p.799.
64. See Michael Heseltine, **THE CHALLENGE OF EUROPE - CAN BRITAIN WIN ?**, (London: Weidenfeld and Nicolson Ltd., 1989), p.119.
65. *ibid.*
66. For additional information on BAe's military aircraft range, see BAe DMO, **MILITARY AIRCRAFT**, (Surrey: DMO, no date).
67. See Paul Betts, "*Jet partnership with Japanese discussed*", **THE FINANCIAL TIMES**, 26 February 1992, p.8. In 1992, BAe was also involved in advanced negotiations with Taiwan Aerospace over a joint venture to make regional jets; see Andrew Lorenz, "*BAe seeks to build in Taiwan*", **THE SUNDAY TIMES**, (Section 3-Business), 9 August 1992, p.10.
68. Most of this section is based on material contained within Magnus Linklater and David Leigh, **NOT WITH HONOUR: THE INSIDE STORY OF THE WESTLAND SCANDAL**, (London: Sphere Books Ltd., 1986).
69. For details of the W30 fiasco see *ibid.* Less than thirty-five of the aircraft were ever sold.
70. The Westland Group comprises Aerospace, Helicopters, Engineering, Industries, Technologies and a number of smaller subsidiary undertakings.
71. Mark Popiolek (ed), "*Take-off time for buoyant Westland*", (The Questor Column), **THE DAILY TELEGRAPH**, 2 June 1993, p.24.
72. See Paul Betts and David White, "*BAe considers launching into helicopter business*", **THE FINANCIAL TIMES**, 24 September 1990, p.10.
73. See various issues of **JANE'S DEFENCE WEEKLY**.
74. This was highlighted earlier; see endnote 36 above.
75. Simon Beavis, op.cit. (Postscript: by the first quarter of 1994, a GKN revised bid enabled the engineering and defence group to capture a controlling stake in Westland; see "*GKN revised bid wins Westland*", **JANE'S DEFENCE WEEKLY**, Vol.21, No.14, 9 April 1994, p.3).
76. See Lawrence Clarkson's paper, "*International Collaboration In The Aerospace Industry*", presented at the Commercial Aviation And Aerospace Conference, (Berlin, June 1992), Financial Times Conference, Speakers'

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77. Mary Kaldor, **EUROPEAN DEFENCE INDUSTRIES - NATIONAL AND INTERNATIONAL IMPLICATIONS**, (University of Sussex: ISIO Monographs, Series 1, No.8, 1972), p.40.
 78. Alastair Buchan, "The Implications of a European system for Defence Technology", Part VI, "Defence Technology and the Western Alliance", (London: ISS, 1967), p.14.
 79. Keith Hayward, **EUROPEAN AEROSPACE COLLABORATION IN TRANSITION**, (Royal United Services Institute, Whitehall Papers No.9, 1991), p.1.
 80. See BAe DMO, **MILITARY AIRCRAFT**, op.cit.p.10.
 81. See "T-45A Rolled-Out", **DEFENCE BRIEFING**, A British Aerospace Defence Ltd Publication, (Surrey: DMO, Issue 11, February 1992), p.1.
 82. *ibid.*p.5.
 83. John McGowan, "*Flying High - The Westland Group*", **RUSI JOURNAL**, Vol.137, No.2, April 1992, p.57.
 84. Much has been written on the crisis. For example, see Magnus Linklater and David Leigh, op.cit.; Ian Davidson, "*The Westland Affair: Policy Issues*", **THE WORLD TODAY**, Vol.42, No.3, March 1986, pp.37-38; and Lawrence Freedman, "*The case of Westland and the bias to Europe*", **INTERNATIONAL AFFAIRS**, Vol.63, No.1, Winter 1986/87, pp.1-19.
 85. John McGowan, op.cit.p.57.
 86. Lawrence Freedman, op.cit.p.19.
 87. The Al Yamamah package has been discussed in a number of articles in the defence and national press. These include: Andrew Lorenz, "*BAe boosted by £1.5bn Saudi cash*", **THE SUNDAY TIMES**, (Section 3-Business), 5 April 1992, p.1.; "*Saudi clears way for \$2.7b UK deal*", **JANE'S DEFENCE WEEKLY**, Vol.17, No.15 11 April 1992, p.597; Simon Elliott, "*Defence of the Desert*", **FLIGHT INTERNATIONAL**, Vol.141, No.4314, 15-21 April 1992, p.21.
 88. See Farooq Hussain, "*Co-operation in arms procurement: a British view*", in Yves Boyers, Pierre Lellouche, and John Roper (Eds), **FRANCO-BRITISH DEFENCE CO-OPERATION**, (London: Routledge/RIIA, 1989), p.135.
 89. *ibid.*
 90. Keith Hartley, **NATO ARMS CO-OPERATION: A STUDY IN ECONOMICS AND POLITICS**, (London: George Allen & Unwin (Publishers) Ltd., 1983), p.157.
 91. Ned Frith, "*The European Fighter Aircraft - Potential And Prospects*", **RUSI JOURNAL**, Vol.137, No.2, April 1992, p.21.
 92. See "*EFA: Key to the future*", (COUNTRY SURVEY: UNITED KINGDOM), **JANE'S DEFENCE WEEKLY**, Vol.16, No.18, 2 November 1991, p.830.
 93. See Ned Frith, "*Affordable Superiority; Eurofighter 2000 Receives The Political Go-Ahead*", **QUARTERLY**, A Journal of British Aerospace, Spring 1993, p.8.
 94. *ibid.*p.9.
 95. *ibid.*p.10.
 96. *ibid.*p.11.
 97. The MiG-29 "Fulcrum" is similar in size and layout to the F-18 Hornet, and was first flown in 1977. It is an all-weather interceptor aircraft, and is capable of speeds exceeding Mach 2. For additional information on specifications and role, see Derek Wood, **JANE'S WORLD AIRCRAFT RECOGNITION HANDBOOK**, (Surrey: Jane's Information Group, 1992, 5th ed.) p.122.
 98. The SU-27 "Flanker" is an all-weather air superiority single-seat fighter aircraft. Its first flight was in April 1981. Its speed is Mach 2.35 and combat radius 1,500km. For additional information, see Derek Wood, *ibid.*p.123.
 99. Ned Frith, "*Affordable Superiority*", op.cit.p.11.
 100. See Keith Hayward, **EUROPEAN AEROSPACE COLLABORATION IN TRANSITION**, op.cit.p.34.
 101. See Keith Hayward, op.cit.; and Laura d'Andrea Tyson, **WHO'S BASHING WHOM?: TRADE CONFLICT**

IN HIGH-TECHNOLOGY INDUSTRIES, (Washington, D.C.: Institute for International Economics, 1992), chapter 5.

102. See Keith Hayward, **EUROPEAN AEROSPACE COLLABORATION IN TRANSITION**, op.cit.p.36.
103. *ibid*.pp.36-37.
104. *ibid*.p.42.
105. As highlighted in **THE GUARDIAN**, 16 December 1980.
106. See Commission Of The European Communities, **The European Aircraft Industry: First assessment and possible Community actions**, COM (92) 164 Final, 29 April 1992, (Brussels: CEC),pp.18-19.
107. SIPRI Report: "Arms Industry Ltd."; as cited in Johann Rapp, "*Defence employment falling further, predicts SIPRI*", **JANE'S DEFENCE WEEKLY**, Vol.19, No.13, 27 March 1993, p.15.
108. *ibid*.
109. See Paul Betts, "*In the throes of transformation*", **THE FINANCIAL TIMES**, (SURVEY: AEROSPACE), op.cit.p.VI.
110. SBAC Briefing Paper; as cited in Paul Betts, *ibid*.
111. See Roland Gribben and Philip Johnston, "*BAe to scrap 2,350 jobs*", **THE DAILY TELEGRAPH**, 13 February 1992, p.1.
112. **Westland Group Annual Report 1992**, p.31.
113. See Peter Southwood, **THE UK DEFENCE INDUSTRY: A CASE OF SEVERE NEGLECT...**, op.cit.
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Part II

INSTITUTIONAL RESPONSES

CHAPTER TWO

THE PROCUREMENT AND REGULATORY ENVIRONMENT

In the 1990s, competition will continue to be at the heart of our procurement practice, but we shall need to adapt to deal better with sole sources and through-life aspects of procurements. The maintenance of an effective UK defence industry will continue to be important to us: but we shall seek to achieve this through the encouragement of industrial competitiveness rather than protectionism.¹

INTRODUCTION

Following the end of the Cold War, additional elements of uncertainty and disarray entered an already complex defence procurement decision-making process: a process heavily afflicted by increasing budgetary pressures, conflicting demands, the pace of technological innovation, and powerful interest groups.² The realisation that an absent monolithic Soviet threat was not synonymous with a safer world soon became apparent, just as the fact that threats - now diplomatically re-phrased as "risks" - were no longer mono-directional nor single-sourced, set alarms bells ringing once again over capabilities to perform potential defence missions. The fear that the "peace dividend" was rapidly degenerating into a peace deficit also weighed heavy for decision-makers, as proposed force cuts were reviewed, and re-reviewed, in the wake of additional missions and responsibilities for our forces.

The defence procurement customer-supplier chain is, as Figure 8. illustrates, a highly complex network, embracing the government (specifically the Cabinet), the Foreign and Commonwealth Office (FCO), the Ministry of Defence (MoD), the

The Customer-Supplier Network Within The U.K. Procurement Environment

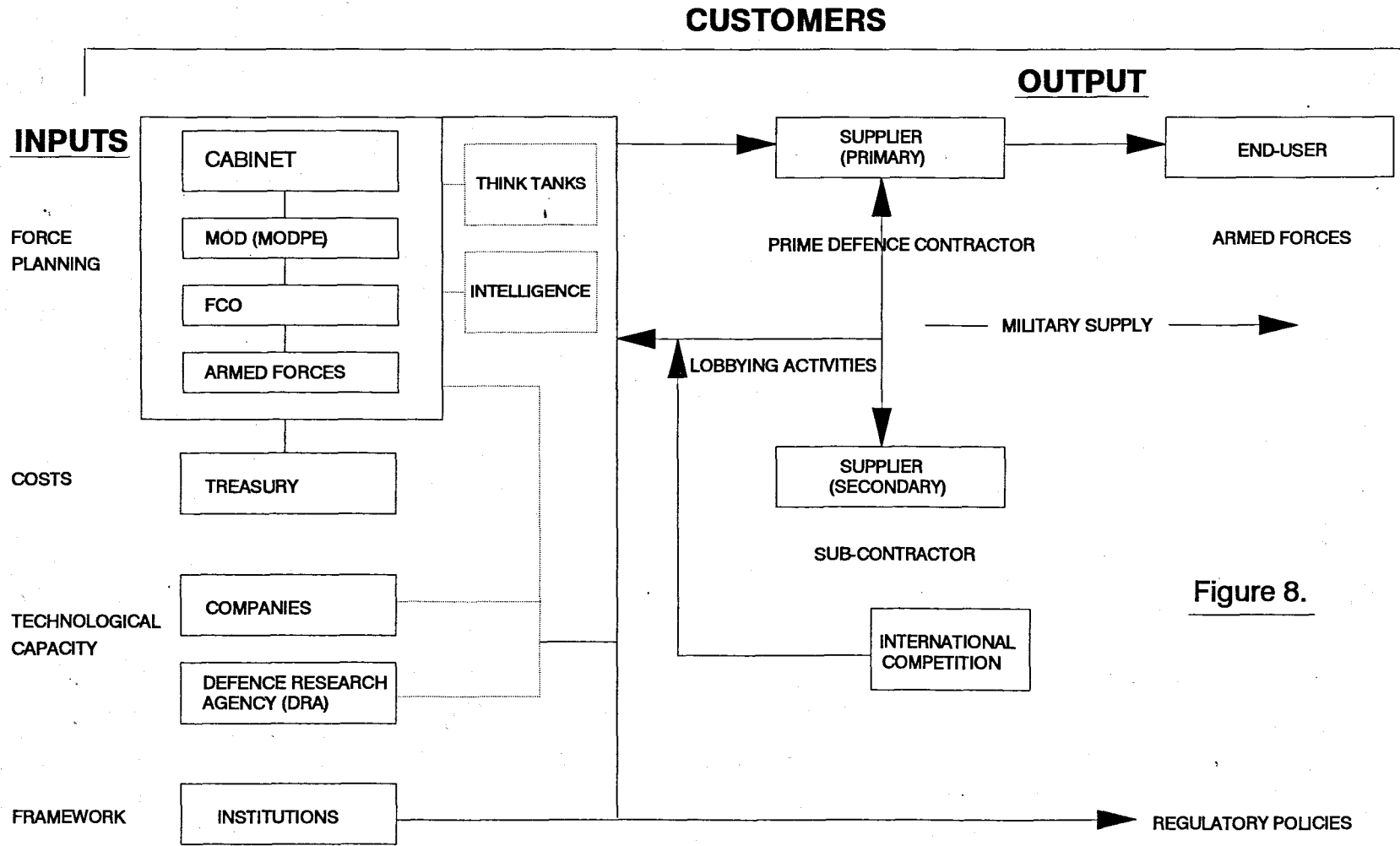


Figure 8.

Treasury, the Department of Trade and Industry (DTI), defence and military intelligence agencies of Britain and her allies, multifarious think tanks, the Armed Forces and defence industrial contractors. Although certain customers inevitably play a more influential role than others in determining requirements, it has to be acknowledged, as Martyn Bittleston³ contends, that weapons acquisition is bounded in practice by the indigenous defence industrial capability available to the state, and by what is currently available for purchase on the world market. However, these two variables do not obviate the need for a government to have a coherent and consistent defence and defence procurement policy.

In order to facilitate sound force choice decisions, force planners can employ one or a combination of force planning frameworks or methodologies (discussed in Chapter Five), each of which has a defence procurement and defence industrial impact. Logically, any rational defence policy should begin with an overall strategy for the defence of a nation's interests. The MoD would then design its forces to meet those commitments and, subject to efficiency tests, send the bill to the Treasury. In practice, however, the government appears to do exactly the opposite: the Treasury fixes the bill, and Britain's Armed Forces have to meet their commitments as best as they can.⁴ From a TQM perspective important questions are raised pertaining to "customer inputs": particular attention focuses on the Treasury, since it appears to be input budgeting, instead of output. Furthermore, the battle for funding within the customer-base is characterized by highly-charged acrimonious customer-supplier exchanges, rather than constructive dialogue. This inevitably contributes towards a higher (CoQ), due to the cumulative negative effect of ineffectual exchanges and process error multiplication.

This chapter explores the complex issues of defence procurement and armaments co-operation (excepting defence trade which is discussed in Chapter Four), examining national and institutional policies and practices. Section 1 analyzes procurement policy in Britain, and examines the role of the Procurement Executive. In section 2, the Treasury's role in the procurement regime is considered. Section 3 examines and reviews the various institutional initiatives in the procurement and regulatory environment.

1. DEFENCE PROCUREMENT IN THE UNITED KINGDOM

1.1 UK Procurement Executive and Procurement Policy

The MoD's declared position is that defence equipment will be procured from the

cheapest available source, preferably off-the-shelf, provided it meets customer requirements and continuity of supply can be guaranteed. The MoD's quest is for "value for money".⁵ Ministry of Defence (Procurement Executive) MoD(PE) officials have stated publicly on numerous occasions, as Sir Donald Hall⁶ points out, that it is not their role to support the British defence industry. This would appear to be confirmed judging by comments made by defence industrialists⁷ who argue that there is no policy to consider the wider economic benefits to this country or the advantages of maintaining a defence industrial base, which is part of the essential make-up of Britain's defence posture. Furthermore, often there does not appear to be even the remotest consideration for the benefits of "spin-off" technology into other areas. However, it is important to acknowledge that including collaborative projects, about 90% of the Armed Forces' equipment is purchased by the MoD from within the U.K. This, as Hall⁸ argues, at least reflects the present competence of the British defence industry: a competence based on past investment, which cannot realistically be maintained if there is insufficient investment for the future. One element which is very much part of Government procurement policy is "competition".

1.2 Defence Procurement and "Competition" in the Market

The late 1980s and early 1990s witnessed a new approach to defence procurement, as the policies introduced formed part of a broader Conservative objective to make the business of public administration more cost-conscious and commercially oriented.⁹ The approach also recognized belatedly that defence companies were better placed than governments to make judgements about responding to the market.

The defence market is very different from other (civilian) markets, and is generally characterized by monopsony, and by the fact that most major purchases of weapons systems are made on a twenty year (or longer) cycle, which adds to the complexities surrounding defence procurement and contracting. It is interesting to observe that for many years in Britain, there has not been domestic competition in the field of combat aircraft (British Aerospace PLC), helicopters (Westland Helicopters Ltd), and aero-engines (Rolls Royce), but this has not prevented the Government from placing over 75% by value of the contracts by competition or otherwise by reference to market forces.¹⁰ Thus, as efforts are being made to address the problem of retaining that "competitive" element against the background of a shrinking supplier-base, the British experience has not been a bad one. Whilst there have been numerous mergers in the

defence industrial sector, particularly since 1989, the United Kingdom has not seen a substantial loss of competition. As Malcolm McIntosh¹¹ points out, most of the recent Government contracts placed, or out for tender - such as EH101 and ASRAAM - have been, or are, subject to genuine competition. Indeed, in some instances, British companies have bid in partnership with European and American firms. Furthermore, as Francis Tusa highlights, the concept of industrial prime contractors, working to Cardinal Points Specifications, is becoming more common: for the EH101 Merlin (ASW) helicopter, the Westland-IBM team faced off, and won, against a consortium of BAe and GEC.¹² According to McIntosh,¹³ the above is not a reason to challenge the validity of competition; rather it is a sensible reflection of the advantages of avoiding duplication of expensive research and development (R&D), and of accessing a wider technological base.

An additional point which also needs to be acknowledged is that given the increasing proportion of procurement costs represented by electronic equipment, software and systems integration - particularly in the aerospace sector - competition for a weapons system between prime contractors who may not be platform or indeed weapons' manufacturers, does seem to be an entirely realistic evolution of the Government's approach to procurement. From a British defence industrial viewpoint, there is a potentially high "external failure cost" (from the Cost of Quality): for if contracts forever find their way outside of the United Kingdom, this contributes to the ultimate erosion of the domestic defence industrial and technological base, which in the long term undermines our security interests (as now dependent on foreign suppliers) - security interests which the MoD was trying to protect in the first place.

1.3 "Partnership Sourcing"

Linked to the above issue of competition, is the often quoted but widely misunderstood concept of "partnership sourcing". McIntosh¹⁴ contends that there should be a close and constructive dialogue with the defence contractors, both in respect of contracts already placed and for prospective requirements. However, as he stresses, this "must not be at the expense of injecting market pressures into our business."¹⁵ For a firm selling goods in the market-place, those market pressures apply to its suppliers whether or not those supplies are competed or the subject of partnership arrangements. The MoD, however, is an ultimate consumer with no competition for the service it provides to this country. Notwithstanding its unique purchasing power, it cannot enter into the kind of "exclusive" partnership arrangements which might be appropriate between prime and sub-

contractors in competitive markets. The free entry into the market of new entities is essential if a dynamic and efficient defence sector is to be retained.

1.4 Off-The-Shelf Procurement

For defence industrialists, one of the major procurement issues which needs to be addressed is the balance between off-the-shelf procurement and procurement through Government funded development programmes. Contractors¹⁶ argue that it is unrealistic to expect industry to take the risk of investing their own funds in the development of a piece of kit against a possible future MoD requirement if that requirement is itself uncertain, and will in fact be subject to competition. It is quite possible that this competition will be from overseas firms, many of whom would have been supported by government funding. Thus there is a strong argument supporting the view that off-the-shelf procurement can in practice lead to overseas procurement, and thus further contribute towards the depletion of the defence industrial base. However, in strict TQM terms, if the MoD - as the "customer" - has a requirement for a particular weapon system to perform a specific task, and that weapon happens to be currently available off-the-shelf, then the decision to purchase is a quality output, since customer requirements have been met first time.

2. THE TREASURY'S ROLE IN THE PROCUREMENT REGIME

2.1 Background to the Survey Cycle

Whatever the public expenditure objective of the Government, it will always be necessary to scrutinize individual departmental programmes to achieve the best value for money from them. The decisions on individual departmental spending programmes are taken in the annual Public Expenditure Survey Cycle (PESC), which culminates in the Chancellor's Autumn Statement in November.¹⁷ The aim is to decide for each departmental programme the cash provision for each of the three coming financial years. Unlike the Ministry of Defence's Long Term Costings (LTCs), these plans are in cash terms. It is important to recognize a significant recent development (of ten years standing now), which concerns the fact that there is no longer any presumption that if inflation is higher than expected, the volume of departmental plans will be preserved by providing extra cash to accommodate the extra costs. Thus if the allowance made for inflation turns out to be insufficient, departments do have to "squeeze" their plans, unless of course ministers choose to make specific exemptions for selected programmes. If extra cash was

just provided, the result would be a vicious circle: inflation leading to increased public expenditure, which further fuels inflation.

In July each year, the Cabinet discuss the Chancellor's latest economic assessment, and is advised of the total bids from departmental ministers, before collectively agreeing on the broad objectives for the next stage of the Survey discussions. In September, the Chief Secretary to the Treasury starts to discuss each programme with the Departmental Minister concerned. If a Department is bringing forward major new policy initiatives (projects), these will be rigorously probed. However, if a comprehensive policy review has recently been carried out, the resulting policy decisions would not usually be re-opened within the context of the Survey discussions. An excellent example of this is provided by the issue of "defence" in 1991 since, by the Summer, Ministers had effectively decided on the policies for implementing "Options for Change" which were enumerated in the 1991 Statement on the Defence Estimates.¹⁸

Since the Treasury work on three-year public expenditure totals, and the MoD work on ten-year LTCs, it is interesting to examine how they slot together. Despite the fact that the timescales are different, and the MOD's LTCs are at constant prices, (whereas public expenditure figures are in cash), the system works because of the recognition that Treasury public expenditure figures are the overriding control. Once these cash ceilings are announced, the onus is upon the MoD to align their LTC plans accordingly, and to manage their various programmes within those ceilings. To a certain extent, the MoD is actually better placed than are a number of other departments, by virtue of the fact that the defence programme is run as block budget, which thus gives it greater scope to re-order priorities should that become necessary.¹⁹

2.2 Reviewing Defence Equipment Reviews

Apart from the major role the Treasury plays in decision-making on defence programme totals, it devotes considerable time and resource to getting better value for money from project decisions. According to the Exchequer and Audit Acts of 1866 and 1889, the Government cannot spend any money without Treasury authority. However, these days, much of that authority is formally delegated to individual Departments. With regard to the MoD, the Treasury will only look at equipment purchases exceeding £25 million and feasibility studies of £1 million or more. According to David Moore,²⁰ the Treasury are fundamentally trying to do two things: a) decide whether they can give

approval to a particular project, and b) satisfy themselves that the MoD are using the right system and procedures. It is obviously important from the Treasury's perspective to ensure that a "quality" system is in operation, since they have delegated a number of projects to the MoD.

2.3 Treasury Support for "Competition"

According to the official line, the Treasury favours exposing British defence companies to overseas competition because it stimulates them to be more "competitive" and efficient in their approach to costs, quality, delivery and so on. If British goods are competitively priced, they will be bought in preference to foreign equipment, but only then, and only if they meet customer requirements. David Moore²¹ points out that if a decision to buy British was taken, as opposed to buying a cheaper foreign piece of kit, this in itself would not be "costless". In fact, there would be a high long term external failure cost. Although the individual British company (and its shareholders) would benefit, there would be disadvantages to others: the additional costs incurred would of course have to be accommodated within a given total defence programme, and as a result of the decision to buy more expensive equipment some other part of the defence programme will suffer in order to provide the offsetting savings. This could be another defence equipment project which a UK supplier was hoping to provide.

2.4 The Peril of Cost-Overruns

Both the Treasury and the MoD are concerned about the problem of cost-overruns on on-going projects. Any extra costs inevitably mean that other parts of the defence budget have to be cut back. New ideas which could have been developed may have to be jettisoned because the possibility of finding offsetting savings to finance them has been pre-empted by the financing of the cost-overrun. The TQM CoQ concept highlights the high cost of quality to be paid for such overruns, with external failure costs being passed on to a number of customers. For defence contractors, the cancellation of specific programmes - which would have already received valuable time and resource - could be highly damaging to the survival of the company, and obviously disrupt their strategic planning activities. Furthermore, the loss of new ideas and lack of innovation is a high external failure cost to be borne by the contractor, in the first instance, in terms of the loss of potential revenue, from a product which would have had a home buyer, and could also have become an export success. Of greater military importance is the fact that it could disadvantage the nation strategically, through a failure to meet the technological

advances of other nations, and to produce the same level of sophisticated equipment necessary to meet future mission requirements.

3. THE INSTITUTIONS AND THE PROCUREMENT & REGULATORY REGIME

3.1 The North Atlantic Treaty Organization

Background

Although NATO has adopted a somewhat pragmatic approach towards procurement and armaments co-operation over the years, this in no way detracts from the capacity of the Alliance agencies to work in this area. Arguably, Article 3 of the North Atlantic Treaty (1949) provides for it:

the Parties separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack.²²

From late 1949 to the mid-1960s, when the Alliance underwent organizational changes, it was largely through the efforts of the Military Production and Supply Board - a body tasked with promoting the co-ordination of production, standardization and technical research in the armaments field - and later through the activities of its successor, the Defence Production Board, that the first tentative steps towards the rationalization of defence procurement were in fact made.

NATO and the Conference of National Armaments Directors

The Council's creation of the Conference of National Armaments Directors (CNAD) in 1966, demonstrated the growing importance attached to arms co-operation and standardization of policies and practices within the Atlantic Alliance. The Main Groups operating under CNAD are: the NATO Naval Armaments Group (NNAG); the NATO Army Armaments Group (NAAG); the NATO Air Force Armaments Group (NAFAG); and a Defence Research Group (DRG), which replaced the Committee of Defence Research Directors. In June 1977, CNAD set up the Tri-Service Group on Communications and Electronic Equipment (TSGCEE). It has initiated a number of co-operative programmes in the Communications, Navigation and Identification (CNI) field, including the NAVSTAR Global Positioning System (GPS), and the Battlefield Information Collection and Exploitation System (BICES). The Tri-Service Group on Air

Defence was disbanded in the Spring of 1981, with the major part of its work taken over by the NATO Air Defence Committee (NADC).

NATO Industrial Advisory Group

Another key player, although not officially recognized as one of the Main Groups - yet enjoying equal status with them - is the NATO Industrial Advisory Group (NIAG), which CNAD established in June 1968.²³ The current NIAG structure comprises a plenary body, a Planning Committee acting under its authority, and permanent liaison groups which advise and assist other CNAD bodies on legal, financial, management problems or other matters of a general nature pertaining to the broad area of armaments co-operation. NIAG membership is open to all NATO nations, but Iceland and Luxembourg have never participated in its activities. The composition of a national NIAG delegation varies from one country to another to suit national requirements and practices, but generally members hold senior positions in defence industrial concerns. NIAG's Chairman and Vice-Chairman are elected from within its members.

NIAG's objectives are threefold: a) to provide an industrial forum for a free exchange of views on various aspects of NATO armaments research, development and production; b) to provide industrial advice to CNAD on how best to foster government-to-industry and industry-to-industry armaments co-operation within NATO and c) to ensure optimal use is made of NIAG resources to assist Main Armament Groups in exploring opportunities for collaboration, and seeking timely and efficient ways to satisfy NATO military requirements.²⁴

NIAG performs its tasks as a result of requests by a) CNAD, b) the NADREPS or c) the Main Armament Groups, and also acts on its own initiative. It interacts closely with NATO project groups, contributing to Outline NATO Staff Targets (ONSTs) and, if required, carries out pre-feasibility studies identifying possible equipment/system solutions to meet ONSTs requirements. According to a NATO Unclassified Document, NIAG has carried out nearly twenty pre-feasibility studies on behalf of the CNAD Main Groups since 1968.²⁵ By its very nature, all of NIAG's efforts are multi-national and collaborative. Robert Fiskette, Vice-President, Martin Marietta International Inc., cites an example of a pre-feasibility study which involved 259 industrialists from fifty-five different companies in nine (possibly ten) countries.²⁶

Over the years, NIAG has been involved in a number of CNAD areas, which is an indicator of how highly regarded it is within the Alliance, and how valuable a role the group plays in the armaments co-operation field.

Recent Armaments Planning Processes

CNAD procedures for armaments co-operation are based essentially on an information exchange process, which seeks agreement between countries and the Major NATO Commanders (MNCs) on harmonized operational requirements in order to promote co-operative equipment programmes. Since NATO is not a supra-national organization, it has no mandatory powers over national governments; consequently, the co-operative process can only be supported and encouraged, but not regulated, by NATO. It is arguable that, in TQM terms, this is an example of an agreed (intentional) built-in "cost of non-conformance" (external failure cost: a cost that reaches the customer), in that all NATO members - in adopting measures that always ensure independent sovereignty is not affected - have agreed not to be constrained, and to support retention of flexibility. This external failure cost is not necessarily synonymous with the production of negative results (low quality output); indeed, this can prove to be beneficial in the long-term, for it can facilitate change and innovation through fostering co-operative efforts, rather than "bull-dozing" members through insistence on adherence to rigid procedural rules.

Phased Armaments Programming System

Whilst there is no centralized armaments planning system in the Alliance, improvements in the management and programming of work have been introduced through the adoption of a "Phased Armaments Programming System" (PAPS) in 1981. The PAPS is fundamentally a managerial review process for CNAD programmes structured around key milestones of a typical weapon system life-cycle. Programme reviews are facilitated at key decision points.

Apart from PAPS, the NATO Armaments Planning Review (NAPR), established in 1979, is another process designed to give a greater degree of coherence and structure to co-operative efforts. As its name suggests, it is primarily a review system designed to expose opportunities for co-operation. It uses, as its main point of departure, equipment replacement schedules provided annually by Alliance members. These are examined by CNAD groups, MNCs and the International Staff (IS), with a view to identifying

standardization requirements and potential opportunities for co-operation. In view of the number of bodies involved in the process, and the level of liaison required to ensure that the best solution is produced first time, in line with the TQM ethos, the utility of employing the "Customer Concept" as an analytical tool is highlighted here.

Conventional Armaments Planning System

In December 1985, recognizing the growing importance of arms co-operation as a primary means of improving NATO's conventional defences, the CNAD was directed to implement a new "Armaments Co-operation Strategy". Strong evidence of the increasing political importance of armaments co-operation could be seen in the Council Meetings of 1985 and 1986, when Deputy Defence ministers addressed the issue of armaments co-operation. In 1987, CNAD examined proposals drawn up by the Secretary-General for the establishment of a NATO Conventional Armaments Planning System (CAPS), and in addition, National Armaments Directors (NADs) discussed the relevance of these proposals to the overall effort to improve NATO's defence planning in the context of the imbalance of NATO/WTO conventional forces. On 8 March 1988, agreement was reached on a plan of action to launch the new system for a trial two-year period and a new Committee, the NATO Conventional Armaments Review Committee (NCARC) emerged, which was specifically commissioned with overseeing and co-ordinating the testing of the mechanisms and procedures being developed.²⁷ Following the successful outcome of the CAPS trial cycle (1988-1989), the NAC, meeting in "Reinforced session", in November 1989, issued a new mandate for implementing the CAPS over two additional cycles: 1990-1991 and 1992-1993. The first full cycle of CAPS was completed in December 1991. Each new CAPS cycle formally begins with a meeting of the NCARC in the beginning of the cycle's even year (1990, 1992 etc.).

The CAPS represents an innovative approach to armaments co-operation. As David Cooper²⁸ contends, instead of harmonizing nationally and internationally on equipment solutions, the logical starting point should be a harmonization of the needed capabilities based upon operational deficiencies that cannot be solved by existing and/or planned equipment. It is intended that CAPS will achieve this. In essence, the CAPS identifies potential "candidate" projects for collaboration, which interested nations may then pursue through the PAPS process. This explains why the CAPS is complementary to, and not a substitute for the PAPS.

The CAPS Process

Originally, it was envisaged that each CAPS cycle would start with a fresh set of armament goals, but it is now widely accepted within the Alliance that the CAPS will be a "rolling process", with each successive plan incorporating new as well as outstanding NATO goals. Expressed simply, the CAPS cycle encompasses four phases,²⁹ each of which has a distinct focus. Information on each is provided below:

Phase 1 - Submission of Armament Goals

NATO members' military needs form the starting point of this phase, with needs ascertained via an Armaments Planning Questionnaire (APQ). Member-countries are requested to report all their armaments goals and activities of a long-term nature, in addition to those of an intermediate nature, which they consider to support the attainment of the long-term objectives (mission). The use of a common coding system³⁰ is intended to promote a reasonably high level of homogeneity in the reporting, and minimize ambiguity regarding the nature of the information being reported.

Phase 2 - Collation and Preliminary Analysis

At NATO HQ, APQ requests are collated and consolidated into a Preliminary Analysis Document (PAD), which comprises two volumes. The first Part is a record, by nation, of all the armament goals reported in the APQ replies. In the second Part, individual goals and armament activities are organized by "functional" requirement and "equipment" type. This dual-approach is necessary, since many different types of equipment could be developed to satisfy any functional requirement and conversely, one specific equipment type could satisfy a number of military requirements. The functional analysis aims at determining whether the 'mix' of national military requirements reported in the APQs, in the form of armament goals, is likely to meet the collective military needs identified in the CAPS as Alliance goals. The equipment analysis addresses, by type, all reported armaments programmes (without respect to a stated NATO goal), to identify potential areas of convergence, overlap or duplication of effort, and to highlight opportunities for co-operation. Admittedly, there is a far from transparent boundary between the two types of analysis: it is very difficult to make a determination (on the basis of a national statement of need) of whether a collective military requirement will be fulfilled, without at some point, taking into consideration the relevant armament activities under way in NATO. This appears to be an area in need of reform.³¹

With the functional and equipment collations completed, the resulting sum of the two approaches provides the basis for the IS to formulate the detailed analysis, containing the conclusions and preliminary recommendations. Part 2 of the PAD is circulated to the nations for their examination in the Spring of the CAPS cycles's odd year (1991, 1993).

Phase 3 - National Review

This phase involves refining the conclusions and recommendations contained in Part 2 of the PAD, mainly through a process of review in national capitals and multilateral consultation at NATO. To facilitate this, two NCARC meetings are scheduled to take place during the Spring of the cycle's second year. This brings the number of scheduled plenary meetings of the NCARC in a cycle to four. The output of this process is an agreed CAP, which is forwarded for approval by the CNAD and subsequent endorsement by Ministers.

Phase 4 - Approval and Promulgation of the Plan

At CNAD's meeting, scheduled in the Autumn of the cycle's second year (1991, 1993), NADs are invited to approve the Plan as a whole, including the recommendations associated with each NATO goal. In many instances, the recommendations will have policy or political implications - which stretch beyond their technical content - and thus the CNAD Plan review is a particularly important milestone in the CAPS cycle. As Diego Ruiz Palmer³² contends, CNAD's participation in these final stages of the armaments planning process is "intended to provide the kind of senior-level impulse to NATO arms co-operation which too often has been lacking."

CAPS: Implementation and Progress to-date.

During the CAPS cycle 1990-1991, there were 482 separate armaments targets reported-on by the NATO countries. In employing the CAPS, these national inputs were grouped for analysis under ninety-nine "functional" areas and sixty-seven "equipment" areas. Eighty-one recommendations for action were eventually forwarded to CNAD.³³

CAPS is being extended following its trial period. If it leads to the establishment of a conventional armaments plan, which is adopted and adhered to, it will have made a valuable contribution to the effectiveness of NATO. However, as Martyn Bittleston³⁴ contends, it would be a mistake to expect too much from CAPS, too soon: its limitations are essentially those of PAPS. Furthermore, results - even in terms of harmonized

requirements - will be slow in coming because the price of adherence to the lofty principles of equipment rationalization in terms of abandonment of national decision-making remains too high.³⁵ The inescapable, inhibiting, factor is that countries can only be persuaded, not coerced, to buy the equipment NATO would like its members to have.

NATO and Trans-Atlantic Equipment Collaboration

In efforts to make the most cost-effective use of NATO resources, there has been an increasing desire on both sides of the Atlantic (particularly by the French and British in Europe) to improve collaboration. It is ironic, however, that it is probably anxious concerns about American competition "factoring out" Western European companies - rather than military factors *per se* - which have fuelled European efforts to enhance Alliance co-operation.

The more recent drive for arms co-operation has resulted in the adoption of a triple approach: a) general Memoranda of Understanding (MOUs) between American and European nations on the reciprocal procurement of defence material and removal of trade barriers; b) a family of weapons approach, whereby nations agree to develop and produce different equipment of a given family under either North American or European leadership, in such a manner that R&D duplication of effort is minimized; and c) the dual-production of weapons by NATO nations of systems developed by other members, under fair and equitable conditions. The key question which has to be asked is whether these measures have helped to improve the passage of "European" defence equipment along the "Two-Way Street" ? Recent examples of blatant U.S. protectionism in the 1980s suggest that improvements are far from complete. The rejection of the Martin-Baker ejection seats and the 81mm 116 mortar³⁶ reinforced the NATO-European view that the USA is very much a captive home armaments market, well-protected by Congress. There are concerns over American "hidden agendas" (dubious "testing" procedures) for foreign procurement, as recently highlighted by Francis Tusa.³⁷ Specific legislation protects America's home market, and this includes the "Buy America" Act (1933) and the "Speciality Metals" rider to the Department of Defense Appropriations Act - a rider introduced every year since 1973, as highlighted by Philip Webber.³⁸ NATO-Europe has become increasingly suspicious of any American proposals for new weapons, viewing them as just another American ploy to sell American equipment to Europe, at a further expense to Europe's already struggling defence industries, rather than as part of the co-operation initiatives. But on the whole, the various measures to achieve greater co-

operation have positively contributed to the achievement of NATO's rationalization, standardization and interoperability (RSI) objectives, which are discussed below.

NATO Interests: "Target RSI"

Whilst it is beyond the scope of this chapter to dwell on these RSI objectives, at this juncture it is useful to examine them briefly, since they do provide the basis for a better understanding of the issues arising today. It seems evident that although NATO members have been pursuing a common goal (rationalization), they have been doing so without full agreement on the means to achieve it.³⁹ As highlighted in The Klepsch Report⁴⁰ (discussed below), the problems with attaining interoperability and standardization of military equipment have been discussed virtually ever since NATO's birth. Although a characteristic feature of these discussions has been a broad measure of agreement on the desirability of both, progress in the field has not been rapid. This is largely attributable to the perceived negative impact of such measures upon national defence industries - the fear that it could lead to mass re-structuring, with devastating effects upon the economy: unemployment, for example - over-shadowing the potential positive implications of such measures upon the Alliance collectively.

Of these objectives, "standardization" has always been the most contentious issue. In the 1960s and 1970s particularly, the USA tended to use the term to mean commonality of equipment type, with the inference being that it was American equipment that should be common. Not surprisingly, this was not well-received in NATO-European circles. Evidence of the extent of the problem can be seen in the fact that agreement was reached as recently as January 1981, when a broad and provisional conception was approved by the Council:

an activity consisting of the process of formulating, issuing and implementing standards, and standards have many levels of operational and design implications within the military sphere (including compatibility, inter-operability and interchangeability)...⁴¹

As Trevor Taylor⁴² points out, clearly rejected in this definition was the idea that standardization had to mean "identity" of equipment.

The standardization issue is inextricably linked with armaments co-operation and procurement, and is of relevance to most NATO agencies. From the beginning, NATO

efforts have been directed towards the incorporation of standardization procedures into standardization agreements (STANAGS). During the Gulf War, CNAD's STANAGS facilitated the cross-operation of naval helicopters from different national platforms. In 1983, the Council established the NATO Standardization Group (NSG), whose composition is significant in that it comprises national representatives from both the operational and materiel-oriented sides of defence departments, representatives from the MNCs, the IMS, and the Military Agency for Standardization (MAS). This Group is responsible to the Council for obtaining national and staff inputs, with a view to the preparation of a composite NATO Standardization Programme (NSP).

When viewed in a TQM framework, another dimension is added to the standardization issue. If "standardization" is used as the criterion for gauging the success of Alliance initiatives (and responses to the contracting defence industrial base) an interesting situation presents itself: to those persons advocating total standardization (of the old Warsaw Pact variety), then the Atlantic Alliance might be judged a relative failure; but on the other hand, the present amount of standardization and arms co-operation within the Alliance might be regarded as highly successful and even optimal, for what is after all a voluntary international grouping of independent sovereign states. Within the TQM framework, the question also arises as to whether standardization is actually an agreed customer requirement, or whether it is merely a vehicle, used by the nation carrying the most clout within the organization, to champion its defence equipment (taking into account pressing domestic political, economic and social objectives, and dwindling defence markets) as the number one choice - the means to an end in other words.

Through applying the CoQ concept, the various costs associated with standardization are highlighted. In some instances,⁴³ if standardization of equipment and rationalization of programmes (the multi-national programme approach) is examined, the "Cost of Non-Conformance" is illustrated: this is a combination of "internal failure costs" (those costs incurred during a particular process, which do not reach the customer) and "external failure costs" (the costs of those failures that actually reach the customer). When applied to multi-national programmes, which would be encouraged by NATO as a means of enhancing co-operation, and which are an economic inevitability in the current defence climate, there are examples of both the above costs: the additional time, effort and resource spent in the initial stages in harmonizing requirements is an internal failure

cost; the expenses involved in "parcelling-out" workshares equitably (which will contribute to greater cost rises) is an external failure cost. Thus the CoQ approach has demonstrated how in certain cases, the rationalization of programmes and standardization of equipment is not always synonymous with cost-savings, irrespective of the economic argument that longer production runs equals lower unit costs.

"Interoperability" is a sub-section of standardization, and should not be viewed as an alternative to it. The Pentagon (now NATO-approved) definition is the:

ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together.⁴⁴

One graphic example of the lack of interoperability is that reported in 1974, of a NATO exercise in the North Atlantic, in which Alliance forces themselves "shot down" 30 of about 60 of their own aircraft, largely due to the communications systems of the Allied aircraft not being interoperable.⁴⁵

When applied to equipment, interoperability can be achieved either through the presence of common sub-systems or through compatible sub-systems.⁴⁶ Both interoperability and standardization are not ends in themselves, but the means to an end; rationalization is that end.

"Rationalization" is very much an umbrella term used to describe any action:

which makes more rational use of...defence resources both as individuals and collectively. This includes a better and more efficient division of tasks and at least compatibility of equipment among different allies.⁴⁷

It can be furthered by increased standardization and interoperability, and through employing other measures such as the development of international command structures.⁴⁸

3.2 The European Community

Background

This section provides information⁴⁹ on the various European Community (EC) organs likely to have an impact upon defence industrial matters. The Council of Ministers decides on the laws which set up EC policies. Each Council consists of Government

Ministers from the Member-States, accountable to their own Parliament, representing national interests. Decisions are taken by unanimous agreement, qualified majority voting (QMV), or by simple majority, depending on the subject under discussion. The European Commission has three main tasks: a) to make proposals for EC laws, b) to ensure that they are implemented, and c) to manage EC policies. The European Parliament (EP), whose 518 members are directly elected every five years, is consulted on draft laws and may propose amendments. It works with the Council in setting the Community budget. The Community Heads of State (or Government) constitute the European Council, and generally meet twice a year to give overall direction to the Community's work. It is arguable that ratification of Maastricht does strengthen the democratic accountability of Community instruments: the EP should have increased powers to carry out inquiries into cases of Community law maladministration, and will have a greater say over legislation, in addition to acting as a watchdog over the manner in which the Commission implements the Community budget. National Parliaments should also be encouraged to play a greater role in Community affairs through scrutiny of EC legislation: a periodic conference of parliaments will bring together representatives of the EP and national parliaments to discuss the Community's development.⁵⁰

Although defence production and procurement have traditionally been excluded from the EC's purview under Article 223 of the Rome Treaty, the Commission has made inroads in the defence industrial field through its general industrial policy and application of non-defence-specific items. It advocates Article 223's abolition (discussed below), favouring the creation of a joint procurement agency. However, the vast majority of EC member governments fear that this would compromise their ability to make sovereign decisions on defence.

EC Defence Procurement Excursions 1975-1983

Confirmation of the EC's long-held desire to bring defence procurement within its purview can be found in the plethora of reports which emerged in the 1970s-1980s: Gladwyn,⁵¹ Tindemans,⁵² Klepsch,⁵³ Greenwood⁵⁴ and Fergusson.⁵⁵ Figure 9. summarizes key tenets and recommendations of these early EC "excursions" in the defence procurement arena.

Year	Report	Selected Key Tenets/Recommendations
1975	Gladwyn	a) Highlighted importance of standardization. b) Recommended creation of central Armaments Procurement Agency.
1976	Tindemans	a) Favoured a common industrial policy on the manufacture of arms within the framework of the Community. b) Suggested establishment of European Armaments Agency.
1978	Klepsch	a) Recommended creation of a single Community market in military equipment. b) Acknowledged interrelationship of civil and military industrial production sectors. c) Highlighted need to pursue a Community industrial policy. d) Proposed creation of a central European Armament Procurement Agency (EAPA). e) Favoured closer cooperation between the Commission and the IEPG.
1980	Greenwood	a) Suggested creation of a modest information clearing house: a European Defence Analysis Bureau (EDAB). b) Favoured establishment of Public Procurement Task Force. c) In an explanatory note to the Report, Davignon suggested that any new body created for defence procurement needs should not be under the EC, but instead, between the Community and WEU, or else attached to the IEPG.
1983	Fergusson	a) Argued that Greenwood's EDAB proposal should take the form of expanded IEPG Panel I activities. b) Public procurement programmes should be established on the basis of common criteria and open to companies from all member-states. c) Argued that the Commission might be best-equipped to undertake Procurement Task Force functions.

Source: Gladwyn, *op.cit.* p.2.; Tindemans, *op.cit.* p.19.; Klepsch, *passim*; Greenwood, *passim*; Fergusson, *op.cit.* (29b,a,c).

Figure 9. Selected EC Defence Procurement Excursions 1975-1983

Procurement and a Euro-Defence Union ?

Following the signing and eventual ratification of Maastricht, it is now clear that some form of Euro-defence identity is firmly on the EC-WEU agenda. The possibility of some form of military procurement agency - within a European Defence Union - being created, to join European Monetary Union (EMU) and EPU, is once again under discussion.⁵⁶ Although such an entity may never materialise, analyzing such potential eventualities is a useful exercise since it highlights the economic and political implications of closer union, and the difficulties associated with it. A European Defence Union (EDU), as Ron Smith⁵⁷ contends, could be cost-saving if it leads to procurement rationalization, but it would be cost-increasing if it created space for lobbyists and vested interests to shape policy in their direction. The prospect of a Common Armaments Policy adding a tank mountain to the Common Agricultural Policy's butter mountain is not such a fanciful analogy, and could become a concrete reality.⁵⁸ If an EDU were to develop, it would need institutions which would minimize the scope for expensive and counter-productive "pork-barrel" politics in Brussels. The lobbying power of domestic interests tends to be highest where the fixed costs and learning curve effects are largest: aircraft for example. Ron Smith⁵⁹ argues that given scale economies in Europe, an EDU, by

introducing competitive purchase or centralized procurement, might save 20% on weapons purchases - a gain of \$10 billion for WEU members. Savings, could be larger, but to realize them in practice, requires re-designing procurement procedures, which vary greatly between the European countries.⁶⁰

Whilst a high degree of international collaboration already exists within the defence industry, a quantum leap towards a European armaments agency would have to overcome a number of hurdles: a) the national sovereignty and defence sensitivity issue; b) the problems of harmonizing procedures; c) the scenario of a particular project plagued by technical difficulties - the agency would have to decide whether these were merely initial "teething troubles" that could be successfully overcome, or whether they should authorize the cancellation of the project; d) agreement would have to be reached on the primary objective of the agency - should it be "value for money" or support for industrial policies that strengthen the industrial base? With regard to procurement objectives, the British MoD has emphasized the importance of doing one thing: meeting military needs at the cheapest available price. This would appear to be a sensible approach, since trying to achieve both goals can result in missing both targets. However, given the acute differences in attitude between the French and British, reaching agreement on procurement goals would be highly problematic. It should also be recognized that the above issues are perplexing enough at a national level, but at the Euro-level these difficulties will multiply.

Whilst there is agreement on the benefits of creating a co-ordinated procurement process, caution has been urged by defence analysts and procurement officials alike over the creation of a European Procurement Agency. Malcolm McIntosh has argued "before endorsing it as a concept, we will need to consider what it might actually do."⁶¹ McIntosh has emphasized the fact that whilst some items of equipment lend themselves to standardization and common procurement, others are more national and reflect genuine differences between the military and strategic circumstances facing different countries.⁶² It has to be recognized that in order to "add value" to the defence procurement process, any European agency would have to improve on the efficiency and effectiveness of existing procurement structures. Since this will be easier for some equipments rather than others, it may be better to see an agency "start with only a few obviously common items and make its case from there."⁶³

Apart from creating a single European procurement agency, there are other possible scenarios to consider: a) competing joint agencies, with more specialized remits, to procure particular types of equipment and b) an open European market, with fixed-price contracts and competitive tendering, which would offer the much-needed transparency. From a "quality" perspective this would be welcomed, since transparency would greatly reduce the difficulties of specifying objectives and negotiating procedures. In addition to the above, the "family of weapons" approach is another important area which could be developed further.

The European Commission and Article 223 of the Treaty of Rome

Article 223 of the Rome Treaty has increasingly been under scrutiny. The Commission has begun to question whether defence equipment should be excluded from its area of influence, or should more correctly come under EC jurisdiction, through being essentially an industrial and commercial issue. Proposals have already been forwarded to EC member-states to delete Article 223, which effectively puts arms trade and production beyond the regulations of the Single European Act.

There is no justification, Leon Brittan has argued, for maintaining discrimination, favouring national producers, under Article 223. In 1991 he said that:

National discrimination and unbridled state subsidy in the defence field has been bad for Europe's security -because armed forces have been tied to national suppliers, rather than being free to secure the equipment they really need. Neither the armed forces nor the tax-payers have had the best value for money.⁶⁴

In TQM terms, the above is a classic illustration of "non-quality" output, since customer requirements have not been met: there is a high external failure cost passed on to the armed forces (inappropriate equipment), which undermines the country's security (which incidentally tax-payers are paying for: again, customer requirements have not been met), and risks lives.

Leon Brittan has proposed that European internal market rules be applied to the defence sector. However, strong resistance by EC members to eliminating this article has meant, in practice, that only "dual-use" goods are to be excluded from this article. Britain and France have expressed reservations, and Italy and Greece also share anxieties, since

some of their local industries dependent on protected markets would face severe survival challenges in the new open market.

Invoking the "national security" exemption clause is a controversial, and arguably highly-damaging, aspect of current defence-contracting practices, and is an area which the Commission wishes to "clean-up". At the end of October 1991 Leon Brittan announced that defence contracts awards would be examined to ensure that they do not flout EC trade rules. He said he would investigate whether the national security exemption was being used by governments as "a device to protect so-called dual-use production with primarily civil applications."⁶⁵ According to Brittan, some EC governments may be using the exemption clause to grant contracts for material with civilian applications to national producers, at the expense of foreign competitors.

The "Single Market" and Defence Industries

After years of groundwork following the Single European Act (1986), the European Community formally became a single market without internal frontiers on 1 January 1993. This market, by definition, is to be free of all trade barriers. In addition, this market also means approximating standards, harmonizing existing regulatory frameworks, and moving towards more open procurement procedures. Defence contractors are not left out in spite of Article 223, since practically all of them have "civilian" interests, and thus will be affected by EC trade, competition and public procurement rules. It is important to recognize that the existing Community framework for public procurement already embraces a significant share of defence equipment. The Suppliers Directive of 1988 applies to all products bought by government agencies except for those covered by the security exemptions of Article 223, notably "arms, munitions and war materiel". The major difficulty at the moment is that individual governments are deciding for themselves what Article 223 should include. The European Commission has been given strong powers to enforce respect for competition laws, and also to ensure repayment of illegal state aids. These, as Carol Reed⁶⁶ highlights, are increasingly seen as important 'tools' to ensure an even (level) playing field. For some EC members (particularly those with nationalized defence industries, or heavily state-subsidised industries), this may be a disincentive to incorporate defence under Community procurement rules, and is probably a major reason why the Commission's proposal to delete, at least amend, Article 223, was resisted.

Another area where the internal market will affect defence contractors is the harmonization of the legal framework for companies, which will (in theory) remove the fiscal hurdles to the creation of European firms. A 1988 European Commission document highlighted the importance of creating suitable conditions for co-operation between EC companies - particularly through harmonizing legal and taxation arrangements - and affirmed that its "work [aimed] to promote cross-frontier co-operation."⁶⁷ However, regarding existing legal mechanisms, it is still apparent that the European aerospace industry lacks a European Community legal framework appropriate for trans-frontier operations. The adoption of the European Economic Interest Grouping (EEIG)⁶⁸ - designed to facilitate intra-European Joint Ventures (JVs) - has probably been the only significant step forward, but its scope is limited, and successes have been few.

Greater progress has been achieved on the Taxation front, with evidence of Community successes. In July 1990, the Council of Ministers adopted three directives on mergers, parent-companies and subsidiaries. The "parent companies" Directive (90/435/EEC), adopted on 23 July 1990, aims at eliminating the double-taxation of profits distributed in the form of dividends by a subsidiary in one member-state to its parent company established in another member-state. This has been the first major step towards alleviating what in practical financial terms is a urgent concern to companies. The European Commission's investigation into taxation problems within the Community continues, with the abolition of double-taxation on cross-border flows a priority concern.⁶⁹ Specific measures are expected to be proposed shortly. The Commission's objectives include enlarging the scope of the "parent companies/subsidiaries" Directive to all parent companies liable to company taxation, irrespective of the legal form they might take.⁷⁰

The Single Market also brings an additional dimension to competition policy within the Community, and this is reflected in the Merger Control Regulation (MCR) of 1989.⁷¹ Under the Regulation, the Commission has the power to oppose, modify or approve large-scale mergers, acquisitions or joint ventures, likely to have an impact on the EC market both within and beyond EC territory. The MCR applies to deals involving two or more companies operating on the European market having a combined turnover of more than ECU5 billion, provided at least two of the firms have a turnover of at least ECU250 million.⁷² Mergers are deemed to have take place not only when two or more corporations merge, but also when direct or indirect corporate control is acquired through

stock or asset purchases, contractual relationships or other means. The position of a Joint Venture (JV) appears slightly more complex, in terms of whether a case falls within the scope of the regulations. In the event that a JV incorporates the pre-existing activities of the parent companies while the parent companies withdraw permanently, as suppliers or as customers, from the JV's market and either transfer their entire business assets to the JV, henceforth acting as holding companies (a complete merger), or transfer to the JV activities that the parent formerly carried on independently and only in certain commercial sectors (partial merger), the operation requires notice and is subject to the MCR. Illustrating this are Aerospatiale and (ex-) MBB's joint control of the new holding company "Eurocopter", which undertakes the parents' activities in the helicopter market.

The EC's jurisdiction over mergers as part of a wider competition policy has not always had smooth results. Leon Brittan was heavily criticized by the French and Italian Governments, as well as by German EC Industry Commissioner, Martin Bangemann, in 1991, for ruling against a proposed joint take-over by Aerospatiale and Alenia of the Canadian aircraft group DeHavilland.⁷³

Aerospace analysts have voiced concern over this Merger Regulation. Pierre Condom⁷⁴ contends that if such a regulation is blindly applied to aerospace manufacturing, it could prevent the formation of large, European trans-national consortia, which are needed in the new market-place. Mergers may be dealt with on a case-by-case basis, but the great danger is that the vetting procedure could become a tool in the hands of Brussels Eurocrats to shape the future aerospace industry. Condom⁷⁵ highlights the possible scenario of the "vetting-criteria" driving companies in Europe to team-up with American firms - in order to attain the required market critical size and structure - thus avoiding incurring the wrath and confusion of Brussels. If this becomes a reality, this EC regulation could be construed as an example of an "external failure cost" (part of the cost of Non-Conformance), a flawed output, that has reached the external customer (the defence company), hindering inter-European co-operation, by preventing the formation of Euro-trans-national consortia.

The European Commission and the Aeronautics Industry

Following the adoption of the first Communication on the aeronautics industry in July 1990, the European Commission has continued to examine the competitive position of the industry in global markets, and to consider potential measures to help place the

European industry in an economic and legal environment, in which it is more competitive. In line with the November 1990 Communication on "industrial policy in an open and competitive environment", the Commission's agencies have been working with a view to back up efforts made by industrialists to improve their competitiveness; furthermore, there is an awareness that the EC and member-states must ensure that a favourable environment exists, and that therefore, strenuous efforts should be made to help establish trans-European networks of transport and telecommunications, for example.⁷⁶ According to EUROPE,⁷⁷ the Commission will probably focus on the creation of a "Favourable Framework", and also "Fair Conditions of Competition". Regarding the Framework, the Commission needs to explore such areas as speeding up the harmonization of technical norms (which could involve industrial standardization), creating a common legal framework with the status of a "European Company", and setting up trans-European networks. On the competition front, it is most likely that the Commission will target the application of EC competition rules (including an analysis of direct and indirect public aid elements), and measures to guarantee fair international competition.⁷⁸

3.3 The Western European Union

Background

Within two months of the failed European Defence Community (EDC)⁷⁹ initiative, the WEU was formed, in October 1954, by the Paris Agreements which came into force on 6 May 1955. The most significant features of the new arrangement were: the establishment of a Parliamentary Assembly; wider powers of decision for the Permanent Council; and the creation of the "Agency for the Control of Armaments" (ACA) to supervise newly agreed controls on weapons production.

Ever since its inception, the WEU has primarily concerned itself with enhancing armaments co-operation, hence the establishment of the "Standing Armaments Committee" (SAC) - a subsidiary body of the Council - set up on 7 May 1955. The purpose of this Committee, which would work closely with NATO, was to develop consultation and co-operation in the armaments field, with the aim that such co-operation, in facilitating "joint solutions", would assist Governments in meeting their respective military requirements by agreement on issues such as the development, standardization, production and procurement of arms concluded by all (or some) of the WEU members. It would of course be open to other NATO member-countries to participate. In terms of

SAC's external customer relationships, until the Committee's abolition in November 1989 (as discussed later), it maintained close contacts with the NATO Military Agency for Standardization (MAS), and the FINABEL⁸⁰ Committee of Principal Military Experts. However, as highlighted in The Klepsch Report, the SAC's performance in laying down the criteria for new weapons systems' development has been disappointing.⁸¹ The WEU did not attempt to create any kind of armaments pool between its member-states, which would have been a logical initiative.

WEU Structural Deficiencies Prior to 1993

Prior to 1993, a number of WEU structural and policy deficiencies were impeding the institution's ability to deliver a "quality" output. Of major concern was the organizational structure of the WEU, which saw the location of interdependent departments of the Head Office in two different capitals, Paris and London: most of the policy and research functions were carried out in France, whilst the executive operated from Britain. In TQM terms, this contributes towards a higher CoQ - inefficient utilization of organizational resources - and should be avoided since it undermines the efficiency of the organization. The move of these key functions to a new central location (Brussels) on 18 January 1993 was thus a welcome development.

Another area in need of review pertains to the fact that the WEU Assembly comprises European Parliamentarians, who already meet at WEU, NATO and other institutional fora, and therefore have increasing demands placed upon them, but lack the time (and depth of expertise) to adequately address the issues. There is a strong argument, in TQM terms, for this Assembly to extend its internal customer base - thus possessing a wider skills base - and include industrialists (mainly defence industrial players), civil servants, diplomats and academics, who would provide a broader "talent pool" to prepare the intellectual and policy framework necessary for the creation of a stronger European defence identity within NATO.

WEU Arms Co-operation and Procurement: Achievements and Interests

A Report of the WEU Assembly Defence Committee on "A European Armaments Policy"⁸² highlighted three major reasons why co-operation in the armaments procurement field was necessary. The Report contended that financial considerations, the military imperative (military requirements are fundamentally the complementary ones of interoperability and/or standardization), and socio-economic factors, all necessitated

enhanced co-operation in this field.

Ten years later, and without witnessing any significant developments in the field, the WEU approved a Common "Platform on European Security Interests", which was seen as an affirmation of Western Europe's quest for a common European position on principal security issues. Apart from the re-asserted commitment of the WEU powers to NATO and an acknowledgement of the need for better burden-sharing, it also recognized the need for at least a semi-umbrella organization to guide European armaments procurement - with the long term aim of establishing a free market in European defence goods. Harvey and Smith⁸³ contend that a WEU procurement agency would make sense since the member-states have a great deal in common both in terms of the technological requirements of their military forces, and the production capabilities of their respective defence industrial sectors. A WEU procurement agency (if ever created) could later be absorbed into a NATO agency, although it is probably more realistically achievable to have a WEU-wide entity as opposed to a NATO-body, given the fact that some NATO members have little in the way of a defence industrial capacity. But it all seems light years away, and even though such a Platform does offer much in the way of rhetoric, it should be remembered that nothing can be accomplished unless the political will is present.

Apart from enhancing co-operation in the armaments and procurement fields, the WEU has also been examining the problem of duplication of effort in combat capabilities, and in the manufacture of weapons platforms. In May 1990, its "Technological and Aerospace Committee"⁸⁴ reviewed progress in European armaments co-operation. It called for more integrated European military research, and urged the creation of a more genuinely open defence equipment market in Europe.

WEU Developments Post-1989

Following the decision of WEU Ministers on 13 November 1989 to abolish the SAC,⁸⁵ the WEU has been striving to clarify its policy and strategy on armaments co-operation, and re-examining its institutional role, given the existence of the IEPG, and of course increased EC (EU) manoeuvres in the wider defence and security domain.

The Maastricht Treaty (signed on 7 February 1992) requested the WEU to elaborate and implement those decisions and actions of the EPU which have defence

implications. As a consequence of this, the WEU members mentioned, in their declaration appended to the Maastricht Treaty, that among the proposals to be examined further would be "enhanced co-operation in the field of armaments with the aim of creating a European armaments agency."⁸⁶

The Petersberg Declaration (19 June 1992) does not provide any additional detail pertaining to the rather timid wording in the Maastricht text. On the contrary, it appears to envisage the project in the context of the IEPG. WEU Ministers proposed that experts of both the WEU and IEPG should analyze the issue of enhanced armaments co-operation, and carry out an initial examination of the role and functions of a possible European armaments agency.⁸⁷

There are obvious duplicatory aspects to this whole process. It is thus a welcome development to see that the IEPG will be integrated into the WEU framework. Defence Ministers from the thirteen IEPG nations agreed to dissolve the IEPG, and to transfer its activities to the WEU. This, as Marc Rogers⁸⁸ highlights, seals the role set for the WEU under the EC's Maastricht Treaty as Europe's armaments' planning and procurement coordinator.

3.4 The Independent European Programme Group

Background

Established on 2 February 1976, the IEPG is independent - mainly due to French insistence - of both NATO and the Eurogroup, and aims to promote co-operation in the research, development, production and procurement of defence equipment. The French were not over-enthusiastic about joining the IEPG, and only agreed after their Mirage aircraft had lost to the F-16 in the North European states.⁸⁹ There was a price to be paid, however, for French membership - which arguably has hampered the organization ever since - as Stephen Kirby⁹⁰ has highlighted: the pursuit of European rather than Atlantic co-operation; attempts to achieve interoperability as opposed to full standardization; and the insistence that co-operation within Europe should continue in a procedural, rather than a structural, manner to minimise the restraints on French sovereignty and arms sales. As a result of accommodating the French, plans were postponed for establishing a procurement secretariat, which meant the continued absence of a single European voice to talk to the North Americans. In its first seven years, IEPG members never met at Ministerial level. Research directors met only by chance, and far too late to discover

whose work was being wastefully duplicated by whom.⁹¹

In the mid-1980s the IEPG took on a new lease of life, with the publication of the high-level working group (European Defence Industry Study: EDIS) Report in December 1986, which was subsequently adopted by IEPG Defence Ministers at their Seville meeting on 22 June 1987. Entitled "Towards A Stronger Europe",⁹² it made recommendations for the transformation of European armaments production and procurement. This Report, as Ian Gambles⁹³ argues, was sufficiently in accord with governments' thinking to set the wheels of intergovernmental action in motion. The IEPG Luxembourg Communiqué and "Action Plan" (issued 9 November 1988) emerged soon after, and as a direct result, the IEPG underwent a number of organizational changes in its Panel structure, which were intended to strengthen the institution and increase its efficacy. The tasks of the old Panels I (requirements harmonization) and II (projects) were brought together, in order to facilitate the translation of the all-important staff targets into viable working projects. The new three-Panel structure (Figure 10.) that was born in 1989 was much better equipped to deal with harmonizing defence procurement and co-operation. The new arrangement was as follows: Panel I (under Norway), responsible for harmonizing operational needs, including equipment for NATO's European Rapid Reaction Corps (RRC); Panel II (under France), primarily concerned with research and technology,⁹⁴ and has concentrated efforts on the ambitious target of a European Technology Plan (ETP), which eventually evolved into EUCLID. Panel III (under Germany) is responsible for procedures and economic matters including the European defence equipment market. The IEPG functions through these three Panels, which report to six-monthly meetings of national armaments directors (NADs) who, in turn, report to defence ministers who meet three times every two years. The chairmanship of the IEPG rotates every two years. A permanent secretariat is based in Lisbon, Portugal.

IEPG Achievements and Interests

The IEPG's "Action Plan" was intended to open up completely the European defence equipment market to contractors from all IEPG nations. To facilitate this, "focal points" were established in member-countries, to which companies from member-states could register an interest in becoming suppliers. In addition to this, countries were also supposed to start producing, on a regular basis, national bulletins giving details of impending bidding-opportunities.⁹⁵ The experience gained by the IEPG and their

IEPG STRUCTURE (1992)

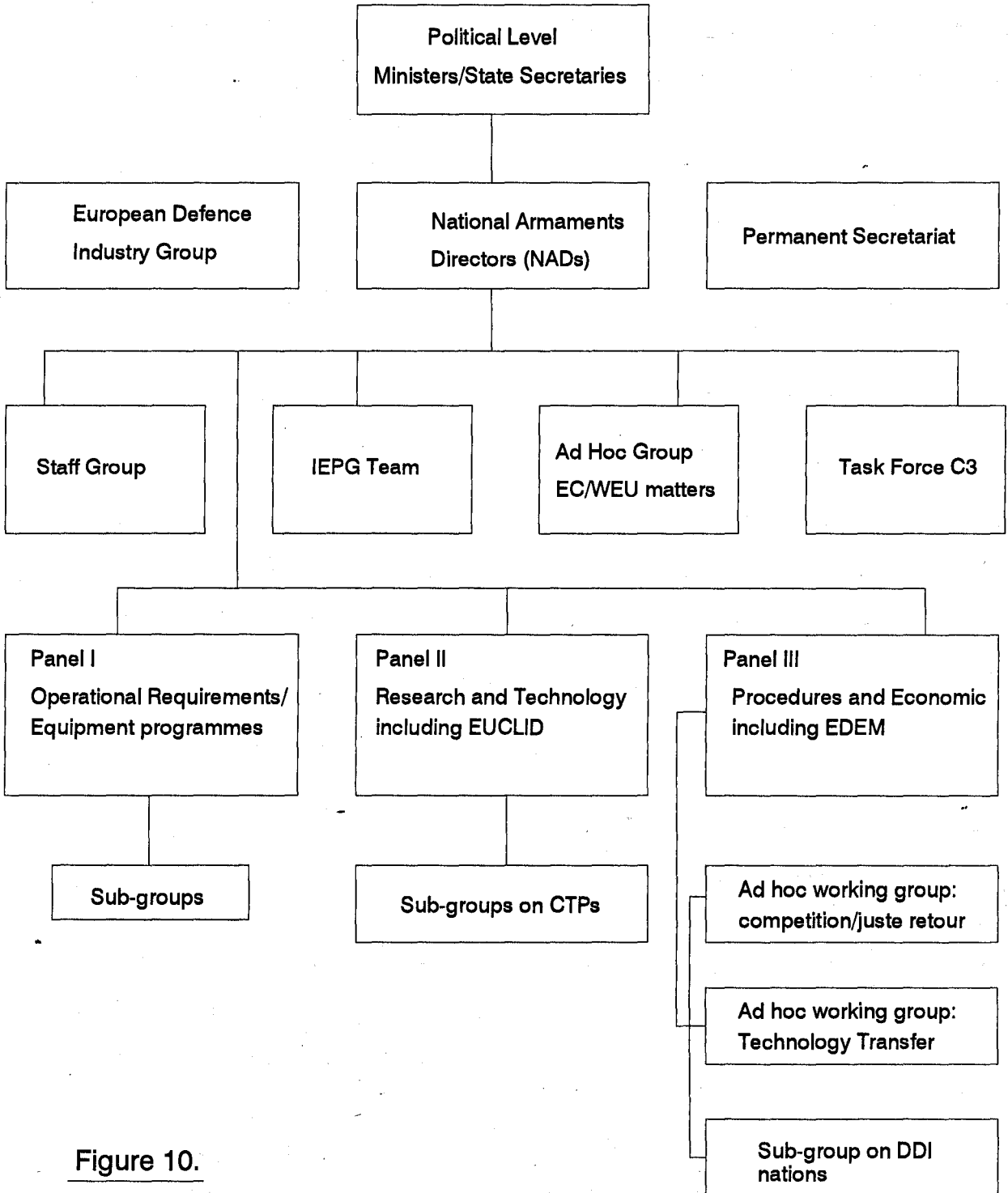


Figure 10.

knowledge of potential problem-areas in this field, will be invaluable for the work currently being undertaken by Panel III on the creation of a European Defence Equipment Market (EDEM), which is intended to facilitate cross-frontier procurement, and allow the optimum use of members' defence budgets.⁹⁶

Although the "Action Plan" and the "Coherent Policy Document" represented a significant step forward in the quest for "equal market opportunities", a number of problems have arisen. Firstly, bulletins appearing in different languages and formats, creating difficulties for external customers: defence contractors from other countries.⁹⁷ Secondly, the continued existence of state-owned, state-subsidised and private-owned defence companies within the member-states, which arguably militates against the success of any measures aimed at creating a fairer market. Since all the companies are not starting from the same position - through some receiving state support - the playing field is far from level. The fundamental point which has to be acknowledged, is that the benefits of any policy, just as with any system or law, cannot be obtained, if the necessary machinery is not in place to facilitate its implementation and development, and if the political will is also lacking to see a policy succeed. Additional difficulties arise from the fact that the IEPG cannot adopt any binding measures because it is not recognized officially by a Treaty.⁹⁸ Furthermore, as General van Diest recently said:

How can we open up one or all of our markets if we have no recourse against the protectionist attitudes of other countries ?⁹⁹

His comment is one shared by some countries, who are unwilling to open up markets, fearing the potential loss of their defence trade, and concerned about restrictions on their ability to compete in other foreign markets (no actual reciprocity), if those countries were adopting a protectionist stance. International "sticks" to beat those who transgress - those unwilling to play the "open market" ball-game - are noticeably absent from the defence trade arena: an external failure cost.

IEPG Developments Post-1992

As alluded to above, the IEPG is to be subsumed within the WEU. Following the IEPG's NAD's Report, Defence Ministers in Bonn, December 1992, formally agreed to incorporate IEPG into WEU with immediate effect. However, it is important to recognize, as was emphasized in a 1992 WEU report, that simply transferring IEPG

structures to WEU would not eliminate all the well-known difficulties.¹⁰⁰ If a new procurement agency is created, it will of course need a minimum of legal status - which was one of the major problems plaguing the IEPG - and a right of initiative, which could, for example, permit the agency to call for tenders. However, as the report itself admits,

even the best juridical structure will not be enough if it lacks the political will of all member countries which is essential if they are to agree on a joint equipment policy.¹⁰¹

The absence of political will is of course a major stumbling block to progress in European armaments co-operation, but at least opportunities for facilitating it are increased if the appropriate machinery is in place. Certainly, the WEU forum is in a stronger position than the IEPG to achieve results, since it is a body based on an international treaty - with its own legal personality - and it could provide a more solid and visible framework for co-operation.¹⁰² Under a revamped WEU umbrella, greater progress on the establishment of a European Armaments Agency could also be expected, if the member-countries agree on it. However, it is hoped that the same successes enjoyed by the more informal IEPG can in fact be translated into successes within the more formal arrangements of the WEU. If these results are not equalled or surpassed, then irrespective of the fact that the IEPG's functions have been transferred to the WEU - thus helping rationalize efforts to improve co-ordination between European nations on these armaments' issues - there may in fact be a "high external failure cost", in that progress will be limited, and results not forthcoming.

3.5 Eurogroup

Background

Established in 1968, Eurogroup provides a forum in which European NATO Defence Ministers can co-ordinate their views on current security and defence policy issues, with the aim of ensuring a strong and cohesive European contribution to the common defence of NATO. Although it is not part of the body of the Atlantic Alliance, this group operates within the framework of NATO's integrated military structure.¹⁰³ Meetings of Defence ministers take place twice a year, just before the half-yearly Ministerial session of NATO's Defence Planning Committee (DPC), which provides the focal point for its work. The workings of the group are overseen by an ad hoc committee of Eurogroup Ambassadors at NATO HQ, but a Staff Group is responsible for the routine

day-to-day operations of the body. All work is carried out through "sub-groups" which operate as ad hoc Committees. Of these, it is the EURONAD/Armaments Co-operation group which laid the foundation stones for closer co-operation in defence equipment procurement, and resulted in the formation of the IEPG, now the principal European forum for work in this area. Fernando Nogueira contends that the commitment and work of the sub-groups has been positive and should be encouraged; their work would be greatly facilitated "if they were given a better political framework and more closely defined political guidance".¹⁰⁴

Eurogroup Achievements

Eurogroup's two most significant achievements are the so-called "European Defence Improvement Programme" (EDIP) - which involved a special European contribution to NATO military construction of over \$1 billion - and the formulation of "Principles of Co-operation on Defence Equipment".¹⁰⁵ The "Principles" constitute an important part of the policy basis for NATO co-operation in the development and procurement of military equipment, and were formally adopted by CNAD as "NATO Guidelines for Improved Equipment Collaboration".

Eurogroup Developments Post-1990

Eurogroup's future is inextricably linked with the evolution of NATO and the other institutions comprising the security architecture of Europe. Consequently, the organization is actively involved in fulfilling its traditional duties of harmonizing European defence activities in sub-groups, and of ensuring that European interests continue to be represented within the Alliance. At Eurogroup's 1990 Spring meeting,¹⁰⁶ member-countries confirmed their determination to participate constructively in efforts to meet the new order. Eurogroup has, as Gerhard Stoltenberg¹⁰⁷ contends, been a most useful instrument for practical co-operation to improve standardization, to conduct joint training programmes, and to promote the interoperability of the Armed Forces within NATO. However, given the fact that the IEPG is now dissolved, with functions transferred to the WEU, it may well be that, in efforts to avoid wasteful duplication, Eurogroup too is soon subsumed within this organization. In May 1992, Eurogroup Ministers decided to make some or all of Eurogroup's activities available to the WEU, as a contribution towards the streamlining and rationalization of Europe's security architecture.¹⁰⁸

CONCLUSION

The preceding examination focused on initiatives within the national and institutional procurement and regulatory regime. At the national level, the examination highlighted the post-eighties' trend within British procurement strategy of: a) achieving "value for money" at every stage of development, production, and support; b) introducing "competition" in all aspects of defence contracts and c) shifting financial "risk" from the customer to the supplier. The analysis also identified a number of attributes common to the institutional initiatives, including: a) the desire to rationalize co-operation in arms procurement; b) the harmonization of requirements; c) efforts to achieve better standardization; d) moves to establish a common procurement (armaments) agency and e) measures to create a level playing field within the defence industrial market.

Whilst a number of the institutional regulatory mechanisms undoubtedly do have a positive effect on defence industrial business operations - such as those mentioned above - it should be recognized that some of the initiatives are deficient, and could have potentially damaging effects on the industry. Firstly, it should be acknowledged that the majority of the initiatives (with the exception of the specific EC aeronautical measures) are designed for defence industry regulation in general, and thus fail to address the specific needs of the aerospace sector. Secondly, the initiatives often fail to recognize that the defence industry is a "unique" sector, which cannot be regulated in the same manner as a civilian product. Thirdly, the existence of multiple institutional actors and instances of inter-institutional rivalry have contributed towards greater ambiguity, confusion and contradiction rather than bringing clarity and harmonization. Fourthly, whilst there has been much rhetoric on the need for a common procurement agency, little has been seen on the "idea-generation" front as to what measures can be implemented to overcome the fundamental obstacles discussed above.

Furthermore, it seems logical to first ascertain whether such an agency is actually required, and if so to establish its terms of reference. Finally, as the above examination alluded to, there is also a need to avoid "over-regulation" as a panacea for institutional inabilities to address specific issues.

Whilst the institutional actors have been pre-occupied with rationalization at an institutional level, as well as at the industrial level, the British aircraft industry has not

been a passive bystander. On the contrary, with consolidation nationally, and increased collaboration away from home, aviation contractors have made themselves better equipped to operate in the rapidly-changing defence industrial environment.

CHAPTER TWO ENDNOTES

1. Malcolm McIntosh, "Defence Procurement Policy: The Way Ahead", *RUSI JOURNAL*, Vol.137, No.5, October 1992, p.75.
2. See Ronald Smith, "The Significance of Defence Expenditure in US and UK National Economies", in Michael J. Breheny (ed), **DEFENCE EXPENDITURE AND REGIONAL DEVELOPMENT**, (London: Mansell Publishing Limited, 1988), pp.9-10.
3. Martyn Bittleston, "Cooperation or Competition ? Defence Procurement Options for the 1990s", **ADELPHI PAPER 250**, (London: Brassey's for the IISS, Spring 1990), p.46.
4. See Editorial, "Death by a thousand cuts", **THE SUNDAY TIMES**, 11 April 1993, p.3.
5. Keith Hartley and Nick Hooper, **THE ECONOMIC CONSEQUENCES OF THE UK GOVERNMENT'S DECISION ON THE HERCULES REPLACEMENT**, (University of York: Centre for Defence Economics, Research Monograph Series 2, 1993), p.23, highlight that "value for money" (VFM) is not a simple concept based solely on the lowest price. According to a 1983 MoD document, the concept, as originally defined, embraced a range of short, medium and long-term considerations, including initial price, life cycle costs, foreign exchange risks, delivery, offsets, impacts on suppliers and the implications for future competition; see Ministry of Defence, **VALUE FOR MONEY IN DEFENCE EQUIPMENT PROCUREMENT**, (London: MoD, Defence Open Government Document 83/01, 1983). The MoD also appears willing to buy from overseas "when the advantages of cost, performance and timescale outweigh the longer term benefits of purchasing the British alternative."; see National Audit Office, **MINISTRY OF DEFENCE: INITIATIVES IN DEFENCE PROCUREMENT**, (London: NAO/HMSO, 1991). Both these documents are highlighted by Hartley and Hooper, **THE ECONOMIC CONSEQUENCES**, op.cit. Ron Smith contends that "To the purchaser of arms, it is value for money not price that counts. What determines value for money is how well the product meets the particular needs of the buyer and the quality of the buyer-supplier relationship."; see Ron Smith, "Is Europe Pricing Itself Out Of The Market ?", *RUSI JOURNAL*, Vol.139, No.1, February 1994, p.48.
6. Sir Donald Hall, "'Options For Change' - The Impact On Industry", *RUSI JOURNAL*, Vol.136, No.2, Summer 1991, p.61.
7. John Weston, the Chairman and Managing Director of British Aerospace Defence Limited, has been particularly vocal on the subject.
8. Sir Donald Hall, op.cit.p.61.
9. Malcolm McIntosh, op.cit.p.72.
10. As highlighted by Malcolm McIntosh, *ibid.*
11. *ibid.*
12. See Francis Tusa, "Euro Industries Take the Lead in Multinational Collaborative Efforts", **ARMED FORCES JOURNAL INTERNATIONAL**, December 1992, p.15.
13. Malcolm McIntosh, op.cit.p.72.
14. *ibid.*p.73.
15. *ibid.*
16. *ibid.*
17. This section is based largely on Malcolm McIntosh, **MANAGING BRITAIN'S DEFENCE**, (Basingstoke: MacMillan Academic and Professional Ltd., 1990) and David Moore, "Defence And The Treasury", *RUSI JOURNAL*, Vol.137, No.1, February 1992, pp.30-34.
18. See David Moore, *ibid.*p.31.
19. *ibid.*
20. *ibid.*
21. *ibid.*p.33.
22. For full text of Treaty, see North Atlantic Treaty Organization, **NATO HANDBOOK**, (Brussels: NATO Office of Information and Press, 1992), pp.143-146.

23. NIAG's objectives, terms of reference, composition and rules of procedure were prepared by the NADREPs, and approved by CNAD in October 1968. It is interesting to note that CNAD's increased influence and NIAG's development largely arose as a result of pressures from the USA, following in the wake of the USSR's invasion of Czechoslovakia in 1968.
24. See North Atlantic Treaty Organization, NATO Unclassified Document: Summary Information Sheet on the NATO Industrial Advisory Group, (Brussels, no date), 145/INFO, p.1.
25. *ibid.* p.4.
26. See Robert Fiskette, "*The Need For Transatlantic Collaboration*", in Bruce George (ed), **JANE'S NATO HANDBOOK 1989-1990**, (Coulson, Surrey: Jane's Information Group, 2nd ed.), p.249.
27. See David Cooper, "*Towards Armaments Planning At NATO*", **CANADIAN DEFENCE QUARTERLY**, Summer 1988, pp.38-42, and NATO, **THE NORTH ATLANTIC TREATY ORGANISATION: FACTS AND FIGURES**, (Brussels: NATO Information Service, 1989, 11th ed.), p.283.
28. David Cooper, "*Allied arms cooperation: need for a transatlantic political strategy*", **NATO REVIEW**, No.5, October 1991, p.34.
29. Most of the CAPS information in this chapter is derived from the following sources: David Cooper, **CANADIAN DEFENCE QUARTERLY**, *op.cit.*; David Cooper, **NATO REVIEW**, *ibid.*; Diego Ruiz Palmer, "*Collective Armaments Planning And Defence Procurement - CAPS REVISITED*", **NATO's SIXTEEN NATIONS**, No.2, 1992, pp.38-41; North Atlantic Treaty Organization, **CAPS BRIEFING DOCUMENT**, (Brussels, no date); and private interviews with members of NATO's Defence Support Division at NATO Headquarters, Brussels, conducted by S.P. Allmark during 1993.
30. See Diego Ruiz Palmer, *op.cit.* p.41.
31. As highlighted by Diego Ruiz Palmer, *ibid.*
32. *ibid.*
33. See David Cooper, **NATO REVIEW**, *op.cit.* p.34.
34. Martyn Bittleston, *op.cit.* p.15.
35. *ibid.*
36. Philip Webber, in **NEW DEFENCE STRATEGIES FOR THE 1990s: FROM CONFRONTATION TO COEXISTENCE**, (Basingstoke: MacMillan Academic and Professional Ltd., 1990), pp.55-56 cites both examples. The Martin-Baker ejection seat was the US Navy's (USN's) preference for their combat F/A-18 combat aircraft, but the USN's decision was overturned by a U.S. Congressman, who wished to ensure votes from workers employed in a competing arms industry in his state. The British mortar was tested for seven years before being rejected on the (dubious) grounds that it did not work in cold weather. In view of the fact that this mortar was combat-proven, through use with the British forces during the Falklands War, this decision to reject the mortar - and the reasoning behind it - seem questionable.
37. See Francis Tusa, "*Europeans Decry 'Hidden Agenda' In US Tests*", **ARMED FORCES JOURNAL INTERNATIONAL**, December 1992, p.24.
38. See Philip Webber, *op.cit.* p.55.
39. However, this is inevitable given the fact that the Alliance is a voluntary grouping of independent sovereign states.
40. See **TWO-WAY STREET: USA-EUROPE ARMS PROCUREMENT**, (The Klepsch Report), (London: Brassey's, 1979), pp.60-61.
41. North Atlantic Treaty Organization, NATO Unclassified Memo, No.PO/80/129 from Secretary General Luns to the Atlantic Council, 7 January 1981, p.2.
42. Trevor Taylor, **DEFENCE, TECHNOLOGY AND INTERNATIONAL INTEGRATION**, (London: Francis Pinter (Publishers) Limited., 1982), p.8.
43. This section is based upon comments made in an article by Pamela Pohling-Brown, "*The business end of joint security*", **INTERNATIONAL DEFENCE REVIEW**, Vol.24, July 1991, p.754, pertaining to the difficulties of reducing costs in joint/multi-national programmes.
44. See Fourth Report to Congress by the Secretary of State for Defense, "*Rationalization and Standardization Within NATO*", (Washington, D.C.: GPO), January 1978, p.129; as highlighted by Trevor Taylor, *op.cit.*
45. See **AVIATION WEEK & SPACE TECHNOLOGY**, 16 December 1974; as cited in **TWO-WAY STREET**,

op.cit.p.20.

46. Trevor Taylor cites the examples of two different tanks with the same sort of gun able to use the same ammunition (common sub-systems) or different guns designed to fire the same ammunition (compatible sub-systems); see Trevor Taylor, op.cit.p.9.
47. See Report to the House Committee on International Relations by the CRS, "NATO Standardization: Political, Economic and Military Issues for Congress", (Washington, D.C.: GPO), 29 March 1977, p.5.
48. It is important to recognize the success of NATO's Integrated Military Structure (IMS) to date, and the close operational cooperation required between NATO and the WEU.
49. This section is based largely on Foreign and Commonwealth Office, **BRITAIN IN EUROPE: THE EUROPEAN COMMUNITY AND YOUR FUTURE**, (London: HMSO, 12628, 1992), pp.6-7.
50. *ibid.*p.11.
51. European Parliament Working Document, **Report drawn up on behalf of the Political Affairs Committee on the effects of a European foreign policy on defence questions**, PE Document 429/74, 13 January 1975.
52. Report by Leo Tindemans to the European Council, "*European Union*", **BULLETIN OF THE EUROPEAN COMMUNITIES**, Supplement 1/76.
53. European Parliament Working Document, **Report on European Armaments Procurement Cooperation**, Document 83/78, PE 50.944, 8 May 1978. Also see **TWO-WAY STREET**, op.cit.
54. European Parliament Working Document, **Report on Promoting Defence and Technology Cooperation among West European Countries**, Document 1499/80, December 1980.
55. European Parliament Working Document, **Report drawn up on behalf of the Political Affairs Committee on arms procurement within a common industrial policy and arms sales**, Document 1-455/83, 27 June 1983.
56. It has been discussed by a number of defence analysts and economists, including Ron Smith; see for example, "*Defence Procurement: A European Identity ?*", **RUSI JOURNAL**, Vol.137, No.1, February 1992, pp.42-48.
57. *ibid.*p.42.
58. An argument developed by Ron Smith, *ibid.*
59. *ibid.*p.44.
60. In France, the procurement agency (DGA) is a patron for the largely nationalized defence industry. Procurement and export promotion are part of a coherent industrial policy. In Britain, the arms industry is a private business. The Procurement Executive moved to competitive tendering some time ago.
61. Malcolm McIntosh; as quoted in Carol Reed, "*United we stand*", (EC93 Report), **JANE'S DEFENCE WEEKLY**, Vol.19, No.1, 2 January 1993, p.29.
62. *ibid.*
63. *ibid.*
64. As cited in Carol Reed et al, "*Taking on the duties of defence*", **JANE'S DEFENCE WEEKLY**, Vol.17, No.1, 4 January 1992, p.25.
65. As cited in Carol Reed, "*EC awards to meet fair trade rules*", **JANE'S DEFENCE WEEKLY**, Vol.16, No.19, 9 November 1991, p.914.
66. Carol Reed, "*Breaking down the last barriers*", (EC93 Report), **JANE'S DEFENCE WEEKLY**, Vol.19, No.1, 2 January 1993, p.25.
67. Commission of the European Communities, **Completing the internal market: an area without internal frontiers**, COM (88) 650 Final, 17 November 1991, (Brussels: CEC), p.20, 6(a).40.
68. This is a loose form of cooperation agreement which permits individuals, companies or institutions from at least two member-states to come together for a specific purpose. There is no capital requirement. Independence is retained by all participating individuals or firms. See Commission of the European Communities, **THE SINGLE MARKET IN ACTION**, (Luxembourg: Office for Official Publications of the European Communities, 1992), p.37.
69. See Agence Internationale D'Information Pour La Presse, "*EC/TAXATION: Commission Presents New Guidelines On Company Taxation, Targeting Double Taxation But Refusing To Envisage Max Rate - Mrs Scrivener Insists On Subsidiarity*", **EUROPE**, (Brussels: Agence Europe), No.5757, 25 June 1992, p.9.

70. *ibid.*
71. Council Regulation No.4064/89 of 21 December 1989 on the Control of Concentrations Between Undertakings, 32 O.J.EUR COMM. (No.L.395) 1 1989. This Regulation affects all transactions meeting the conditions contained therein, as from 21 September 1990. For a detailed analysis of the various issues raised by the Regulation, see Patrick Thieffrey, Philip Van Doorn and Peter Nahmias, "*The Notification of Mergers Under the New EEC Merger Control Regulation*", *THE INTERNATIONAL LAWYER*, Vol.25, No.3, Fall 1991, pp.615-647.
72. See Commission of the European Communities, *THE SINGLE MARKET IN ACTION*, *op.cit.* p.37.
73. As cited in Carol Reed, "*Breaking down the barriers*", *op.cit.* p.26.
74. Pierre Condom, "*Europe's way ahead*", *AEROSPACE WORLD*, Vol.V, June 1991, p.32.
75. *ibid.* pp.32-33.
76. See Agence Internationale D'Information Pour La Presse, "*(EU) EC/INDUSTRY: European Commission Prepares Communication On Aeronautics Industry - World Market Taken Into Consideration For Mergers - 'European Authority' For Safety - Towards Insurance System On Exchange Risk For Dollar ?*", *EUROPE*, (Brussels: Agence Europe), No.5714, 22 April 1992, p.9.
77. *ibid.*
78. *ibid.* pp.9-10.
79. The origin of the EDC can be traced back to the time of the Korean War, when plans were formulated to allow Germany's military participation in a Western defence alliance, whilst controlling its access to atomic, biological and chemical weapons. The plan was developed and sponsored by the French Government. After eventual endorsement by the U.S. Administration, the project collapsed in 1954, when it was rejected by the French Parliament. This was apparently due to the fact that after two years of debate, the EDC was now viewed by the French as an American project to force a European federation along military lines, involving a large German component, with the risk that Germany could ultimately dominate; see for example, William C. Cromwell, *THE UNITED STATES AND THE EUROPEAN PILLAR*, (Basingstoke: MacMillan Academic and Professional Ltd., 1992), pp.10-11.
80. FINABEL was created in 1953 following an initiative taken by the French Chief-of-Staff. FINABEL's output takes the form of agreements of military characteristics of arms and reports; for additional information on the organization, see D.C.R. Heyhoe, "*The Alliance and Europe: Part VI, The European Programme Group*", *ADELPHI PAPER 129*, (London), Winter 1976/1977.
81. See *TWO-WAY STREET*, *op.cit.*
82. See the Dankert Report on arms procurement, document prepared for the Western European Union, WEU Document 738, 10 May 1977.
83. See David Harvey and Dexter Jerome Smith, "*In Defence of Europe - The Western European Union Reinvigorated*", in Christopher Coker (ed), *DRIFTING APART ? THE SUPERPOWERS AND THEIR EUROPEAN ALLIES*, (Oxford: Brassey's Defence Publishers Limited, 1989).
84. Assembly of Western European Union, *The Independent European Programme Group (IEPG) and Western European Union (WEU)*, WEU Document 1228, 25 May 1990, (Paris: WEU).
85. As cited in *ibid.*, p.6.
86. As cited in Assembly of Western European Union, *European armaments co-operation after Maastricht*, WEU Document 1332, 23 October 1992, (Paris: WEU), p.13.
87. *ibid.* pp.13-14.
88. Marc Rogers, "*Role for WEU sealed as IEPG dissolved*", *JANE'S DEFENCE WEEKLY*, Vol.19, No.1, 2 January 1993, p.6.
89. See Trevor Taylor, *op.cit.* p.160.
90. Stephen Kirby, "*The Independent European Programme Group: The Failure Of Low-Profile High Politics*", *JOURNAL OF COMMON MARKET STUDIES*, Vol.XVIII, No.2, December 1979, pp.175-196.
91. See Michael Heselstine, *THE CHALLENGE OF EUROPE: CAN BRITAIN WIN ?*, (London: Weidenfeld and Nicolson Ltd., 1989), p.199.
92. See *IEPG Ministerial Communiqué*, Seville, 22 June 1987; as cited in *NATO REVIEW*, No.4, August 1987, p.33. Also see Assembly of Western European Union, WEU Document 1228, *op.cit.*

93. Ian Gambles, *"Prospects for West European Security Co-operation"*, **ADELPHI PAPER 244**, (London: Brassey's for the IISS), Autumn 1989.
94. For additional information on the IEPG's research, development and technological activities, see Chapter Three.
95. At one stage only Britain and France were producing bulletins; see **THE FINANCIAL TIMES**, 18 December 1989.
96. See Assembly of Western European Union, WEU Document 1332, op.cit.p.16.
97. However, the situation has been steadily improving: the IEPG has already created a working group tasked with the standardization and centralization of bulletins.
98. See Assembly of Western European Union, WEU Document 1332, op.cit.p.17. It is interesting to consider why there was a two-year test-period for opening-up the armaments market - which ended in December 1992 - when the members had supposedly all agreed (in principle) that it would be a beneficial development. Apparently, as Dr.Lothar Webber pointed out (during a European Defence Industry Conference, London, 1991), the Defence Ministers could not agree to convert these principles into mandatory instructions on their respective national procurement agencies. Some of the members argued that the IEPG lacked supranational authority, and therefore it was only feasible to entertain such procedures on a voluntary basis.
99. Briefing by General van Diest to the Technological and Aerospace Committee, Brussels; as quoted in Assembly of Western European Union, WEU Document 1332, *ibid*.
100. WEU Document 1332, *ibid*.
101. *ibid*.
102. See Assembly of Western European Union, **Activities of the IEPG**, (Information Letter to the WEU Assembly concerning the IEPG), WEU Document 1359, 4 February 1993, (Paris: WEU), p.2.
103. Consequently, France is absent. A number of analysts cite this as a major weakness and limitation of the organization: these include Trevor Taylor; as cited in Bruce George (ed), **JANE'S NATO HANDBOOK 1989-1990**, op.cit.
104. Fernando Nogueira, *"The European security architecture: The role of the Eurogroup"*, **NATO REVIEW**, Vol 39, No.4, August 1991, p.7.
105. See Robert Zweerts and Kelly Campbell, *"The Search for integrated European Programme Management"*, in J. Drown, C. Drown and K. Campbell (Eds), **A SINGLE EUROPEAN ARMS INDUSTRY ? DEFENCE INDUSTRIES IN THE 1990s**, (London: Brasseys (UK), 1990), p.79.
106. For text of the Eurogroup communique, see **NATO REVIEW**, Vol.38, No.3, June 1990, p.33.
107. Gerhard Stoltenberg, *"Managing change - Challenges and tasks for the EUROGROUP in a changing political environment"*, **NATO REVIEW**, Vol.38, No.4, August 1990, p.17.
108. See *"Statement by EUROGROUP Ministers on EUROGROUP Institutional Change"*, Brussels, 9 December 1992; as cited in Documentation, **NATO REVIEW**, Vol.41, No.1, February 1993, p.32. (Postscript: on 1 January 1994, Eurogroup ceased to exist but its functions were incorporated successfully in to NATO and the WEU. See *"Statement by EUROGROUP Ministers"*, Brussels, 8 December 1993; as cited in Documentation, **NATO REVIEW**, Vol.42, No.1, February 1994, p.23).

CHAPTER THREE

THE RESEARCH & DEVELOPMENT AND TECHNOLOGICAL DIMENSION

Industry is quite prepared to invest in technology in response to a perceived market opportunity, balancing the attendant risk and reward. But industry cannot be expected to cover the cost of every aspect of Research and Development, from the pure search for knowledge for its own sake to the development of a specific product. As in all advanced countries, government surely has a role to play in the evolution of the nation's technology base.¹

INTRODUCTION

This chapter explores the various institutional initiatives in the research & development (R&D) and technology sectors in an era of dramatic geo-political change and uncertainty. Section 1 provides brief background information on R&D and technological trends in the post-1945 period. In section 2, the importance of science and technology to the nation is discussed. Section 3 explores the issue of dual-use industries and technologies, which have been increasingly gaining in importance following the end of the Cold War. Section 4 focuses on the current national R&D scenario in Britain. Although, as this chapter highlights, an internationalization and institutionalization is undoubtedly taking place in technology, it is important to recognize that national developments are still significant, for the locus of action has not shifted totally from national players - governments and defence companies - to international entities. In section 5, institutional policies and initiatives are examined. The issues explored in this section include structural institutional deficiencies, the level of customer-interfacing between institutional, governmental and defence industrial actors, and the high costs to be incurred by nations if inadequate and inappropriate R&D investment is made.

1. BACKGROUND TO RESEARCH & DEVELOPMENT AND TECHNOLOGY

1.1 Historical Context

Over the years nations have put their faith in bigger and better arsenals to provide them not only with security, but also with prosperity. Prosperity and military power are believed to be associated with technology.² Since the end of the Second World War, European governments have been increasingly worried by the technological domination of the USA - and in more recent years by that of Japan and South Korea - in their domestic and international markets. Much of the USA's dominance in industrial markets is largely attributed, as Keith Hartley³ highlights, to American expenditure on defence, space and nuclear R&D, particularly in the aerospace and electronics industries. Between 1953-1971, aircraft manufacturing continued to occupy first place in the U.S. comparative advantage scale.⁴ Since then, European governments - within institutional frameworks - have employed policies aimed at reducing the technology gap. However, as a result of increasing budgetary pressures, industry may have to take the initiative in driving further technological successes.

1.2 The 1960s-Late 1970s: From an Obsession with Scale to Support for Generic Technologies

In the 1960s, Europe's perceptions of technological domination by the USA - the "American Challenge" as Jean-Jacques Servan-Schreiber⁵ described it - led the governments of France and Britain to promote a series of large-scale enterprises as national champions, or standard-bearers of technological prowess. This was achieved through mergers, subsidies, and support for collaborative Euro-ventures. However, as events in the 1960s demonstrated, the experience of these more "interventionist" policies aimed at promoting bigger firms - working on the "bigger must be best principle" - has not on the whole been that successful.⁶ The fixation with scale meant that governments often failed to recognize that "size" could not compensate for poor management; indeed, as Britain discovered to its cost, this often only served to compound the problem.⁷ In addition, another powerful actor was also at work: governments in the 1960s were under pressure from publicly-funded technological lobbies to finance show-pieces for nationalistic reasons, even when it became obvious that they were not commercially viable.⁸ The Concorde programme illustrates this point.

As a result of keeping alive certain projects, which were to all intents and

purposes commercial failures, the effects of the recession in the mid-70s were even more severe, for it meant that policies, initially designed to nurture new, technologically-sophisticated industries were instead used to prop-up the "lame ducks" in sectors ranging from shipping to aerospace.⁹ However, it would be inaccurate to state that there were no success stories at all, since in a few sectors governments did succeed in obtaining innovative leads in large-scale projects related to defence equipment and infrastructure - such as transportation and telecommunications - through interventionist policies. Whether this was attributable to good fortune rather than the result of strategic thinking is of course debatable. But there are nonetheless, combinations of public and private policies which have enabled new players to catch-up in the aerospace industry, for example, the European investment in Airbus illustrates this point perfectly, for it rose to challenge Boeing in the 1990s, having begun life in the face of an emerging Boeing monopoly.

In contrast to the 1960s "big is best" approach, the late 1970s saw the emergence of a new trend in R&D and technology: that of a movement away from assisting 'sunset' industries - such as steel and shipbuilding - towards support for 'sunrise' technologies, specifically electronics. Parallel to this trend was a conscious shift away from selective sectoral support towards more broadly-based policies aimed at strengthening the technological infrastructure.¹⁰

1.3 The 1980s-1990s: Institutional Change and National Uncertainty ?

Whilst the 1970s witnessed a move towards generic technologies, and support for the national research infrastructure, the trend in the 1980s was a shift in the focus of industrial policy in Europe from national actors to the institutions. The EC, in particular, was playing an increasingly important role in the direction of future R&D and technology, although this was "civil" in character, notwithstanding the fact that dual-use technologies existed. The Cold War's conclusion brought uncertainty to defence R&D, since national pressures increased to reduce defence expenditure. At this juncture, however, where there is still so much instability, uncertainty and potential volatility in the world, it would be illogical to axe R&D to such a low level that it becomes ineffectual - in the mistaken belief that it is "maximizing" the peace dividend - when in reality it is "minimizing" security, through reducing a nation's capacity to produce weapons systems to meet the needs of the Armed Forces and those of its allies. It is quite clear - a fact recognized by the British Government and the institutions (see below) - that defence industries are the fertile ground where technologies are developed and next-

generation equipment produced, as existing capabilities are surpassed. It would thus seem that, in the 1990s, whilst national funding for R&D and technology will continue - through selective national and institutional projects - it will have to be more strategically targeted, as a result of increasingly burdensome budgetary pressures. It also seems likely that the immediate post-Cold War period will be characterized by industry having to take a disproportionate share of the costs and risks, since government funds will be insufficient to maintain the necessary "blue sky", "cutting edge" research.

2. SCIENCE AS DEFENDER OF A NATION ?

2.1 Why Support R&D and Technology ?

It is arguable that for the successful defence of a country governments need a sound understanding of developments in military technology. This is necessary in order to facilitate the procurement of cost-effective equipment for their Armed Forces, and also to aid evaluation exercises vis-a-vis the current - and future - capabilities of other nations, allies or foes. Most governments do recognize - but to varying degrees - that their own research laboratories underpin the technology of the country's defence industrial base. However, it is interesting to note that in Britain, the MoD's remit does not include promoting the national technology base. A government's role in supporting research is of great importance, since defence industrial companies are subject to market pressures, and are not always in a position to - or lack the inclination to - invest sufficient and timely funds in research into the military technologies needed for a nation's security.¹¹ Since substantial benefits can be derived from the transfer of technologies from the military to civil sectors, and vice versa, there are commercial advantages for the adoption of a long-term R&D strategy. Technological advances initiated for defence applications have been exploited successfully by civil industry in fields ranging from new materials and electronic devices, to advanced aerodynamics with applications to civil aircraft and jet engines.¹²

Although the Cold War is over - and this was very much the "driver"¹³ for technological developments in the 1980s - it is important to recognize three important facts: a) technology cannot be disinvented; b) technology does not stand still; and c) other nations are still pursuing military strength via superior technological advancement. As a consequence, governments need to ensure that military R&D is not neglected, thus avoiding high "external failure costs" being passed on to the nation as a whole, in the

form of improperly equipped forces. In TQM terms, these costs would demonstrate the government's inability to deliver a quality output in this sector. However, defence companies - many of whom have civilian interests as well as military, and are benefitting from the cross-transfer of technology - also have to maintain a degree of investment in R&D and technology, since governments are unable to sustain high spending levels, due to increased budgetary pressures (discussed throughout). Thus for the defence companies, who obviously do not wish to fall behind their national and international competitors, funds must be injected into R&D - in order to reduce their CoQ -in terms of loss of influence in existing markets, and potential lost opportunities in new markets.

There is another major reason why military R&D and technology has to be supported, and this concerns its role in the non-conflict-free post-Cold War environment. As Karl Dersch¹⁴ contends, defence technology will increasingly become a part of a comprehensive spectrum of concerted actions to ease crises and conflicts. Technology, much of it derived from military origins, will increasingly be called upon to undertake non-military tasks such as the control and verification of sanctions, environmental monitoring and disaster relief. In view of the nature of "aerospace", it is clear that aerospace technologies, in particular, will have a valuable role to play in contributing towards a more stable environment.

2.2 How Much Should Be Spent on R&D ?

This section addresses the issue of defence R&D expenditure levels. At the 1989 "Stamp Memorial Lecture",¹⁵ Derek Roberts argued that this figure should never be pre-judged as a percentage of sales; rather it is a decision which should be arrived at after careful analysis of a number of variables, discussed below. Although Roberts' comments were directed towards R&D in general, they do make a valuable contribution to a wider understanding of defence R&D.

Of the many issues that, Roberts¹⁶ argues, need to be considered are: a) the potential benefit in sales and profit if the R&D is successful, and is fully exploited; b) the potential risk and cost to a company's business if such work is not carried out; c) the current status of a company's competitors, and its current activities; d) the company's capacity - skills and resources - to exploit the research commercially, if the R&D is technically successful; and e) the attitudes and reactions of company shareholders to changes in R&D expenditure levels, where there are currently increasing pressures to

deliver short-term profits. Examined together, the first three points are very important from a TQM perspective, for if after considering these factors, the company under examination is viewed in a favourable and positive light, then pursuing the R&D will contribute towards lowering the CoQ, in terms of identifying an opportunity which has to be taken; that is: if such a course of action - the R&D - was not pursued, then the company would in the long-term incur high external failure costs, as a result of loss of influence and loss of market share. Viewed in TQM terms, the fourth point is highly significant for it relates to the structural composition of a company, and whether its mechanisms facilitate or inhibit the ability of the firm to pursue a quality venture.

The fifth point highlights a major dilemma facing defence companies today: in view of declining military expenditure - and in the absence of a well-defined military threat (or threats) - how do you justify to company shareholders increased military R&D expenditure ? The problem is one of shareholders wanting short-term gains, at the expense of long-term investment. This investment could bring substantial rewards in the future through new additions to a company's product-base. However, from a TQM perspective, the company's shareholders are major customers, and thus their requirements have to be met. Consequently, if the shareholders wish to see the company reduce its R&D spending - even if it would appear to be a myopic view - a company's decision to disregard their wishes would be undesirable and considered a non-quality move. This highlights the difficulties arising from a complex customer-network, in which certain customers have more expertise than others - and would thus be in a good position to argue the case for increased defence R&D in a sector where they can clearly see commercial potential - but can be over-ruled by other customers who have more influence, which can result in reduced spending, or projects being curtailed, on short-term financial grounds, rather than on long-term strategic grounds.

On the specific issue of defence R&D expenditure, Roberts¹⁷ contends that it has not damaged the wider industrial scene in Britain, and cites a number of reasons for this: firstly, the research elements of defence expenditure have supported some very important areas of technology for civil applications as well as defence (see above); secondly, the level of R&D spent must be judged not only by its relevance to the implementation of defence policy, but also by its relevance to the defence equipment industry, with its consequential impact upon exports, wealth and employment creation; and thirdly, if certain technological elements had not been researched, developed and pursued in the

military sphere, what guarantee is there that those same valuable technologies would have necessarily emerged as a result of a civil research effort? Individually these reasons are significant factors, but their collective strength provides a very solid argument for continuing to support military R&D.

3. DUAL-USE INDUSTRIES AND TECHNOLOGIES: DUAL PROBLEMS ?

3.1 Background

The dual-use debate has gained momentum in the last few years, mainly due to the spiralling costs of defence equipment. It is being driven fiercely by the "fall-out" from the outbreak of peace. Civilian-developed technologies and products are generally less costly than their military counterparts, because they are created under commercial - true market - conditions, and usually have longer production runs. Military goods, by comparison, tend to be developed and produced in an increasingly over-bureaucratized, regulatory environment, which has a much slower production rate. Thus, it can be argued that the flow of dual-use technologies and goods is probably going to become more of a one-way street from the civil to the military sector, than a balanced two-way street. As a result, as Rainer Rupp¹⁸ contends, the obstacles for military industries to penetrate new civil markets are very high.

3.2 Strategic and Non-Strategic

It is important to recognize the fundamental difference between "strategic" and "non-strategic" dual-use industries. Non-strategic dual-use products are those which are not armament-related, for example, clothing. Strategic dual-use items are those goods which can be used or adapted for weapons systems or force multipliers, such as the miniaturisation of laser technology in portable compact disc players for laser-guided smart munitions. For the purposes of this chapter, the analysis conducted focuses on strategic dual-use products.

3.3 Military R&D as an "Add-On" to Civil Technology ?

In the current climate - with increasing pressures on governments to drastically cut defence expenditure - the concept of dual-use industries and goods will inevitably gain further support, particularly because the potential military "add-on" to civilian technology scenario is viewed by some as the only means to ensure the preservation of a defence industrial base. Although adopting this approach can bring short-term savings - due

primarily to increasing the efficiency of resource allocation - it can in fact be highly damaging in the longer term, from a security perspective. The "negative" quality dimension is highlighted when the issue is analyzed in a TQM context, employing the CoQ concept: such an initiative increases supply-dependency on the global market, rather than on a national or institutional market. Additionally, it should be noted that it would indeed be fallacious to assume that civil technologies can produce all high-technology military kit. Rainer Rupp¹⁹ cites the example of the civil micro-electronics industry which, as he points out, cannot be expected to - and probably would not - produce acceleration-stable guidance elements that can be fired from cannons, if there is no market for it. Thus, there will always be areas which need to be funded and developed within the military research sector.

3.4 Institutional Initiatives in the Dual-Use Domain

Chapter Two highlighted institutional interest in the dual-use domain, specifically focusing on EC initiatives. All of the institutions are considering the position of dual-use goods and technologies. With regard to controls on exports, these are discussed in Chapter Four.

4. THE UNITED KINGDOM NATIONAL SCENARIO

4.1 Government Support for Defence R&D

In Britain the majority of government-funded research is sponsored by the MoD on the military side, and by the DTI for all civil projects. Government spending on defence research should be in the region of £474 million for 1992/1993, which represents about 17% of overall planned expenditure on defence R&D and 4% of total procurement spending.²⁰ In view of the force re-structuring that is taking place, priorities in the defence research programme are constantly being reviewed, and modifications made to the existing defence research management organizational mechanisms.

Until quite recently, defence research in Britain was organized in fifteen Major Fields, which were sub-divided into sixty-six Research Areas, and supervised by the Controller of Establishments and Research (CER) in the MoD. This Research Area system was inherently deficient, in that it focused on the technologies rather than on the particular requirement of the Armed Forces, resulting in a situation where the military benefits of particular items of research were not always explicit. From a TQM

perspective, there would be a high CoQ, since customer requirements were not the primary consideration in the process.

In response to the above concerns, and stimulated by the government's post-1979 "Thatcherite" philosophy - favouring market forces driven by consumer choice - the defence research programme was re-organized into a Package Management System (PMS). Under PMS, each defence research package is covered by a contract - or a set of contracts covering individual work items - between the "Package Customer", a Service Officer in one of the operational requirements branches of the MoD, and one or more of Britain's Government Research Establishments which have been combined since 1 April 1991 into the Defence Research Agency (DRA).²¹ A Package Manager organizes each contract on behalf of the DRA, and is responsible for allocating and monitoring work in the appropriate parts of the research establishment, as well as providing a taut customer-contractor relationship with his Package Customer in MoD.²²

Modifications to the PMS have simplified its operation, and increased procedural efficacy. A new "military function" of operational analysis has been created to draw together analysis work on sea, land and air systems; each of which constitutes a separate package. The packages relating to the design and performance of aircraft for different military functions - offensive air support, offensive counter-air, interdiction, anti-ship operations, maritime support, anti-submarine warfare (ASW), air defence and naval air defence - have all been combined into one package. As Kirkpatrick²³ points out, this simplification acknowledges that several functions can involve the same aircraft and aero-engine, and all do rely on the same enabling technologies of aerodynamics, materials, propulsion, and so on. In conjunction with other complementary measures, this has cut the overall number of technology/systems/functions interactions, correspondingly reducing the scope for wasteful bureaucracy, whilst preserving the paramount aim of customer-led programmes.

4.2 Government Support for Civil R&D

CARAD

In the civil domain, the main aerospace area of the DTI's government-funded research is the "Civil Aircraft Research And Demonstration" (CARAD) programme - commenced 1 April 1990²⁴ - which supports pre-competitive research and technology demonstration relating to aircraft technologies. It also receives MoD and industrial

funding.

The nature of the civil aerospace sector, with its market distortions - domination by a few large (mainly American) firms, benefitting from considerable direct and indirect government support, technology-protection and barriers to market-entry - necessitates the existence of British Government assistance to industry. Thus, although admittedly there is a presumption in Britain that the allocation of resources should be left to the market, the non-existence of the "level playing field", and existence of additional factors interfering with the smooth operation of this sector, provides solid justification for a degree of British Government involvement. CARAD is a DTI response to the above problems, with the aim of allowing Britain to remain a key aerospace player into the next century.

CARAD's objectives²⁵ are:

- a) to help industry maintain the technology necessary to launch successful ventures in world markets;
- b) to help make the British civil aircraft industry an attractive partner in civil collaborative projects;
- c) to help maximize the spin-off from military research and demonstration support;
- d) to increase collaborative projects with higher education institutes so as to "pull through" academic research;²⁶
- e) to consider the scope for encouraging small and medium sized enterprises to become involved in collaborative ventures;
- f) to consider ways of disseminating CARAD technology to non-aviation sectors in Britain.

Each of CARAD's programmes has testable objectives which are subject to continuous evaluation. A rolling series of evaluations was agreed with the Department's economists, taking in turn each of the technologies supported by CARAD, and providing feedback on achievements of objectives and addressing the rationale.²⁷

Of the airframe technologies that CARAD supports, important research has been taking place within the helicopter sector: work continues on aerodynamics and aeroelasticity and model rotor experiments, with noise and vibration also being covered;

progress has been made on the feasibility stage of the European Future Advanced Rotorcraft EUREKA project (EUROFAR); and although progress on the LINK Rotorcraft programme has been slow - largely due to a dearth of suitable projects, one project did commence, on blade/vortex interactions.²⁸ European Transonic Windtunnel (ETW) expenditure peaked in 1992 - thus alleviating budgetary pressures on future potential projects - and the windtunnel project, having made excellent progress, is expected to be completed within budget on time.²⁹

CARAD I concluded in March 1993, having received funding of £56.9 million, with an additional £21.5 million for Britain's share of the ETW. CARAD II which runs through until 1996 is likely to keep core spending at the £60 million mark.³⁰

Throughout 1992-93 the aerospace industry called for increased R&D spending in key civil technologies, and there was concern early in 1993 that these calls had been effectively quashed by the Government.³¹ During 1993, the DTI examined a report - produced by its own aviation committee - setting out the "National Strategic Technology Acquisition Plan" (NSTAP), but a government response - and recognition of the problems - was not immediate.

It is interesting to observe that whilst Tim Sainsbury, Industry Minister, told a parliamentary enquiry into civil aerospace R&D that he did not detect any "anxiety" within the industry on the R&D issue, the UK industry, individually and collectively was expressing very deep anxiety about low levels of government funding. Evidence presented by the SBAC states:

SBAC members fear that failure to sustain adequate R&D investment to counter international competition could mean an inevitable erosion of UK capability - and once lost, the industry's leading position could not be regained.³²

In TQM terms, the SBAC's report highlights the alarmingly high CoQ resulting from a non-quality government R&D policy: through the government's failure to adopt a long-term view, external failure costs are high. These indirect costs can be broken down into lost opportunity costs, loss of prestige/status in the global aerospace industry, and costs associated with loss of influence, including market share.

Since DTI figures³³ also suggested that UK aerospace industry sales lagged behind France³⁴ for the second year running, industrial "anxiety" appeared to be a most natural reaction. The government's inability (unwillingness) to recognize the problems clearly constituted a problem in itself. As a blistering aerospace editorial expressed it:

The greatest cause for concern is...not the lack of support so much as the wilful recognition that there is no justification for such anxiety.³⁵

The Government's eventual announcement that it would adopt the technologies and priorities enumerated in the NSTAP was thus a welcome boost for an industry fighting for survival.³⁶

"Launch Aid"

Aside from CARAD funding, the government also provides a form of assistance - "Launch Aid" - for specific aerospace projects, under the 1982 Civil Aviation Act; most of the other support DTI provides is under the Science and Technology Act. The objective is for government to share with industry the risks of long-term aeronautical projects. No provision is made in the Public Expenditure Survey (PES) except for approved projects: in the 1989 PES these were the Anglo-Italian EH101 helicopter (involving Britain's WHL), and the Airbus A330 and A340 (involving BAe).³⁷ According to Tim Sainsbury, the government has paid out over £1.22 billion in launch aid since 1979.³⁸ Whilst this funding is welcomed by industry, it is important to note that this aid does come with tight restrictions: a) a 60% limit, b) only available if the project cannot proceed without such funding and c) early payback.³⁹ Furthermore, by definition - that is: "launch" - this funding cannot be used for genuine forward-looking R&D. These restrictions and deficiencies arguably reduce the efficacy of the industrial assistance.

4.3 The British Aircraft Industry and R&D

The Industrial Dimension

Both BAe and the Westland Group recognize the need for R&D investment, in order to ensure continuing improvements of existing products and the introduction of new ones to their product-base. Over the years, BAe has been leading the way. In 1990, the company funded research from the Group's own resources totalling £270 million.⁴⁰ BAe has played a major role in setting up collaborative research, such as the EUROMART

aeronautical initiative within the European Community, and the DTI-supported Materials 2000 programme.⁴¹ Increasingly, the trend has been one of industry and government working more closely together, specifically through the vehicle of the Defence Research Agency (DRA). One such programme, involving BAe and the DRA's Weapons Systems Division, is the "Research Vehicle for In-Flight Submunition Ejection" (REVISE). REVISE, a recoverable and re-usable flight vehicle, will be used to investigate a number of aspects of stand-off weapons - recognized as very important following the Gulf War - including air carriage, controlled release at low level and high speed, and submunition ejection. The prototype REVISE made its first flight attached to a DRA Tornado aircraft on 18 December 1991,⁴² and successful tests were carried out in July 1992, when it was launched for the first time from a Tornado aircraft at Mach 0.6.⁴³ From a TQM perspective, such collaborative ventures between industry and government (with the emphasis on customer-interfacing and customer involvement in projects) will contribute towards lowering the CoQ, since there is less likelihood of external failure costs accruing, through an understanding of what the customer wants and what industry is able to deliver.

The BAe Group's diversity results in a sharing of expertise and experience throughout the Group, and across a spectrum of technologies. The cross-fertilization of technology potentially offers large cost-saving opportunities. In 1990, Rover engineers established close links with aerospace engineers at the Sowerby Research Centre, resulting in valuable exchanges in areas such as computer-aided design (CAD), and advanced manufacturing.⁴⁴ In TQM terms, there are benefits to be accrued by the company as a whole, since technological advances in one area - or the identification of a deficiency in one technology area - can reduce long-term costs, through selective targeting of future sectors for investment, and through implementing modifications at an earlier, rather than later, phase of development.

The organization of the Westland Group, with its major operating divisions of Aerospace, Engineering, Helicopters and Technologies, reflects the company's strategic commitment to R&D and technological advances. For many years, Westland has prided itself on being a market-leader in composite rotor blade technology and gearbox technology. Westland Aerospace (WAL) - which has responsibility for flight critical structures in advanced materials and also for aircraft sub-systems - has three core business sectors, turboprop engine nacelles, flexible fuel tanks and flotation systems. In

recent years, it has enjoyed many technological achievements: for example, despite the current trading difficulties in the civil aircraft market, four WAL-designed engine nacelles were successfully integrated into aircraft flying for the first time in 1992.⁴⁵

Westland Technologies comprises three companies: Hermetic Aircraft International Corporation, based in the USA; Westland-Sitec in Germany; and the largest, Normalair-Garrett Limited (NGL) in Britain. NGL supplies control systems and components for the international aerospace, defence and engineering industries. NGL is committed to innovation. This is borne out by its results: a major achievement has been the selection of NGL by Boeing Military Aeroplanes Division to supply the On-Board Oxygen generator (OBOG) and the integrated Breathing Regulator with Anti-G Valve (BRAG) for the engineering/manufacturing phase of the USA's F-22 programme.⁴⁶ Whilst maintaining its internal drive towards TQM, NGL has successfully achieved BS5750 (ISO 9001) MoD approval.⁴⁷ In efforts to ensure that the internal organization is geared towards customer-orientation, NGL has re-arranged its manufacturing plants at Yeovil - the site next to WHL, thus enjoying the benefits of close geographical proximity - to implement cellular manufacturing, which will further improve quality, productivity and responsiveness to customer requirements.⁴⁸ Within WHL, further developments have been made in high-technology composite rotor blades, and in the Engineering Division, major investments have been made in the latest technology plant.⁴⁹

Industrial R&D Spending 1989-1992

In 1992, industry spending on defence R&D fell by 5% to £1.4 billion in cash terms, and 8% in real terms to £1.3 billion compared with 1991 figures.⁵⁰ Overall industry expenditure on R&D (including government funds) in the civil and defence sectors increased by 2% to £7.9 billion in cash terms but in real terms (using the GDP deflator) it decreased 2% to £7.18 billion over 1991.⁵¹ Between 1991-1992 total aerospace R&D investment decreased by 9% in cash terms, a real-terms decline of 12%. The aerospace R&D decline continues the post-1989 defence downward trend: peak R&D spending by British companies was in 1989 with £7.7 billion in cash terms spent in the civil and defence fields, but since then expenditure has fallen every year.⁵²

5. THE INSTITUTIONAL DIMENSION

5.1 Background

Whilst the USA has injected much capital into R&D, NATO-Europeans, with the exceptions of Britain and France, have not been so generous. As Hubert Curien⁵³ highlights, whereas in America, two-thirds of public funds for R&D are of military origin, military credits in Europe amount to less than one third of total R&D spending. The reduced activity in R&D - and thus reduced number of opportunities for cross-fertilization between the two sectors - juxtaposed with inappropriate investments, lacking commercial exploitability, are arguably the major reasons why European firms have failed to-date to acquire the same strength as American firms in civilian markets.

Although national technology programmes are important, it is developments on the international scene which continue to drive the pace and scope of R&D and technological progress. In view of the increasing internationalization of defence industrial production, a logical progression has now evolved whereby technology and industry policies are co-ordinated and dominated by "international" players. As highlighted above, the 1980s witnessed a shift away from sole national government competency in the area to trans-national consortia and institutional involvement in the technology area. Whilst there is no doubt that this internationalization and institutionalization has started -and continues - it is not "complete", for national governments still wield influence and foot much of the bill.⁵⁴ Margaret Sharp and Keith Pavitt⁵⁵ argue that the combination of the block exemption - incorporated in the SEA - of state aid for collaborative programmes, with intergovernmental schemes such as EUREKA, still gives governments considerable discretion in their subsidies to 'sunrise' industries. However, the increasingly hard line being taken by the European Commission on aids and subsidies in recent years - witness its stance in the Rover case⁵⁶ - has begun to provide very real constraints on such subsidy programmes. This has all helped shift the locus of action from national governments towards the Commission in Brussels.⁵⁷

5.2 The European Community

Introduction to the EC

Before examining EC manoeuvrings in the technology sphere, it is useful to begin this section by considering the sectoral nature of the institution, for a structural assessment will assist an analysis of the organization's ability to deliver a quality output.

The EC organizes its business operations into sectoral markets. As a result, it is not appropriately structured to deal with "defence" as a consolidated entity or to deal with aerospace as a consolidated group. As was highlighted in the preceding chapter, Article 223 of the Rome Treaty does preclude Community involvement in "defence"; however, in the aerospace domain, where the distinction is somewhat blurred between the civil and military sector - and where most aircraft companies have interests in both - the EC's initiatives are having an effect on the military business through the civil aeronautics excursions made mainly through the transport directorate. This, from a TQM perspective, is a most significant fact, for it appears that the EC is formulating decisions affecting the military aerospace community, without taking into account the "knock-on" affects for defence - and defence is outside of its purview anyway, which means that its capacity to deliver a quality output is questionable.

Within the European Commission, aeronautics research is generally handled by the Directorate General for Research and Development (DG12), under the department for "support of scientific and technical policy". It is arguable that the small size of this unit reflects the failure of the organization to recognize the strategic importance of adequate long-term research. However, in recent years - particularly following the Cold War's conclusion - there have been a number of Commission papers (discussed below) addressing the future of the aeronautics industry, affirming the importance of maintaining the industry and an adequate technological base. Thus it seems that the Cold War's conclusion may be driving a resurgence of EC interest in aerospace and aerospace technologies, even if only to formulate a survival strategy.

Manoeuvrings in the R&D/Technology Sphere

At the Community level, there are a range of policies similar to those of individual member-states. There are some large-scale interventionist programmes: notably certain parts of the ESPRIT programme in electronics. Some are outside the European Commission's ambit, either organized functionally - as with Airbus and the Space Programme (Space Agency is ESA) - or within the EUREKA framework.⁵⁸

EUREKA is an important programme to consider because it was deliberately placed equi-distant between the EC and WEU, to make it more politically acceptable to Euro-sceptics. Established in April 1985, as a result of a French initiative, it was intended as a response to the threat posed by the USA's SDI programme to Europe's

technological competitiveness. Unlike SDI, EUREKA is restricted to civilian programmes, but nonetheless, many of the same technologies are involved in both, such as optical electronics and particle beams. Although initially cautious about the programme, from June 1985, the British Government "took an uncharacteristically prominent role in promoting the concept."⁵⁹ Stephen George⁶⁰ highlights three factors which, he contends, attracted Britain: a) unlike EC programmes, EUREKA was more concerned with the application of technology than with prime research which might not produce practical results; b) whilst there was some disagreement over public funding levels, the emphasis of EUREKA - thanks to British insistence - was more on privately funded collaborative programmes; and c) EUREKA was not an EC programme, having its own secretariat rather than being under the Commission's control. As George⁶¹ points out, suspicion of allowing the Commission to become too powerful had been a strong factor motivating Thatcher Governments to look for European co-operation to be developed in frameworks other than the Community.

The success of ESPRIT and EUREKA in the 1980s led to a mushrooming of similar programmes based upon the principle of pre-competitive, collaborative research - organized by the Commission - and brought together from 1987 onwards under the large umbrella of the Framework Programme.⁶² The Third Framework Programme (1990-1994) - formally adopted in April 1990 - is more than a research programme; it constitutes a five year strategy. According to Britain's DTI, it will extend the concept of developing 'rolling' R&D programmes in order to respond to the dynamic nature of technological development today.⁶³ The Fourth Framework (1994-1998) will continue to focus on pre-competitive research, and complement EUREKA activities.

A 1992 Commission Working Document,⁶⁴ pertaining to Research and Technological Development (RTD) policy within the context of the Fourth Framework, called for greater consistency between national policies and Community policy, based on the fact that less than 4% of all government expenditure on civil research and technological development by member states is a joint action under Community policy. It also called for strengthened links between Community activities and the EUREKA programme.⁶⁵ The importance of harmonizing programmes, and of reducing the potential for duplicatory projects, is important to both national actors and the institutions, because of tight resource constraints and budgetary pressures.

Selected Aerospace Initiatives

The first major EC aerospace initiative came in 1986 when industry leaders were called together to give their views on the existing status of European research. As a result of a two-year study, a significant report, "Toward A Programme Of Strategic Measures In Aeronautical Research And Technology For Europe"⁶⁶ emerged. Whilst recognizing that EC nations were competing strongly in world markets - achieving between 23% and 27% of global sales in civil and military aircraft markets in the first half of the 1980s - it also highlighted growing concerns about future prospects for European players. In particular, concern was expressed because of the powerful drive by the USA to sustain pre-eminence in research and technology:

confronted by the vast strength and scale of activity of [Europe's] main competitors in the world market, notably America, the European industry remains largely divided between national interests in the field of research and technology. Continuation on this path can only lead to failure.⁶⁷

The report highlighted that it was illogical for the aircraft industry "to remain fragmented in the key field of technology acquisition",⁶⁸ when it had to operate in a world market, and to be competitive and efficient in that market. The report called for greater European co-operation: sixty projects were identified that might be suitable for co-operation among the contributing companies. However, despite the logical arguments raised in the report, the EC reduced the proposed ECU60 million pilot programme to ECU35 million contribution to a new aeronautics section in the BRITE/EURAM "more general research effort."⁶⁹ This was itself conditional upon industry supplying an equal amount. The new package - the "Industrial and Materials" (IMT) Programme, (1991-1994), BRITE/EURAM II - continues the work of its forerunner, with its principal objective being that of rejuvenating Europe's manufacturing industries by strengthening its scientific and technological base through R&D activities. Those key technological areas targeted for research include "Aeronautics Research", which will cover a broad spectrum of activities in aeronautical technology areas, such as aeronautical structures and manufacturing technologies, and technologies of aircraft operations.⁷⁰

The important role aerospace plays in exerting a "knock-on" effect on the acquiring and mastering of a broad range of leading-edge technologies has been

highlighted in a number of Commission documents, including an April 1992 paper.⁷¹ The Commission emphasized that materials (structures, data processing, design and manufacturing) and know-how (integration, systems aspects) could all be applicable to other sectors later, and that the technology base should be exploited to meet these ends.⁷²

Early in 1993, the Commission decided that the contents of the Fourth Framework Programme should be determined in accordance with two main objectives: strengthening the competitive position of European industry at the international level, and improving the quality of life.⁷³ Although some mention was made of aerospace, the sector does not appear to have been heavily discussed. However, under the agreed First Activity category - "Industrial Technologies" - the report drew attention to "Technology for Transport Means", and stressed that research and technology activities in this sector should benefit from generic technologies developed in other areas, such as "Advanced Manufacturing Technologies" (AMT). For aviation, they suggested that the emphasis should be on the reduction of emissions and improved safety, to name but a few areas.⁷⁴ Further evidence of the EC's commitment to generic technologies, could be found at the Edinburgh Summit meeting in December 1992, when the European Council re-affirmed the need for Community Research and Technology activities to focus on generic pre-competitive research with a multi-sectoral impact.⁷⁵

The EC and a Euro-R&D Agency ?

Whilst a number of joint European research projects do exist, the idea of a co-ordinated pan-European research effort on the lines of America's NASA, for example, is still embryonic. It is interesting to observe that it is "industry" which is now spearheading efforts to attain better co-ordination, and this is illustrated by the efforts of AI in forcing the pace of change: the consortium has already opened discussions with national research institutions including France's ONERA⁷⁶ and Britain's DRA. It is arguable that there is a strong case for greater R&D co-operation within a multilateral (EC ?) framework, given that member-states are confronted by similar commercial problems, such as the protectionism of Japan and the USA, which all affect the availability and quality of partnerships on offer.⁷⁷

However, whilst greater co-ordination between the programmes would doubtlessly be welcomed by industry and governments alike, it is debatable whether creating a Euro-R&D agency is necessarily desirable, or whether it is the most appropriate means of

achieving co-ordination. If such an agency was to be created, two fundamental issues⁷⁸ would have to be addressed: firstly, who owns the technology rights ?; and secondly, who would take responsibility if something does not work ? Until these issues are tackled, setting up a Euro-agency would be highly problematic. From a TQM perspective, such an agency would only be desirable - delivering a quality output - if it: a) gave customers what they wanted, as opposed to what the agency thought they wanted; b) improved upon existing national and institutional mechanisms, without contradicting or duplicating them, and without adding greater ambiguity; and c) did not have a high CoQ tag stuck to it, in terms of external failure costs being passed on to customers, in the form of over-regulated, over-bureaucratic procedures.

5.3 The North Atlantic Treaty Organization

Introduction to NATO

NATO has always recognized the importance of technological developments in contributing to stability in the world, and thus has created numerous internal mechanisms which focus upon R&D and technology. Figure 11. shows a highly simplified diagram of the technology development structure within NATO. Technological progress, as Keith Gardner⁷⁹ contends, is essential to NATO's continued successful defence of the peace. The Gulf War experience demonstrated the significant contribution advanced technology makes to the successful completion of a campaign. One of the problems confronting Alliance members is how to ensure retention of "superior technology", and that issue is addressed by the technology agencies.

As Figure 11. shows, technology is addressed within three major organizations - the CNAD, Science Committee (SC) and Military Committee (MC) - who all report to the North Atlantic Council (NAC). This section focuses on selected CNAD agencies and MC agencies - which have most relevance to this research - but, it is useful to consider briefly their fellow internal customers, in order to have a broad understanding of NATO's technology network. The SC⁸⁰ has prime responsibility for advancing NATO's "Third Dimension": civil science and technology. NATO's MC sponsors three technology organizations, comprising two research centres - SHAPE (STC) and SACLANT (SACLANTEN) - and a military aerospace technology agency. The two research centres act as technology advisors - they are specialists - to NATO's two main military commands. The military aerospace agency is the "Advisory Group for Aerospace Research and Development" (AGARD), which was formed in 1952, becoming an agency

NATO's Technology Development Structure and Internal Customer Interface

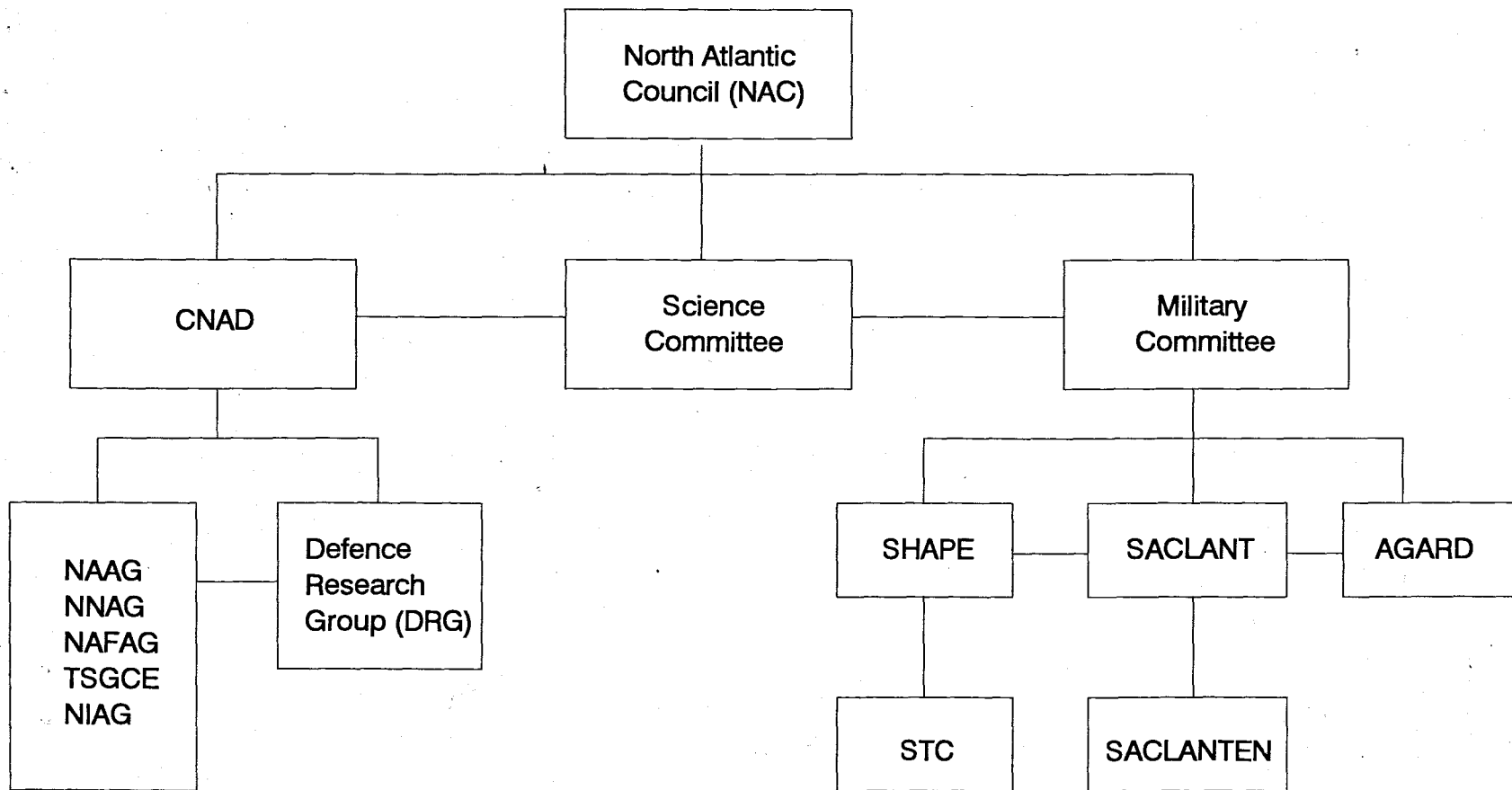


Figure 11.

SOURCE: NATO REVIEW, February 1993, (p.24).

under the MC in 1966. Additional information on the key agencies is provided below.

NATO Industrial Advisory Group

Prior to 1990, the majority of NIAG's pre-feasibility studies centred on work sponsored by one of the Main Groups under CNAD. However, since 1990, NIAG has completed several studies - started under its own initiative - including a study into Disarmament Verification Techniques.⁸¹ NIAG has also been requested to undertake a study to identify options and appropriate technologies for a Multi-Role Aircraft for the post 2010 period. Ten countries support the need for this study, and four nations are believed to have a requirement for the aircraft. The study is unlikely to begin before mid-1994.⁸²

Defence Research Group

As highlighted in Chapter Two, the DRG is one of CNAD's Main Groups. In contrast with the other groups, the DRG focuses on the earlier phases of the technology development cycle, having responsibility for the technology base, as opposed to the development of specific military equipment. It provides a unique forum for collaborative research, and acts as the forum for exchanges between the "EUCLID" Programme (discussed below) of the IEPG, and the USA's "Critical Technologies Plan", which is seen by some NATO-Europeans as merely championing American interests.⁸³ From a TQM perspective, the key question to be asked, if the above is true, is what sort of agency is it, if it is being so manipulated by one player, that national interests, rather than Alliance interests, are always being promoted? However, it could also be argued, that there are occasions where the promotion of one national (generally the USA's) interest is synonymous with - or certainly not contradictory to - the interests of the wider customer base. Notwithstanding the above, it is still a deficient system, with a high CoQ to the other customers, if one customer always has more leverage. The DRG's role and value should not be under-stated, since there is a scarcity of effective fora for exchanges dealing with technology. Indeed, as Keith Gardner⁸⁴ highlights, it is the only place where researchers concerned with classified technology are able to interface with their international colleagues.

The DRG's mission is to "exchange information and co-operate on research and technology which might lead to future defence equipment."⁸⁵ The DRG's structure⁸⁶ comprises three levels: the main group, which is largely composed of research directors,

many of whom have direct responsibility for national defence research; Panels and Special Groups of Experts (SGEs); and the Research Study Groups (RSGs), which are manned by national experts at the project level. DRG's structure and procedures are aimed at initiating and managing international collaborative research projects, which are executed within the RSG frameworks. There are currently fifty RSGs⁸⁷ under the DRG, and these are administered by eight Panels and two SGEs. Technical areas covered include air defence and electronic warfare.

In examining institutional output from a TQM perspective, it is essential to focus on the machinery and (complementary) mechanisms that exist within the organization, in order to establish whether an agency or committee has the capability to deliver a quality output, or is hampered in its efforts to deliver such an output, by virtue of broader institutional structural deficiencies. In the case of the DRG, it appears that the broader NATO structures and procedures - developed during DRG's evolution - are conducive to the promotion of an effective environment for collaborative research. This contributes to the reduction of potential external failure costs - with programmes for the greater good of the Alliance, benefitting all customers - thus lowering the CoQ. Furthermore, since the DRG provides a "pre-arranged" legal structure, this means that activities can be routinely carried out without negotiation of MOUs, thus saving months - perhaps even years - in the "gestation" period for new activities. In addition, since the organization of the International Staff (IS) for the DRG consists of just three Staff Officers and two secretaries at NATO HQ, all efforts would appear to have been made to maximize efficiency and cost-effectiveness.

The DRG operates via three main vehicles: the exchange of technical knowledge, collaborative research, and joint experiments and/or field trials. It is important to recognize that there are certain limitations upon the DRG's capacity to act, which could militate against the provision of a quality output. International co-operation is, of course, only possible when participating nations are willing to share their data and knowledge; if they are not, then co-operation is impossible. Additionally, the increasingly expensive nature of projects also presents problems, since most states will insist upon MOUs, which take time to negotiate, thus impeding quick progress.

Notwithstanding the above problems and limitations, the DRG does fulfil an important role in the research and technology domain. The significance of its role - and

quality of its output - can be gauged by considering the following factors. Firstly, a well-established customer network exists in the DRG - with good relations - and the fact that so many nations are willing to contribute the time of their best experts indicates that they (the customers) believe they will receive a positive return on their investment. Secondly, consideration has to be given to the quantity and specialist content of the DRG's output; it should be noted that to date, the DRG has produced approximately 400 major technical reports, many of which have been invaluable to the needs of other customers in the network, in terms of contributing towards cost-savings. Of further note is the DRG's sponsorship of numerous co-operative field trials: these have resulted in significant savings for participating states - through resource sharing - as well as greatly expanding databases, through data-sharing. It is therefore apparent that the DRG makes a valuable contribution to NATO's technological initiatives, and to the wider aims of the Alliance.

Advisory Group for Aerospace Research and Development (AGARD)

Whilst CNAD agencies are the major civilian bodies working under the NAC in the defence equipment and technology spheres, AGARD is the principal agency on the military side - reporting to the MC - tasked with aerospace R&D co-operation. Defence aerospace is of critical importance to NATO members: it is estimated that in the major Alliance countries about 50% of R&D funds for defence purposes is directly related to aerospace, and as much as 35% of all procurement funds are for aircraft, missiles and space systems.⁸⁸

AGARD's organization⁸⁹ comprises: a National Delegates Board (NDB), composed of up to three representatives of all Alliance nations; Technical Panels, currently nine are operational; an Aerospace Applications Studies Committee (AASC), composed of systems specialists from the major nations and representatives of NATO elements; a special Steering Committee, consisting of several NDB members and NATO military representatives; and Administrative, Financial and Publications agencies.

AGARD's Technical Panels - each consisting of 40-80 national experts - meet twice a year, in conjunction with technical symposia.⁹⁰ Of these Panels, the "Flight Mechanics Panel" (FMP), formed in 1952, is one of the original four. As originally conceived, this Panel's primary focus was on the flight-test problems of Alliance nations. Whilst the purview of the Panel has remained essentially unchanged for the past thirty years,⁹¹ there has been a significant increase in collaborative initiatives with the other

Panels. This reflects a growing recognition of the critical interdependency of the various disciplines represented by the Panels. Among the many activities undertaken by the Panel, one of the most recent studies on aircraft was the "Integration of Externally Carried Weapons Systems with Military Aircraft" (1985-1988), and of the special briefings to the MC, the 1986 briefing on "Enhancing NATO Flight Test Capability"⁹² was a notable success. Recent activities which best illustrate the co-operative involvement of the Panels - very important from a TQM perspective, in terms of internal customer-interfacing - are the joint FMP and Fluid Dynamics Panel (FDP) Symposium on "Unsteady Aerodynamics" (Spring 1985).⁹³

The AASC was formed in 1971. Under the Steering Committee's direction, it organizes and guides applications studies of a systems nature which transcend the scope of individual Panels or groups of Panels, by organizing Study Teams and conducting periodic reviews of their progress.⁹⁴ It generally initiates two Systems Studies each year, and occasional Workshops, each executed by a different group of experts from the NATO member-states, including systems engineers, military officers, industrial experts and government officials. This Committee has initiated thirty-five major Systems Studies at the request of the MC and member-countries. These studies continue to have a major impact upon the common and national development of aircraft and missile systems. Furthermore, many current operational problems have been addressed, such as low altitude, high-speed training in combat aircraft, and defence against directed energy weapons.⁹⁵

AGARD is in many respects a unique Trans-Atlantic forum, striving to bring R&D and military organizations in the NATO countries to a common level of knowledge, of the state-of-the-art, and the trends in aerospace technology. AGARD serves important functions for the Alliance: it acts as a means of information exchange and joint analyses and evaluation; it recommends effective ways for Alliance member-states to use their R&D capabilities for the common benefit of NATO; it provides solid technical aerospace advice to other NATO bodies; and it improves co-operation among Alliance members in aerospace R&D, stimulating advances in aerospace technologies relevant to strengthening NATO's common defence posture. To ensure AGARD maintains its unique "supplier" attributes, a rationalization of the Technical Panels is highly likely, driven largely by three factors: a) efforts to minimize "technology overlap", b) the fact that certain technologies are no longer as relevant as they were initially, and c) national budgetary

pressures.⁹⁶

As AGARD looks to the future, it is important to recognize that in an evolving NATO, aerospace will inevitably become relatively more important for defence, because of the emphasis on mobility, flexibility and verification. Changing military missions - under conditions of reduced budgets - will necessitate an increase in international co-operation, especially at the R&D level, and this is the area in which AGARD excels. AGARD's existence, and successes to date, demonstrates that although various organizations in aerospace do compete they can also co-operate, when the opportunity arises.⁹⁷ From a TQM perspective, this leads to a lower CoQ within NATO, in that common standards and a cross-utilization of facilities benefits the organization as a whole.

5.4 The Western European Union

Introduction to the WEU

Although the WEU's mandate does include arms collaboration, in practice, as David Garnham⁹⁸ argues, it often defers to the IEPG in this field. Notwithstanding this fact, it should not be forgotten that the WEU has examined the problems of duplication of effort in combat capabilities, and in the manufacture of weapons and platforms. In May 1990, its "Technological and Aerospace Committee" reviewing progress in the armaments co-operation area, called for:

more integrated European military research under the auspices of the Euclid programme by increased joint funding and the rationalization of existing national defence research establishments;⁹⁹

The emphasis has very much been on harmonizing research and technology programmes, focusing on collaborative projects.

Following the Maastricht negotiations, where the EC directed that the WEU should assume a wider role in European defence matters, a working group led by Britain was set up, with a view to bringing the IEPG into the WEU organization.¹⁰⁰ Although the political decision for this integration was taken in 1992,¹⁰¹ it will be some time before details emerge of how this will affect institutional and industrial working relationships.

5.5 The Independent European Programme Group

Introduction to the IEPG

As highlighted above, the IEPG is a forum in which 13 NATO-European nations aim to promote collaboration - in efforts to facilitate the effective use of R&D funds - and to eliminate duplication of R&D effort. Of the IEPG's three Panels -all of whom report to the IEPG's National Armaments Directors (NADs), it is Panel 2 which has competency in the R&D and technological domain, having responsibility for all technical matters, including "EUCLID".

In recent years, the importance of aerospace technology has been recognized by the IEPG. During their April 1986 meeting, IEPG Ministers directed that special efforts should be made to promote the widest possible co-operation in the field of military aeronautics. Just over one year later, at their Seville meeting - June 1987 - they re-affirmed their support for this research sector, directing that efforts should be made to:

increase collaboration on major sub-systems, on drones and on the new technologies needed for future aeronautical projects.¹⁰²

At that meeting, Defence Ministers also re-affirmed their strong support for the IEPG as the principal European forum for co-operation in the research, development and production of defence equipment.¹⁰³ Additionally, they underlined the importance of greater co-ordination of European national research and technology efforts, directing that efforts should be made to increase the number of Common Technology Projects (CTPs), including wherever possible, Technology Demonstrators. It was also agreed that "co-operation needed to be developed on a systematic basis, concentrating upon areas of Technological priority."¹⁰⁴ In efforts to promote co-ordinated research and technological co-operation, it was thought necessary to have a stronger involvement of "industries" in the CTP process, and in the definition of priority areas, as well as achieving a longer term harmonization of national research and technology plans within a wider framework.¹⁰⁵ Since then, there has been a greater commitment to R&D. According to government sources in France, the British and French Governments have invested over £10 million between 1988-1990 on joint R&D programmes for defence: these R&D projects include a laser radar for warning helicopters of obstacles.¹⁰⁶

The IEPG and EUCLID

The formation of the European Collaboration Long Term in Defence (EUCLID) programme in 1987 provided the defence industry - through its various trade associations¹⁰⁷ - to advise and influence the IEPG on both the technical and contractual aspects of this initiative. The Cold War's conclusion however, has cast doubts over a number of projects - whose survival will probably be on a day-to-day "wait and see" basis - and resulted in fewer new projects commencing. In July 1991, IEPG Defence Ministers, meeting in Brussels, launched only two projects in the EUCLID programme. Despite concern over the viability and/or future of some projects, IEPG Defence Ministers do recognize the value for Europe of the EUCLID programme. At their Oslo meeting in March 1992, they re-affirmed EUCLID's value, and noted that the first contracts for Research and Technology Projects (RTPs) were expected to be signed shortly.¹⁰⁸ They also commented that a number of CTPs, whose launch preceded that of EUCLID, had now been completed successfully, and that others were progressing well.¹⁰⁹

Future Large Aircraft

One project that should survive the cutbacks, and uncertainty, is a new European transport aircraft - the "Future Large Aircraft" (FLA) - which is regarded by the military as even more essential following the experience of the Falklands and Gulf conflicts.¹¹⁰ It is acknowledged by all the major institutions that a substantial airlift capability is crucial for any successful European out-of-area rapid deployment operation. The FLA is the all-European collaborative aircraft intended to replace the C-130 Hercules and C-160 Transall aircraft.¹¹¹ For several years, the Euroflag consortium - Aerospatiale, Alenia, Casa, Deutsche Airbus, and Britain's BAe, with associate partners in Portugal (OGMA), Belgium (FLABEL) and Turkey (TAI) - waited for the outcome of IEPG studies into future transport requirements. Phase 1 of the FLA programme has been given the go-ahead by European NADS, who ratified the Outline European Staff Target (OEST). In January 1992, Euroflag began a FLA pre-feasibility study, which ran to the end of the year.¹¹² Feasibility, according to Euroflag's Chairman, Nino D'Angelo, should finish before the end of 1994, and it is hoped that FLA development could start in 1995.¹¹³ Britain withdrew to "observer status" in the project about three years ago; the British Government was never an enthusiastic supporter of the programme, according to industry sources, and it is also understood that the RAF are keen to procure the new generation C-130J or Hercules II aircraft.¹¹⁴ Notwithstanding the British Government's withdrawal, BAe are still committed to the programme - as an industry partner - and are financing

their contribution to the programme themselves.

5.6 The European Defence Industries Group (EDIG)

The European Defence Industries Group (EDIG) was set up by the trade associations in Europe - in 1976 - to provide a formal customer interface with the IEPG. Its objective was to become the formal industrial advisory group to the IEPG, but it was not until 1984, that it was formally recognized by the IEPG governments as "the designated forum to advise IEPG on industrial matters."¹¹⁵ For many years, the IEPG seemed to prefer to operate by excluding industry from certain discussions - not a customer-friendly approach - but attitudes and operational procedures have changed.¹¹⁶ Two years ago, EDIG opened an office in Brussels, employing a small secretariat under the direction of the Secretary General. Because of Belgian law, EDIG had to legally become a Belgian company.¹¹⁷ EDIG's controlling body is its Board, on which Britain has three members, each representing one of the trade associations - the SBAC, EEA and DMA. Membership of committees and working groups are drawn from industry and appointed through the trade associations. Currently all of these contributions are made on an entirely voluntary basis, but it is arguable that due to increasing budgetary pressures on defence companies, and increasing pressures from shareholders for instant benefits - as opposed to potential long-term gains from adequate investment - the contributions to such bodies could decline, thus seriously reducing the efficacy of the organization.

The EDIG organization closely parallels that of the IEPG. It has two committees: a Technical Committee - which covers the activities of Panels 1 and 2 - and an Economic and Legal Committee, which interfaces with Panel 3.¹¹⁸ These committees report to a Board of Directors, chaired from January 1993, by Mr. Jan Bosma of the Netherlands.¹¹⁹ As with most other nations, the EDIG Directors are also NIAG delegates, and this greatly assists the cross-linking of experience and information between the two organizations. As a further means of ensuring good communications between EDIG and IEPG Panels, the Board has appointed Focal Points to liaise with the three Panels. These Panels have been selected to reflect the nationality of the Chairmen of the Panels. As alluded to throughout, TQM highlights the importance of the customer-supplier network - focusing attention on points of entry for customer inputs - and institutional structures vis-a-vis capability to deliver a quality output. In view of the fact that EDIG's customer-interfacing is of a very high standard - and that efforts have been made to ensure that its mechanisms are

complementary - it would appear that, from a TQM perspective, the organization is structured to deliver a quality output to the defence industrial players and other customers, and is striving to reduce its CoQ.

EDIG's activities in many ways parallel those of NIAG. Its prime aim is to study and advise on scientific, technical, structural and economic aspects of common interest to its membership - European industry. Between 1987-1990, EDIG concentrated much of its attention on the EUCLID programme, tracking the content of the programme through the EDIG Technical Committee, and contractual matters - particularly IPR - through its Economic & Legal Committee. EDIG's value can be gauged by the fact that it is the only recognized focal point for the IEPG with industry on the EUCLID programme.¹²⁰ More recently - specifically since the end of the Cold War - the organization has widened its remit to include, for example, a dialogue with the EC and WEU regarding the transfer of IEPG functions to the WEU, and cross-border competition. EDIG is able to provide expert technical advice and recommendations to the WEU-(IEPG), and form the basis for a conduit of information between industry and government. From a TQM perspective, the institution has a valuable role to play - is suitably structured to fulfil that role - and is too expert a customer to be excluded from discussions. It should be welcomed as a key player to assist the major institutions in the formulation of a strategy for Europe's defence industries in the 1990s.

5.7 FINABEL

FINABEL's aim is to encourage co-operation in the land armaments field, in terms of defining the qualitative requirements and military characteristics of equipment, as well as joint testing. In view of the fact that this organization is not concerned with air weaponry, it is cited here merely as a point of reference, highlighting another forum where technology-related matters are discussed.

CONCLUSION

One of the central themes of this chapter has been the claim that an adequate level of investment in defence R&D and technology has to be made, in order to lower the CoQ, thus minimizing erosion of the long-term capability of the nation's defence industrial base. Through examining the effects of reduced R&D and technological expenditure in a TQM context, it is apparent that the CoQ greatly outweighs any,

misperceived, "peace dividend" gains, and thus efforts should be made to sustain investment and to avoid drastic cuts. Adequate R&D investment brings benefits, as discussed above, in terms of facilitating the procurement of cost-effective equipment for the Services, and in the long-term will improve the international competitiveness of the nation through investment in innovation.

The continued need for defence R&D and technology expenditure - and investment in key civil technologies - has to a certain extent been recognized by all the institutions. As discussed above, there has undoubtedly been a shift in the focus of industrial and technology policies in Europe from national actors to institutions and trans-national consortia. From the above examination, a number of themes emerge: a) an institutional agency may be incapable of producing a "quality" output in the technological area because of structural deficiencies or procedural constraints; b) of the existing fora it is arguable that some are merely vehicles for championing national interests, as with the USA's influence in CNAD, and with France and EUREKA; and c) some of the institutional initiatives, particularly those of the European Community, are arguably of a reactive nature - in terms of the organization feeling obliged to act in the international R&D and technology arena, driven on by the impetus of "1992" and by moves for greater Euro-integration - rather than by the long-term strategic considerations of the wider customer-base: national actors including governments and defence companies. It is quite clear, as Margaret Sharp and Keith Pavitt¹²¹ contend, that Community policies have emerged ad hoc to meet the requirements of the moment, rather than as part of a considered, co-ordinated policy agenda.

However, whilst there are a number of institutional initiatives in this sector, it is also important to consider the national scenario - since the locus of power has not shifted totally from national governments to international players - and it appears that the national dimension too is far from being defect-free. Due to budgetary constraints R&D is an area which will continue to have an uncertain future, because by its nature it is a long-term exercise, and thus requires a long-term approach: investment must be made today for potential gains tomorrow, but there are no guarantees that there will be gains tomorrow. Since post-Cold War governments are under increased pressure from electorates to put immediate and short-term needs before long-term investment plans and possible gains, R&D expenditure is thus decreasing. But the government does have a major role to play in the future of R&D. John Weston contends that whilst industry is

not asking for, and Government does not need, an industrial strategy in order to identify recipients for subsidy, the Government does need an industrial strategy which indicates which industries are capable of generating genuine major wealth.¹²² He argues that this is needed in order to assist in the decision-making process when allocating scarce resources, setting priorities for investment in scientific research.¹²³ The dilemma confronting industry is that at the same time as governments are asking them to shoulder a greater share of the responsibility for military R&D, they also expect to have high-tech equipment to meet all eventualities. Companies are commercial concerns - they are not charities - and are answerable to their shareholders, many of whom want all benefits now, with minimal investment in R&D. Consequently, industry is unwilling to bear what it perceives as a "disproportionate" share of costs and risks, giving up time to develop a product which may not be in fact a saleable item. But if industry cannot deliver, governments will look to international suppliers, many of whom will be state-supported, and thus UK companies will suffer anyway. Since today's investment is tomorrow's future, there is clearly a need for a long-term approach to supporting the science and technology infrastructure, and for government and industry to work more closely together, in the interests of the wider customer-base. The way forward is not through directing larger and larger sums of government money at R&D on an ad hoc basis, but instead, making sure that funds are strategically targeted, thus gaining the maximum benefits for all customers: the government, defence companies and the Armed Forces.

CHAPTER THREE ENDNOTES

1. Lord Weinstock, *"Introduction: Technology And Procurement"*, **RUSI JOURNAL**, Vol.137, No.1, February 1992, p.19.
2. As highlighted by Keith Hartley, in Douglas Dossier, David Gowland and Keith Hartley (eds), **THE COLLABORATION OF NATIONS**, (Oxford: Martin Robertson & Co.Ltd., 1982), p.154.
3. *ibid.*p.155.
4. *ibid.*
5. See Jean-Jacques Servan-Schreiber, **THE AMERICAN CHALLENGE**, (London: Hamish Hamilton Ltd., 1968), translated from the French by Ronald Steel, originally published as *"Le Defi Americain"*, (Paris: de Noel, 1967).
6. See Margaret Sharp and Keith Pavitt, *"Technology Policy in the 1990s: Old Trends and New Realities"*, **JOURNAL OF COMMON MARKET STUDIES**, Vol.31, No.2, June 1993, p.133.
7. *ibid.*p.134.
8. *ibid.*
9. *ibid.*
10. *ibid.*p.135.
11. As highlighted by Dr. D.L.I. Kirkpatrick, *"The Management of Defence Research"*, **RUSI JOURNAL**, Vol.137, No.3, June 1992, p.22.
12. See Cabinet Office, **ANNUAL REVIEW OF GOVERNMENT FUNDED RESEARCH & DEVELOPMENT, 1990**, (London: HMSO, 1990), p.104.
13. The important role played by the Cold War, in terms of being the "driver" for technology, was highlighted in a private interview with Alan Nicholson-Florence, Marketing Director, BAeSEMA, conducted by S.P.Allmark, Esher, Surrey, 28 May 1993.
14. Karl Dersch, *"Opening Address: A Broad Overview Of The Changing Structure Of The European Aerospace Industry"*, (Commercial Aviation and Aerospace Conference - Opportunities For East-West Collaboration, Berlin, 11-12 June 1992), Speakers's Papers, see p.1.6.
15. Derek Roberts, *"The Role Of Industrial Research And Development"*, **The Stamp Memorial Lecture**, University of London, -21 November 1989.
16. *ibid.*p.3.
17. *ibid.*p.7.
18. Rainer Rupp, *"Dual Use Industries"*, (Contribution to the Defence Economics Workshop, Brussels, 6 March 1992), p.5. - background paper, North Atlantic Treaty Organization, NATO - **Central and East European Seminar on Defence Industry Conversion**. Brussels, 20-22 May 1992.
19. *ibid.*p.7.
20. See **STATEMENT ON THE DEFENCE ESTIMATES 1992**, Cm 1981, (London: HMSO, 1992), p.61.
21. The DRA represents an amalgam of the former Royal Aerospace Establishment, the Admiralty Research Establishment, the Royal Signals and Radar Establishment, and the Royal Armaments Research and Development Establishment into one corporate entity.
22. D. Kirkpatrick, *op.cit.*p.23.
23. *ibid.*p.24.
24. For additional information on CARAD see Department of Trade and Industry, **CARAD Annual Report 1990/91**, (London: DTI, October 1991); and also see **CARAD Annual Report 1991/92**, (London: DTI, October 1992).

25. As enumerated in Department of Trade and Industry, **CARAD Annual Report 1991/92**, *ibid.* p.2.
26. See Julian Moxon et al, "*Backing Europe*", **FLIGHT INTERNATIONAL**, Vol.141, No.4305, 12-18 February 1992, p.23.
27. See Department of Trade and Industry, *CARAD Annual Report 1991/92*, *op.cit.* p.7.
28. *ibid.* p.4.
29. *ibid.* p.3.
30. See Kevin O'Toole, "*UK rejects plea for R&D funds*", **FLIGHT INTERNATIONAL**, Vol.143, No.4369, 12-18 May 1993, p.24.
31. *ibid.*
32. As quoted in "*COMMENT - A Matter Of Anxiety*", **FLIGHT INTERNATIONAL**, Vol.143, No.4369, 12-18 May 1993, p.3.
33. As cited in Kevin O'Toole, *op.cit.*
34. The argument that the figures for the French industry are artificially inflated - by the size of its space industry, and through the inclusion of Airbus sales - misses the point. As a **FLIGHT INTERNATIONAL** editorial ("*COMMENT - A Matter Of Anxiety*", *op.cit.*) highlights, the telling statistic is that overall British sales have been declining to those of France.
35. As quoted in *ibid.*
36. See Nick Cook, "*Ball starts rolling on UK 'action plan'*", **JANE'S DEFENCE WEEKLY**, Vol.20, No.5, 31 July 1993, p.8.
37. The British government agreed to provide the BAe Group launch aid totalling £700 million for various Airbus projects, of which £50 million was repayable in three instalments, the final instalment of which was paid in January 1992. See **British Aerospace Annual Report And Accounts 1991**, p.34. Incidentally, according to Peter Bruce, BAe Airbus Limited received less than £1M in state aid through R&T grants in 1992; Peter Bruce, Business Development Manager, BAe Airbus Limited, personal letter (unpublished) to Susan P. Allmark, 25 May 1993.
38. As quoted in Kevin O'Toole, *op.cit.*
39. As highlighted in "*COMMENT - A Matter Of Anxiety*", **FLIGHT INTERNATIONAL**, *op.cit.*
40. **British Aerospace Annual Report And Accounts 1990**, p.14.
41. **British Aerospace Annual Report And Accounts 1988**, p.9.
42. See "*Revise Flight Trials Underway*", **DEFENCE BRIEFING**, A British Aerospace Defence Ltd Publication, (Surrey: DMO, Issue 11, February 1992), p.8.
43. See "*REVISE passes UK flight test*", **JANE'S DEFENCE WEEKLY**, Vol.18, No.5, 1 August 1992, p.14.
44. **British Aerospace Annual Report And Accounts 1990**, p.15.
45. **Westland Group Annual Report 1992**, p.8.
46. *ibid.* p.14.
47. *ibid.* p.15.
48. *ibid.*
49. *ibid.* pp.11-12.
50. See Central Statistical Office, Business Enterprise Research and Development 1992, (CSO: December 1993); as cited in Carol Reed, "*Industry R&D spending falls in UK*", **JANE'S DEFENCE WEEKLY**, Vol.21, No.1, 8 January 1994, p.30.
51. *ibid.*
52. *ibid.*
53. Hubert Curien, "*The Revival Of Europe*", in Andrew J. Pierre (ed), **A HIGH TECHNOLOGY GAP**, (New York: Council on Foreign Relations Office, 1987), p.46.

54. See Margaret Sharp and Keith Pavitt, *op.cit.* p.135.
55. *ibid.* p.136.
56. See "*Aid to Rover Group*", **COMMON MARKET (CM) LAW REPORT**, 1992, Vol.63, Part 858.
57. Margaret Sharp and Keith Pavitt, *op.cit.* p.136.
58. *ibid.*
59. Margaret Sharp and Claire Shearman, **EUROPEAN TECHNOLOGICAL COLLABORATION**, Chatham House Paper, No.36, (London: Routledge & Kegan Paul for the RIIA, 1987), p.70.
60. Stephen George, **AN AWKWARD PARTNER: BRITAIN IN THE EUROPEAN COMMUNITY**, (Oxford: Oxford University Press, 1990), p.201.
61. *ibid.*
62. Margaret Sharp and Keith Pavitt, *op.cit.* p.136.
63. Department of Trade and Industry, **EC R&D: A GUIDE TO EC RESEARCH & DEVELOPMENT PROGRAMMES**, (London: DTI, March 1993), p.2.
64. See Commission of the European Communities, **Second Commission Working Document Concerning RTD Policy In The Community And The Fourth Framework Programme (1994-98) Of Community RTD Activities**, COM (93) 158 Final, April 1993, (Brussels: CEC), p.5.
65. *ibid.*
66. See Communication From The Commission, COM (88) 294 Final, 7 June 1988, (Brussels: CEC).
67. *ibid.* p.20.
68. *ibid.* p.15.
69. Julian Moxon et al, *op.cit.* p.22.
70. See Department of Trade and Industry, **EC R&D: A GUIDE TO EC INDUSTRIAL RESEARCH AND DEVELOPMENT PROGRAMMES**, (London: DTI, September 1991), IMT, Sheet No.14.
71. See Commission of the European Communities, **The European Aircraft Industry: First assessment and possible Community actions**, COM (92) 164 Final, 29 April 1992, (Brussels: CEC), p.8.
72. *ibid.*
73. Commission of the European Communities, **Working Document Of The Commission Concerning The Fourth Framework Programme Of Community Activities In The Field Of Research And Technological Development (1994-1998)**, COM (92) 406 Final, 9 October 1992, (Brussels: CEC), p.7.
74. *ibid.* p.23.
75. As quoted in Commission of the European Communities, COM (93) 158 Final, *op.cit.* p.3.
76. "Office national d'etudes et de recherches aerospaciales": France's National Office of Aerospace Studies and Research.
77. See Michael Heseltine, **THE CHALLENGE OF EUROPE - CAN BRITAIN WIN ?**, (London: Weidenfeld & Nicolson Ltd., 1989), p.117.
78. As highlighted by a senior British defence industrialist during a private interview conducted by S.P. Allmark.
79. Keith Gardner, "*Technology development in NATO*", **NATO REVIEW**, Vol.41, No.1, February 1993, p.23.
80. The Science Committee is the only organization within the Alliance structure which is limited to non-classified civil science.
81. See Newsletter of the UK delegation to EDIG and NIAG, **NEWS FROM EDIG/NIAG**, No.1, Spring 1993, p.3.
82. *ibid.* p.4.
83. From a NATO-European perspective, it is arguable that such a programme is merely an excuse (another avenue) for the USA to "pump" billions of dollars into high-technology American firms.

84. Keith Gardner, *op.cit.* pp.25-26.
85. As cited in Keith Gardner, *ibid.* p.26.
86. This section is largely based on Keith Gardner's NATO REVIEW article, *ibid.*
87. *ibid.*
88. See Advisory Group For Aerospace Research & Development, AGARD, (Neuilly-sur-Seine: NATO AGARD, No date), p.5.
89. *ibid.* pp.8-9.
90. Keith Gardner, *op.cit.* p.25.
91. See Advisory Group For Aerospace Research & Development, THE AGARD HISTORY: 1952-1987, (Neuilly-sur-Seine: NATO AGARD, December 1988), p.158.
92. *ibid.* p.159.
93. *ibid.*
94. *ibid.* p.109.
95. Most of this section is based on material contained in AGARD, (No date), *op.cit.* pp.12-13.
96. John Scott-Wilson, Chairman AGARD, private interview conducted by S.P. Allmark, 3 December 1993, Manchester. With regard to technology overlap, John Scott-Wilson has highlighted the "increasing warfare" between the Panels - specifically emphasizing which one has responsibility for the whole system? - see personal letter (unpublished) to Susan P. Allmark, 14 June 1994.
97. *ibid.* p.20.
98. David Garnham, THE POLITICS OF EUROPEAN DEFENSE CO-OPERATION, (Cambridge, Massachusetts: Ballinger, 1988), p.122.
99. See Assembly of Western European Union, The Independent European Programme Group (IEPG) and Western European Union (WEU), WEU Document 1228, 25 May 1990, (Paris: WEU), p.2.
100. See NEWS FROM EDIG/NIAG, *op.cit.* p.2.
101. *ibid.*
102. See IEPG Ministerial Communique, 22 June 1987; as cited in NATO REVIEW, No.4, August 1987, p.33.
103. *ibid.*
104. *ibid.*
105. See Bruce George (ed), "Independent European Programme Group. A Stepwise Development of a European armaments market", (Issued 23 September 1988), JANE'S NATO HANDBOOK 1989-1990, (Surrey: Jane's Information Group, 2nd ed.), pp.302-303.
106. See ELECTRONICS WEEKLY, 18 July 1990, p.28.
107. In Britain, the key Trade Associations are the DMA, EEA and SBAC.
108. IEPG Communique, IEPG/MIN/D-16, 6 March 1992, (Oslo), p.3.
109. *ibid.*
110. See "Ministers launch EUCLID projects", JANE'S DEFENCE WEEKLY, 13 July 1991, p.52.
111. For an excellent article on the FLA, see Wilby Crawford, "Europe Defines Airlifter Needs", INTERAVIA, Vol.46, September 1991.
112. See Carol Reed et al, "MARKET SURVEY: AIRLIFTERS", JANE'S DEFENCE WEEKLY, Vol.17, No.21, 23 May 1992, p.899.
113. See "Future Large Aircraft takes step forward", JANE'S DEFENCE WEEKLY, Vol.19, No.26, 26 June 1993, p.8.
114. See Carol Reed et al, "MARKET SURVEY: AIRLIFTERS", *op.cit.* Also see Charles Bickers, "MPs may force

C-130 replacement debate", JANE'S DEFENCE WEEKLY, Vol.20, No.5, 31 July 1993, p.7. According to Bickers, the RAF has ruled out the FLA as a replacement for half its C-130K Hercules fleet, but a Parliamentary select committee may yet force a House of Commons debate on the subject.

115. See NEWS FROM EDIG/NIAG, op.cit.p.2.
116. As highlighted by a senior British defence industrialist during a private interview conducted by S.P. Allmark.
117. *ibid.*
118. See NEWS FROM EDIG/NIAG, op.cit.p.2
119. *ibid.*
120. *ibid.p.1.*
121. Margaret Sharp and Keith Pavitt, op.cit.p.148.
122. John Weston, *"The Aerospace Industrial Perspective"*, RUSI JOURNAL, Vol.138, No.7, June 1993, p.42.
123. *ibid.*

* Those seeking additional information on Research and Technology Acquisition and Product Development are advised to consult the "Trade and Industry Committee's Third Report on the British Aerospace Industry", HC Session 1992-93, 563-I and II. Of its many proposals, the Report recommends that the DTI should give a high priority to the funding of demonstrator projects in its response to the NSTAP (para 75). On the specific issue of "launch aid", there is a proposal that the DTI should regularly benchmark against the main competitor countries - the form of aid provided and the process for approval etc...

CHAPTER FOUR

SKY WARS : THE BATTLE FOR AIRCRAFT EXPORTS

If God Gave The Hand, Let Not Man Withhold The Sword.
All Have The Right To Fight: None Have The Right To
Judge. To Man The Weapon: To Heaven The Victory.
Peace Shall Not Prevail Save With A Sword In Her Hand.
Nothing Is Ever Done In This World Until Men Are
Prepared To Kill One Another If It Is Not Done.
Unashamed. - Andrew Undershaft, **MAJOR BARBARA**¹

INTRODUCTION

The primary aim of this chapter is to assess the "quality" of institutional output in the defence aerospace trade sector. The initiatives are mainly of a regulatory nature. Two fundamental factors have to be acknowledged from the outset: the first is a semantic point, in that a distinction has been drawn between efforts to "regulate" the trade - which involves managing or monitoring arms sales - and attempts at "restricting" the trade, which entails limiting or confining sales; the second point is that neither this chapter nor the thesis in its totality is purporting to address the ethics or morality of the arms trade. This chapter does, however, consider the legitimacy of the arms trade in the context of the United Nations Charter provisions vis-a-vis the rights of sovereignty and self-defence. Whilst acknowledging that events such as the Gulf War² have highlighted the dangers of proliferation, and of the necessity of establishing some form of control over arms transfers - in order to prevent states acquiring "super-arsenals", through unsupervised, unmonitored multiple imports - this chapter unequivocally endorses legitimate arms sales: legitimate arms sales, based on the right of sovereign states to protect their independence, to exercise their right of self-defence, and to assure a reasonable level of security is a perfectly acceptable norm of international politics. Denying states, particularly those which lack an indigenous defence industrial capability, the right to import defence equipment would be denying them their right of self-defence, a right we demand for

ourselves. Over-regulation of the arms trade would make that right of self-defence impossible to protect.

At this juncture, it should also be noted that support for measures to minimize repeat Iraq scenarios, as illustrated by efforts to regulate the trade, does not imply that: a) armaments in themselves provoke wars;³ b) arms races, or the continued scientific quest for technological superiority in any category of weapons systems, lead ultimately to war.

This chapter provides an insight into the national and institutional aerospace trade domain. Section 1 focuses on export sales of British fixed-wing aircraft and helicopters. In section 2 the British Government's position on arms sales, including national support and regulatory mechanisms, is assessed. Section 3 addresses the institutional level, examining the various institutional initiatives in the defence trade sector.

1. REACHING FOR THE SKIES: BRITISH MILITARY AND CIVIL AIRCRAFT AND HELICOPTER EXPORTS

1.1 Background

In the late 1950s there was a rapid decline in the demand for British weapons exports, particularly aerospace sales which suffered a 50% reduction between 1958-1964.⁴ A number of factors account for this fall: a) a general decline in the Third World Market; b) a failure to develop equipment appropriate for the international market, specifically the failure to find a suitable successor to the Hawker Hunter - the fighter aircraft which had entered service with numerous Air Forces in the 1950s; and c) the fact that customers began to acquire a greater and greater percentage of their arms from the USA and USSR, mainly because of the increasing bi-polarization that was taking place within the international arena, and also because of the fact that more favourable financial terms and "packages" were being offered by the superpowers. Within the TQM domain, the second factor - pertaining to the inability to develop equipment appropriate for the market-place - is a classic illustration of a non-Total Quality activity, that is: failing to meet customer requirements first and every time. Through applying the CoQ concept, it is apparent that heavy "indirect costs" - the loss of influence in the aerospace market, combined with the loss of sales (and support business) for British companies - contributed to the aviation industry's high CoQ in the late 1950s.

In the post-1965 period, British aircraft exports increased, largely due to Third World "buying sprees". India was the most important single customer for British weapons systems across the board between 1971-1985, taking delivery of Canberras, Hunters, Jaguars, Sea Harriers and Sea King helicopters.⁵ Appendices 1 and 2 provide detailed information on exports of British aircraft and helicopters between 1971-1985. British aircraft and helicopter sales to the South American region also grew in the 1970s: the recipients included Argentina, Brazil and China. Despite an embargo on British sales to Chile between 1974-1980, Chile still managed to rank among the most important recipients of British weapons in the area, purchasing Canberra and Hunter aircraft.⁶

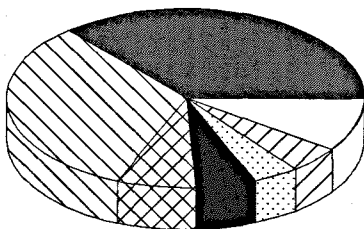
At the end of the Cold War the superpower bi-polarization, which had heavily influenced the pattern of allocation of arms sales, no longer exerted such influence. Arms sales were declining in overall terms. Notwithstanding this fact, the USA and the ex-USSR/Russia still command the largest share of arms exports. In 1992 the overall trade in defence exports continued its downward trend from 1991: according to SIPRI estimates, the value of foreign deliveries of major conventional weapons systems in 1992 was \$18 405M, as calculated in constant 1990 U.S. dollars, which roughly represents a 25% reduction on the previous year's sales.⁷ Figure 12. provides a schematic illustration of the world's leading conventional arms exporters between 1990-1992. From this information, it is apparent that the USA was the dominant arms exporter in 1992 - a position it had attained in 1991 - with overall sales of 46%, slightly down on the 48% figure recorded in 1991. Sales from the USSR/Russia plummeted from 32.4% in 1990, to 18.2% in 1991, to 11% in 1992. Britain's percentage of defence sales in 1990 was 5.8%, falling to 3.3% in 1991, and rising to 5.2% in 1992. Despite the increase in British defence exports in 1992, Britain dropped to 6th position in the ranking of leading conventional arms exporters, behind the USA and USSR/Russia, France (6.2%), China (8.3%) and Germany's 10.5%.

Two important trends are evident: the rise in NATO-Europe's defence trade, and the emergence of China as a major weapons exporter. NATO-European sales constitute a higher percentage figure than in previous years because of three main factors: a) the decline in USSR/Russia sales automatically boosts the European share of defence trade; b) aggressive sales campaigns have been masterminded by NATO-Europe's defence companies who - facing dwindling traditional home markets - are targeting export customers in order to survive; and c) arms control measures, such as the Conventional

Leading Conventional Arms Exporters, 1990-1992 (Percentage of Total Sales)

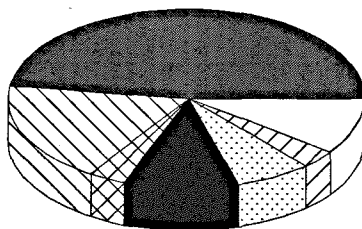
Figure 12.

TOTAL SALES: \$29,272M.



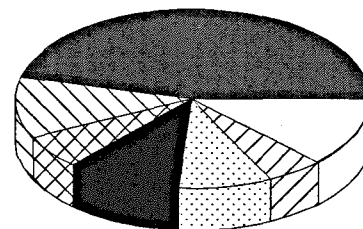
1990

TOTAL SALES: \$24,470M.



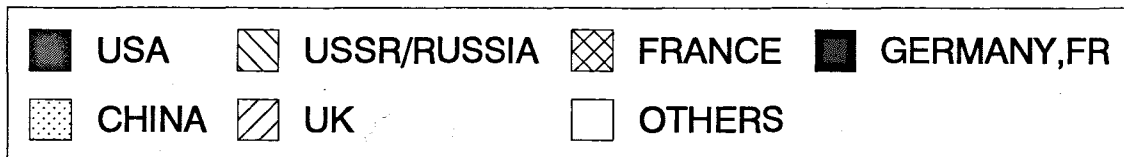
1991

TOTAL SALES: \$18,405M.



1992

KEY



Figures calculated at constant 1990 prices

SOURCE: SIPRI YEARBOOK 1993: WORLD ARMAMENTS AND DISARMAMENT, op.cit.p.444.

Forces in Europe (CFE) Treaty (discussed in Chapter 5), have only had marginal effects on defence spending, since the ceilings imposed on Treaty-Limited Equipment (TLE) are rather high, at least for European-NATO members,⁸ and thus will only affect weapons acquisition in the long run. They have not had a profound effect on world military expenditure. Furthermore, defence sales are still very much in a state of flux, since there are major transfers of weapons still to be fulfilled, particularly American and European equipment post-Gulf War, and also ex-USSR defence trade allocation patterns have still to be established. China's emergence as a leading arms exporter has presented difficulties for the other Permanent Five (P5) members of the United Nations Security Council, exacerbating the problems of reaching agreement on measures to minimize arms proliferation.

Britain's two leading airframe manufacturers, BAe and WHL, continue to be heavily dependent on export sales. The BAe Group in its totality is Britain's largest exporter: export sales in 1990 reached £5 billion. Of this total, BAe Defence's share of this figure was approximately £3.5 billion, making it the United Kingdom's number one exporter in its own right, above ICI, its nearest rival on £3.2 billion.⁹ Figure 13. provides information on the geographical distribution of the BAe Group's exports between 1989-1991. In Appendix 3 detailed information is provided on selected British aircraft and helicopter exports in 1992. From examining the data, two regions, the Middle East and the Asia-Pacific sectors, stand out as key importers. If these figures are taken as the baseline for projecting future aviation trade (sales plus support services), it is logical to assume that British companies will target these regions for future defence trade. This view is strengthened by SIPRI's analysis of overall weapons systems importers, which highlights Saudi Arabia and Japan as leading customers between 1988-1992.¹⁰ This confirms the argument put forward in justification of the British aircraft case-study in this thesis: the industry is a microcosm of UK Defence Inc., and also an accurate barometer of the health of the international defence trade. Information on current and future trade prospects for British aircraft and helicopters is provided below.

Distribution of BAe Group's Sales by Geographical Market, 1989-1991

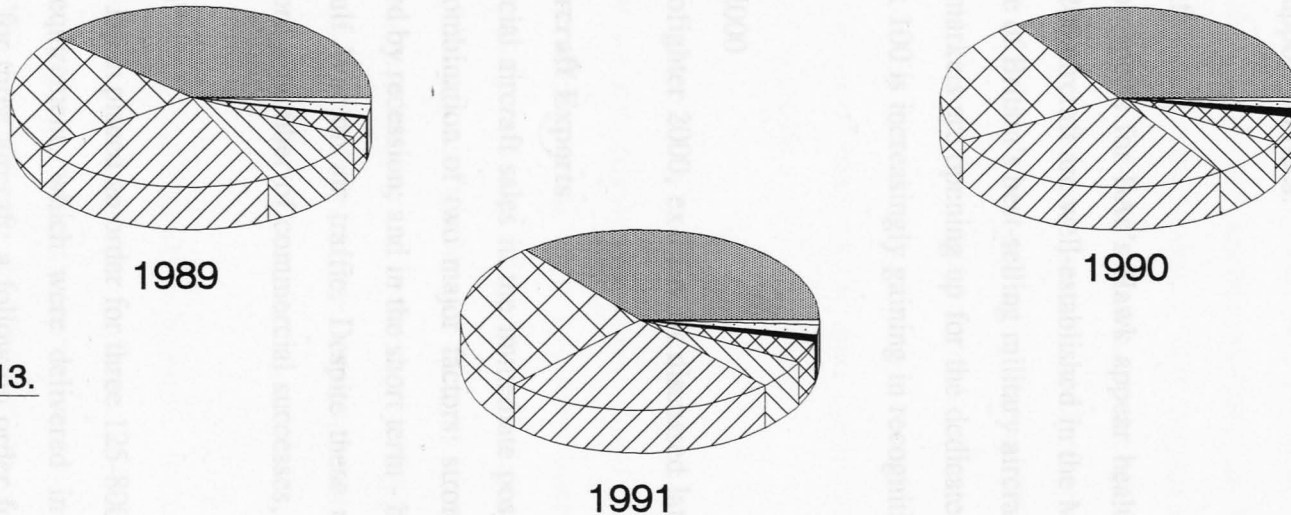


Figure 13.

KEY

UNITED KINGDOM	EUROPE	MIDDLE EAST	NORTH AMERICA
FAR EAST	CENT/SOUTH AMERICA	AUSTRALASIA	AFRICA

SOURCE: BAe ANNUAL REPORT AND ACCOUNTS 1990, op.cit.p.34. and 1991, op.cit.p.35.

1.2 Military Aircraft Exports

a) The Al Yamamah Contract

For BAe and WHL, capitalizing on the defence deal with Saudi Arabia - worth approximately \$1.5 billion - is a crucial opportunity for enhancing the survivability of both companies in the aerospace sector. The original equipment purchases expected under Al Yamamah II were forty-eight Tornado aircraft (24 IDS and 24 ADV variants), up to sixty Hawk 200 fighters, eighty-eight Westland Black Hawk (WS70) assault helicopters, plus a host of support services.

b) Hawk Aircraft

Export prospects for BAe's Hawk appear healthy in the long term, as both the Hawk 100 and 200 aircraft are well-established in the Middle East and Far East markets. The Hawk is one of Britain's best-selling military aircraft, with 600 delivered or on order to date.¹¹ New markets are opening up for the dedicated combat variant, the Hawk 200, whilst the Hawk 100 is increasingly gaining in recognition as a multi-role trainer/combat aircraft.¹²

c) Eurofighter 2000

The Eurofighter 2000, ex-EFA, is discussed later.

1.3 Civil Aircraft Exports

Commercial aircraft sales in the immediate post-Cold War period were affected severely by a combination of two major factors: strong competition in a market-place already weakened by recession; and in the short term - but nonetheless highly damaging - effect of the Gulf War on air traffic. Despite these market conditions, BAe has still managed to record a number of commercial successes, which are enumerated below:

a) BAe 125-800¹³

In 1989, Japan placed an order for three 125-800 aircraft for the Air Self Defence Force's SAR requirement, which were delivered in 1992.¹⁴ In 1991, it placed an additional order for three aircraft: a follow-on order for up to twenty-four is expected, since the overall requirement is twenty-seven aircraft to be delivered between 1995-2003.¹⁵

b) Airbus

The growing success of the Airbus range of aircraft, for which BAe designs and builds all the wings, ranked as one of the few high spots for civil airliner sales in 1991. BAe's Chester and Filton factories produced sixty widebody wing sets in 1991, mainly for the A300 and A310, together with more than 120 for the A320.¹⁶ By the end of 1991, firm orders for Airbus had reached 1,767, of which 815 aircraft were in service around the world, leaving an undelivered backlog of 952 aircraft, valued at \$71 billion.¹⁷ Crucial to the consortium's success has been their ability to meet the special needs (size and capability) of their national carrier-customers: it has resulted in the design and manufacture of half a dozen models.¹⁸ This emphasis upon understanding the market environment is all part of a customer-driven strategy. It is also important to recognize that because of its advanced wing design and efficient twin-engines, the A300 was about 15% cheaper to operate than the competing Boeing 727-200.¹⁹ In TQM terms this meant "quality" was achieved, in that customer requirements were met, with the bonus of lower costs, and also by the fact that this product contributed to lowering the consortium's overall CoQ, in terms of enabling the organization to establish a firm foothold in the market-place, and to create a solid client-base.

In view of the fact that the consortium's external customers also happen to be potential (if they are not already established) Boeing customers, it is hardly surprising that Airbus' sales strategy is to target long-time Boeing customers, in what is rapidly developing into an aggressive sales war. Boeing's highly profitable 747 aircraft would be outclassed if both Airbus and McDonnell Douglas produce 4-engine jetliners, capable of carrying 200 more passengers than Boeing's 747-400.²⁰ The Airbus consortium is encouraged by a survey of carriers in Asia, Europe and North America, which confirmed the need for larger aircraft.²¹

The Westland Group also has an interest in the future success of the Airbus family of aircraft: Westland Aerospace has built up its position as a supplier of specialist components, principally inner-fixed structures and cowls, and in supplying parts for the V2500 used on Airbus A320 aircraft and the CFM 56-502 used on the Airbus A340.²²

1.4 Military Helicopter Exports

As highlighted above, there is tremendous over-capacity in the helicopter manufacturing domain. Consequently, competition between rival helicopter companies has

intensified since 1989, as companies desperately try to carve out new niche markets for themselves to offset dwindling traditional market sales. Westland's sales compare favourably with their European rivals. Figure 14. below provides overall figures of Westland's helicopter deliveries between 1988-1993. Westland's future export prospects are relatively healthy. In Europe, there is only one new medium-heavy lift helicopter: the EH101, built jointly by WHL and Italy's Agusta.²³ Market prospects appear favourable, since it is highly likely (though never certain) that European nations currently operating helicopters such as the American CH-47 Chinook, CH-53 Stallion and CH-46 Sea Knights²⁴ may select the EH101 as a replacement aircraft, as existing fleets become far too expensive, or dangerous, to operate.²⁵ Aside from EH101 sales, Lynx sales are also expected to increase, as highlighted above,²⁶ since the Asia-Pacific region is recognized as a major growth area.

	1988	1989	1990	1991	1992	1993
Sea King	3	15	11	3	1	0
Lynx	10	3	3	16	9	4
Westland 30	4	0	0	0	0	0
TOTAL :	17	18	14	19	10	4

[SOURCE: Westland Group Annual Reports, see Figure 15.]

Figure 14. WHL's Helicopter Deliveries by Type, 1988-1993

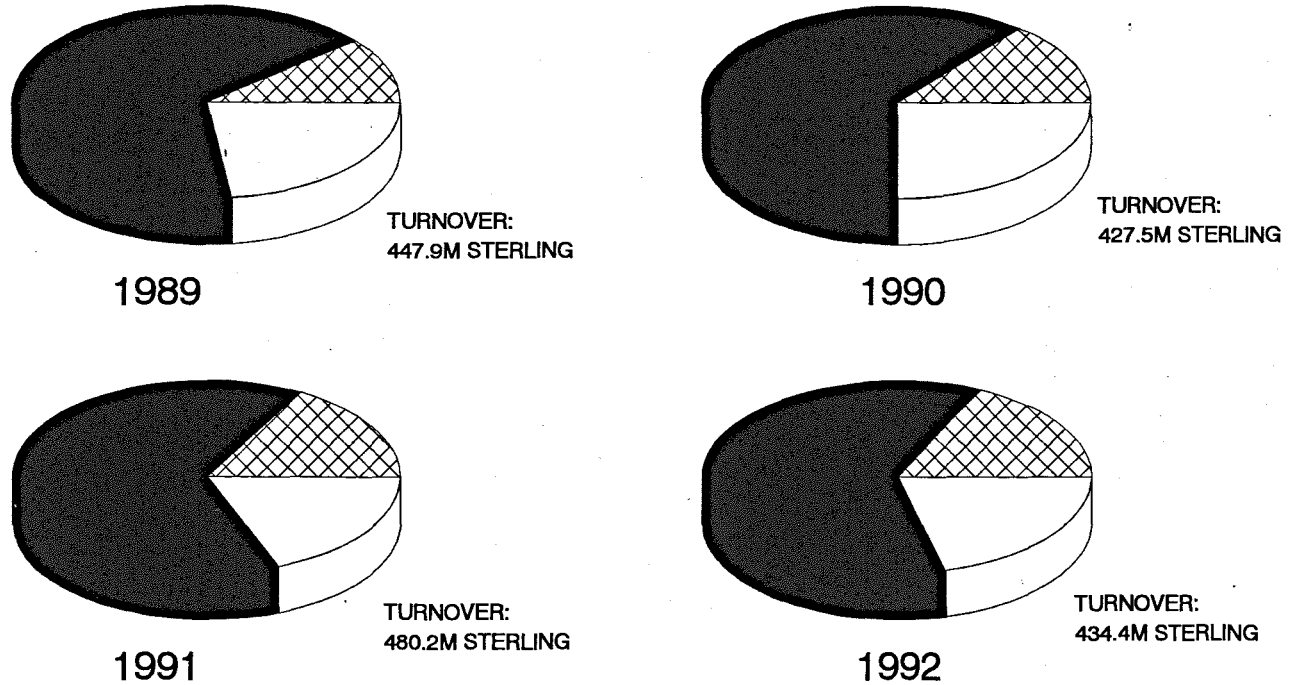
In terms of the contribution helicopter sales make to the Westland Group's annual turnover and profit, it is important to recognize that from 1988-1992, WHL's sales and support revenues constituted an average of 63% during this period.²⁷ Figure 15. provides a sectoral analysis of the Westland Group's turnover (ex-deductions and adjustments) between 1989-1992: it highlights that Helicopters dominate sales, followed by Aerospace and Technologies.

1.5 Civil Helicopter Exports




Export prospects for civil helicopters were discussed above.²⁸

Sectoral Analysis of Westland Group's Turnover (Excluding Deductions), 1989-1992

Figure 15.



KEY

	AEROSPACE		HELICOPTERS/SUPPORT		TECHNOLOGIES
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SOURCE: WESTLAND GROUP ANNUAL REPORTS 1989 (p.35), 1990 (p.31), and 1992 (p.29).

2. MONEY & GUNPOWDER: THE U.K. SUPPORT AND REGULATORY PARADIGM

2.1 The British Government and the "Internationalization" of Arms Exports

Britain was the first West European country to follow the USA's lead in the 1960s in "commercializing" arms sales, by creating the Defence Sales Organization (DSO) within the MoD in 1966. Its task was to facilitate, though not formally contract for, sales. As Frederick Pearson²⁹ highlights, whilst British companies remained responsible for marketing their equipment and support services - and for obtaining licences through the Trade Department - the DSO helped cut through government red tape in obtaining clearances, co-ordinating inter-ministerial consideration of sales, and other related activities. In 1986, the DSO became the Defence Export Services Organization (DESO): its functions remained essentially unchanged.

Whilst Conservative Governments in Britain, particularly Margaret Thatcher's Administrations of the 1980s,³⁰ were much accredited with actively promoting defence exports, it should be recognized that DSO's creation occurred under a Labour Government, and that Labour Governments have promoted arms sales heavily. In fact, over the years, there have not been great party-political differences in attitude towards arms exports. In 1978, the DSO's head expressed the view of the then Labour Government:

The present Government's stated attitude towards requests for exports of defence equipment is based on the rights of other countries, as sovereign states, to protect their independence and to exercise their right of self-defence.³¹

Michael Brzoska and Thomas Ohlson³² contend that it is in line with this reasoning that the British Government - unlike those of the USA and former USSR - does not use arms exports as a major instrument of foreign policy. However, when examining selected cases of whom Britain does and does not export to, an interesting picture emerges: Britain does supply a number of Middle East countries, but not Israel; and for many years it has adhered to an embargo on exports to Taiwan, mainly due to concerns with maintaining "reasonably" good relations with China, because of the Hong Kong factor. On the basis of these few examples, it is apparent that arms exports are inevitably part of government foreign policy, even if governments would prefer it otherwise.³³

Provided that there are no strong reasons for refusing to grant a licence, the fact that a country has requested weapons juxtaposed with the gains for the British economy are usually enough for government support and approval. However, as Brzoska and Ohlson³⁴ highlight, a number of fundamental problems (enumerated below) have arisen with respect to this seemingly simple arms export policy:

- a) the mixture of control and marketing invested in the MoD creates problems, as does the MoD/FCO relationship;
- b) in practice, it is often very difficult to decide whether countries will only use weapons in self-defence. The use of weapons for internal repression is part of the same problem;
- c) recipient countries do not interpret deliveries as purely commercial transactions, but often as some kind of "political commitment", and this view is usually shared by those countries which have unfriendly relations with the recipients.

From a TQM perspective, a number of comments can be made regarding the above. Since TQM is concerned primarily with customer-orientation - providing an insight into the defence constituency under examination - the MoD/FCO relationship, highlighted in point one above, requires deeper analysis. The question of "who is the customer ?" needs to be addressed. Regarding the internal customer network, both the MoD and FCO are legitimate customers in this process, but who is the more important player ? It is important to remember that DESO is part of the MoD. Regarding the second point - that of weapons usage - the TQM issue of meeting customer requirements almost seems superfluous, if a country is requesting equipment for task X, but using it for mission Y: clearly, governments and contractors have no guarantee that the recipient will only use the equipment for self-defence purposes; nor can they enforce it. However, if it becomes apparent that equipment is being used for internal repression, and this is viewed as unacceptable by the supplier-nation, the supplier-nation can of course ban future sales to the offending country. The third point mentioned above is another important issue, since export sales of defence equipment - by their very nature - do signal approval of the recipient's politics. From a supplier's point of view, there could be a high external failure cost to be borne, if it results in lost opportunity sales through losing contracts to nations disapproving of a particular country.

2.2 British Export Support and Credit Financing

"Financing" is an essential aspect of defence export sales, with many companies looking for extended credits. Important changes were made to the provision of export credit in Britain in 1991: the Export Credit Guarantees Department (ECGD) formerly operated under the Export Guarantees and Overseas Investment Act (1978), but since 23 October 1991, its powers have derived from the Export and Investment Guarantees Act (1991). Following the privatization of the ECGD in 1991, which saw the sale of its short-term business to the Dutch Insurance Group, NCM,³⁵ the ECGD only provides facilities for medium and long-term export credit on projects and capital goods exports. However, it is important to recognize that it will continue to operate as a separate government department. Since the privatization, there has been some uncertainty surrounding the cover customers would receive, and in addition, critics have argued that foreign ownership of a national trade insurer jeopardizes British exporters' chances of competing overseas.³⁶

2.3 British Export Regulations and Controls

Britain and her EC partners all currently employ some form of arms export regulation grounded in national law. Although the basic structure of the legislation is broadly consistent, differences do exist, and these are largely determined by distinctive national views over the political, economic and military dimensions of the international arms trade.³⁷ British political attitudes are based upon a perception of some political utility in arms transfers, viewing them as a means of enhancing the security of allies, friends and overseas possessions. The official guidelines for Britain's export control regime are:

- a) maintenance of collective security of Britain and her Allies;
- b) maintenance of national security;
- c) foreign policy guidelines;
- d) fulfilment of U.K. Non-Proliferation Treaty obligations;
- e) concern about international terrorism or internal repression.³⁸

Britain is a key member of the "Co-ordinating Committee for Multilateral Export Controls" (COCOM), established in 1949 to co-ordinate controls on exports of strategic significance from NATO-members and Japan to the WTO countries, and also to China.³⁹ In addition to applying a country list in the context of the COCOM embargo, Britain also

maintains another list of countries to which certain types of equipment cannot be exported: this list includes Libya and Syria, as agreed by EC Foreign Ministers in the framework of EPC. Britain has been particularly concerned with the problem of arms proliferation and under Prime Minister John Major, has supported enthusiastically the Register of Conventional Arms under UN auspices.

3. INSTITUTIONS AND DEFENCE TRADE

3.1 Background

This section examines the various institutional initiatives in the defence trade sector, including those pertaining to arms export regulations, export credit financing, and the problems presented by export subsidies.

3.2 The European Community

Background to the EC and Arms Export Regulations

Despite the existence of Article 223 of the Rome Treaty, the EC - specifically the Commission - has revealed its growing "interest" in the defence industrial and defence export control sectors. Thus, in addition to addressing the question of arms procurement within a common industrial policy, the Fergusson Report of 1983,⁴⁰ also examined the complex issue of arms sales. Whilst emphasizing that the arms trade was a matter of continuing concern, causing "both political and commercial difficulties between member-states and with their allies",⁴¹ it also acknowledged that arms sales were "an important, even vital, means of meeting the costs of national defence", and did contribute to restoring and maintaining stability in regions who have been "deliberately de-stabilized by arms supplied by third countries."⁴² Regarding a common sales policy, it was suggested that whether it be of a moral, political or economic motivation, it would appear to be:

a desirable development to complement the growth of a Community foreign policy through European Political Co-operation.⁴³

However, since the whole issue of the Common Foreign & Security Policy (CFSP) in the post-Maastricht era has been plagued by a number of doubts raised by member-states (discussed in Chapter 5), it is unlikely that at the present time such an arms policy could emerge within this framework. Whilst it thus appears that events could happen sooner rather than later, it is interesting to observe the optimism of the European

Parliament (EP), which has made its view on the subject perfectly clear. In an arms export Resolution in 1992, it urged that such matters "be brought within the Community ambit in anticipation of European Union", and considered that powers and responsibilities pertaining to the above are "the first plank in the common foreign and security policy..."⁴⁴

Although the EP has urged the Commission to act more quickly in the above area, it is important to recognize progress already made by the Commission in one specific sector which it has been targeting, that of dual-use equipment. Early in 1992, EC member-states were asked to consider adopting common rules on exports of dual-use equipment and technology.⁴⁵ This request, originating from the Commission, resulted from the increasing attention that was being directed at the need to stem arms transfers to potentially hostile states. With the opening-up of a unified market among the Community members, there was a perceived need for common policies and regulations, and enforcement, to prevent leaks of weapons-applicable materials and technologies. Whilst it should be noted that all EC countries subscribed to the COCOM list, these new proposals imply a common list of products and forbidden destinations. The EC is also very enthusiastic about achieving uniform border controls.⁴⁶ The road to achieving controls has been far from straightforward, largely due to the EC's machinery - institutional inertia - and national differences. Despite Industry Ministers being unable to reach agreement on a common system of export controls for dual-use equipment - which in TQM terms generates a number of questions, discussed below - the Commission persevered. On receiving a Commission document on the subject, the European Council established a working group to help prepare a final proposal for the regulation, and this was eventually completed on 31 August 1992.⁴⁷

As enumerated by SIPRI,⁴⁸ the harmonized EC regulation (as proposed) will contain five essential elements:

- a) a common list of dual-use goods and technologies subject to control by all EC member-states. This list is a modified version of the industrial list employed in enforcing the COCOM embargo;
- b) a common list of destinations to which exports should be controlled. Whether there are destinations to which all exports should be proscribed had not been decided;

- c) common criteria for issuing licences;
- d) the establishment of a permanent forum or mechanism for co-ordinating licensing and enforcement policies and procedures;
- e) the establishment of procedures for administrative co-operation between licensing and enforcement agencies including a system for information exchange.

Before considering the EP's response to this initiative, it is useful to focus briefly on the TQM dimension alluded to above - regarding the EC Industry Ministers meeting - since key issues arise concerning how the institution conducts its business, and whether or not the EC could ever produce a "quality" output in this field. Due to adherence to the Rome Treaty, the EC obviously could not have a gathering of Defence Ministers to discuss the issue, so instead Industry Ministers gather. But in TQM terms, it would be logical to allow Defence Ministers to input the decision-making process, since they possess specialist competency, knowledge and expertise, they know their external customers (specifically the Armed Forces), and they are probably in the best position to make a quality decision. It is therefore arguable that a quality decision could never arise from the Industry Ministers meeting since inappropriate persons were present for the task: it is a classic illustration of the "Conformance/Built-in-Non-Conformance" dilemma (from the CoQ concept) where the institution wants to act in a particular field, but lacks the adequate machinery to do so and/or is actually inhibited and restricted from action because of treaty or procedural compliance.

Returning to the Commission's initiative, in a September 1992 Resolution,⁴⁹ the EP welcomed the initiative, and called upon them to submit proposals as soon as possible on: dual-use products and technologies to be regulated; common criteria for the issue of Community export licences; and a joint body or common machinery to co-ordinate policies and procedures for exercising controls, and for permanent updating of a common list of "prohibited destinations".⁵⁰ However, within the same resolution, the Parliament also declared that it considered the proposal for a Regulation presented in July 1992 to be insufficient inasmuch as it provided for decision-making on the list of products and on destinations to remain a national competence, on the grounds that these are decisions of a strategic nature: the Parliament insisted that, in the framework of consultation, it should also be consulted on the list of dual-use products and technologies, as well as on the list of "friendly" states which are to benefit from a simplified authorization

procedure.⁵¹

In addition to the Commission's forays in the arms export control sector, the EP, as alluded to above, has been playing an increasingly active role in the arms trade debate: it expressed support for the development of an EC arms export policy in 1990,⁵² 1991,⁵³ and in 1992.⁵⁴ The 1992 Resolution urged EC governments to:

refrain from encouraging [the export drive] by ending the promotion of arms exports through government agencies and by stopping export credit for weapons deals.⁵⁵

It also reiterated that whenever the Commission and Council are engaged in international relations with arms-producing countries, they "should seek agreement on world-wide restrictions on arms exports."⁵⁶

However, perhaps arguably of greater importance than initiatives emanating from the EP have been the deliberations of the inter-governmental process of EPC.⁵⁷ At the June 1991 European Council meeting in Luxembourg, EC Foreign Ministers agreed on seven common criteria for arms exports in the EPC framework.⁵⁸ At their Lisbon meeting, 26-27 June 1992, an eighth criterion was added: in making decisions on whether or not to permit arms exports, member-states should consider the compatibility of arms exports with the technical and economic capacity of the recipient country, taking into account the desirability that countries should achieve their legitimate needs of security and defence with the least diversion for armaments of human and economic resources.⁵⁹ As with the criteria agreed in 1991, the country from which the export originates will be responsible for interpreting the guideline. As SIPRI⁶⁰ points out, the inclusion of this criterion reflected the interest of some EC countries - Germany and the Netherlands - in discussing the linkage between security and economic development.

Most of the initiatives and issues discussed above are strongly dependent on the status of Article 223, for its deletion would of course facilitate the implementation of an EC defence export control policy. Martin Bangemann, Commissioner for Industrial Affairs and the Internal Market, said, in 1991, that the EC's capacity to deal with the problem of defence equipment sales and sensitive technology would serve as a test of its "fitness to handle major security issues."⁶¹ This emphasis on "fitness" is very important

in TQM terms, for the concern with capacity to perform effectively determines the provision of a quality output. In the run-up to the Maastricht summit, the Dutch Government, as holders of the EC Presidency, proposed that defence equipment production should be brought under the Single Market rules, coming into force on 1 January 1993. This, it was stated, would stimulate intra-Community defence trade by removing the protection from EC legislation previously provided for the defence industrial sector by Article 223. As Mark Harvey⁶² highlights, in addition to providing the beginnings of an EC identity, it was also stated that such a development would reduce the need for European defence manufacturers to export arms - to a broader range of countries than currently exists - and would harmonize Community export controls of dual-use equipment. Proposals to delete the Article apparently died in the dispute over whether the EC should develop any defence identity at all: in the difficult political climate of 1992, when increasingly desperate efforts to attain ratification of the Maastricht Treaty took priority, measures to dilute national control over any aspect of foreign and security policy were over-ridden.⁶³ Despite this result from Maastricht, the EP has continued to repeat its call for Article 223's deletion so that member-states "will no longer be able to prevent a common policy on the control of arms exports by invoking national security interests."⁶⁴

Notwithstanding the debate surrounding whether or not the EC should involve itself in defence industrial and defence export control matters - outside of competency - there are a number of reasons for arguing that arms exports would be best controlled outside of an EC framework and within the wider framework of the United Nations.⁶⁵ Catherine Guicherd⁶⁶ contends that the EC is unlikely to be the appropriate framework for comprehensive arms export regimes, for the simple reason that it includes only a few of the world's major arms exporters - only Britain and France. Guicherd suggests that the Community is more likely to intervene in the field of arms export control as the sponsor of initiatives to be carried out in the broader framework of the CSCE or UN.

EC-US Trade Friction: "To Subsidize or Not to Subsidize ?"

Ever since the first Airbus aircraft rolled off the production line, allegations of unfair subsidy⁶⁷ and government support for the European commercial aircraft industry have been flying across the Atlantic from disgruntled American companies and politicians. Despite the fact that both the American industry and Europe's Airbus are recipients of state support, it is the "legitimacy" of European state aid to the Airbus

programme which has been the subject of an increasingly bitter dispute between the EC and USA. But it is important to recognize that throughout most of its history, the American aircraft industry benefitted from a makeshift but nonetheless effective industrial policy. Although, as Americans argue, the goals of this policy have been primarily military in nature, it has had an unintended and unavoidable spillover in the commercial market-place. However, in contrast to American industrial support, as Laura D'Andrea Tyson, Chair of President Clinton's Council of Economic Advisers, argues:

European industrial support for Airbus has had avowedly commercial objectives, although such intervention has often been defended on dual-use grounds.⁶⁸

Given the economics of the aircraft industry, it is clear that Airbus would not have had a chance against established American airframe manufacturers, without massive development, production and marketing support during its first 25 years.⁶⁹

In view of the fact that the European consortium recognized that Airbus' future would largely be determined by its export successes - particularly penetrating America's large air transport market - it is hardly surprising that America and the EC were soon engaged in a trade war. The 1979 GATT Agreement⁷⁰ failed to head-off worsening friction between the protagonists because "it failed to address the competing industrial priorities behind this friction."⁷¹ As Tyson⁷² highlights, international rules can only moderate trade conflicts when the parties to the conflict can find common ground or mutual interest, but they cannot eliminate that conflict when the interests of the parties are fundamentally antagonistic.

The acrimony extended into the 1980s and early 1990s, particularly as Airbus secured new orders.⁷³ By 1991, the Airbus consortium had captured about one third of the world market for large commercial jets, displacing McDonnell Douglas as the second largest producer in the world,⁷⁴ with its sights firmly set on becoming number one. Needless to say, the Americans were not enthusiastic about this Euro-challenge, and Presidential candidates were especially vocal on the subject. Throughout his election campaign, Bill Clinton focused on the consortium, claiming it had received over \$13.5 billion in trade-distorting subsidies and, for this reason, would increase its market share at the expense of American firms.⁷⁵ The Europeans counter-claimed that the U.S. industry was benefitting from indirect subsidies through military contracts. Whilst it is difficult

to verify Washington's figures on "subsidy", it is obvious that Airbus operates within a privileged market in Europe. As John Appleby and Edward Foster⁷⁶ point out, the national carriers of most EC countries operate Airbus aircraft. Furthermore, some companies are in a very privileged position: France's Aerospatiale, which holds 37.9% of the consortium, is a state-owned manufacturer - due to be privatized in the not too distant future - supplying the state-owned airline.⁷⁷ It is also significant that a parallel partnership exists in the helicopter and missile production sectors, built around the same core - the DASA-Aerospatiale axis - which coincidentally mirrors the EC's central political partnership.⁷⁸

Despite the trade friction - or maybe because of its costs - the USA and EC entered into a bilateral trade agreement in 1992 (Figure 16.), which is applicable to all future government involvement in the development of commercial aircraft of 100 seats or more. The agreement is remarkable on four major counts: first, it establishes specific quantitative limits on both direct and indirect (military) subsidies for the development of new aircraft;⁷⁹ second, the agreement resolves the dispute over which interest rate should apply to the repayment of launch-aid; third, at least two annual meetings are mandated by the agreement for the purpose of monitoring its implementation; and fourth, the agreement explicitly proposes that its new disciplines be incorporated into the 1979 GATT agreement on civil aircraft and be adopted by all of the signatories.⁸⁰ In view of the highly cyclical nature of the global aircraft market, both sides saw an "escape clause" as a necessary condition for accepting the agreement, and this was duly incorporated. Although the agreement has been criticized by American observers - but not interestingly enough by American producers - because it allows the Europeans to continue to subsidize Airbus, this criticism, as Tyson⁸¹ contends, overlooks a crucial point: because of the industry's underlying economics, government support for the development of new aircraft cannot, and should not, be ruled out altogether.

TQM often provides an insight into the constituency under examination, and with regard to the aircraft manufacturing constituency, two important points can be made. First, pertaining to the nature of the aircraft manufacturer customer-supplier relationships, there is an element of Trans-Atlantic dependency: this is illustrated by Boeing's unwillingness to file a 301 petition against Airbus - since it is dependent on the European market - which contrasts with the Semiconductor Industry Association's willingness to file a 301 petition against Japanese companies, since American semiconductor industries

Aircraft covered

All aircraft of 100 seats or larger are subject to the agreement's provisions.

Direct support levels

Funds advanced by governments for aircraft development may not exceed 33% of total development costs and are to be provided only to programmes in which there is a reasonable expectation of recoupment within 17 years.

Interest rates

Airbus will repay the first 25% of total development costs at the government cost of borrowing (GCOB) within 17 years of disbursement; the remaining 8% will be repaid at the GCOB plus 1% within 17 years of first disbursement.

Repayment conditions

Airbus will make repayments on a royalty or per-plane basis and in a specified manner that limits backloading. Under previous practices, the terms and conditions on government launch aid to Airbus had allowed it to delay payment until late in the repayment cycle, thereby increasing the value of low-cost support.

Prior commitments

The agreement does not apply to any prior or outstanding government support committed to large civil aircraft programmes.

Indirect supports

Both sides agree that indirect (i.e., military) supports should neither confer unfair advantage on manufacturers of civil aircraft nor lead to distortions in international trade in such aircraft. Identifiable benefits from indirect support are limited to 3% of the value of the industry-wide turnover in each signatory and 4% of the value of each firm's annual sales. Benefits will primarily be calculated as cost reductions in the development of a civil aircraft programme realized from technology acquired through government R&D programmes.

Transparency

Both sides agree to exchange, on a regular and systematic basis, information on the total amount of government support for new development projects and its share in total development costs; the terms and conditions of such support; aggregate data on disbursements and repayments relating to direct government support; and aggregate amounts of identifiable indirect support. In addition, both sides agree to provide a complete list of prior disbursements and commitments, including information on the type of repayment obligation and the planned repayment period.

Inducements and offsets

By clarifying rules on inducements in the 1979 GATT agreement, the 1992 agreement strengthens the prohibition on governments conferring special favours in exchange for aircraft purchases. Both sides agree that such inducements include foreign military or economic aid and landing rights.

Escape clause on emergency aid

Either side may temporarily derogate from the agreement, "with the exception of the development support provisions", if the survival and financial viability of an aircraft manufacturer are in jeopardy. Any such withdrawal would require consultations with representatives of the other side, full disclosure of information to justify the withdrawal, and full explanation of the remedy to be used.

Production supports

No further production subsidies are available.

Equity infusions

Equity infusions are excluded from the agreement. However, both sides commit themselves not to provide equity in such a manner as to undermine the effectiveness of the agreement.

Dispute settlement mechanisms

Both sides will consult at least twice a year to ensure the functioning of the agreement. Either side may request consultations related to the agreement at any time. Such consultations must be held no later than 30 days after they are requested.

Source: Adapted from "Agreement Concerning the Application of the GATT Agreement on Trade in Civil Aircraft"; as cited in Laura D'Andrea Tyson, *op.cit.* pp.208-209.

Figure 16. Provisions of the 1992 Agreement between the USA and the European Community on Civil Aircraft Trade.

were not dependent on the Japanese market.⁸² The second point relates to costs and benefits of "subsidy" incurred and enjoyed by different members of the customer-base: whilst European subsidies may have harmed American producers, they have undoubtedly

also benefitted American airline companies and their passengers through encouraging competition and innovation.⁸³

The EC and Export Credit

Section 2.2 above examined the national position in Britain vis-a-vis export support and financing. The national dimension is obviously important to British companies, but recent developments at the institutional level are increasingly affecting U.K. company operations. This section focuses briefly on European Community initiatives in the export financing sector. At a meeting in Belgium in October 1993, EC Foreign Trade Ministers called for a harmonization of the credit re-insurance market, arguing that common standards for exports and foreign investments would improve the spread of risk and boost export sales.⁸⁴ However, in view of the fact that European exporters and their insurers enjoy varying levels of support from their national governments, it is hardly surprising that the DTI's response was: "Britain is cautious. We have an unusual system."⁸⁵ The problem of hidden subsidies causes the most concern. If these hidden subsidies - so enjoyed by other European nations - are not removed, as a result of new measures, then harmonization will not have contributed towards a "quality" initiative by the institution since, instead of benefitting the widest possible customer-base, such measures have only served to reinforce the disparity which exists among countries within this sector, and to thus offer benefits to a select few.

3.3 The North Atlantic Treaty Organization

Background

NATO has been very concerned with the wider problems of proliferation and arms trade regulation. On 18 October 1990, Manfred Worner, suggested that NATO should examine "new dangers arising from regional conflicts directly affecting the security of member nations", and particularly concentrate efforts on controlling the proliferation of new military technologies, which would require:

a global and enlightened COCOM, based on the co-operative participation of all technologically advanced countries including the [former] Soviet Union.⁸⁶

No Western country wishes to see a repeat of the Iraq scenario, which was only able to happen militarily because of Iraq's accumulation of military power through

unsupervised, unmonitored multiple arms imports. NATO has given unequivocal backing to Alliance defence trade regulatory mechanisms, and has also strongly endorsed the United Nations Register of Conventional Arms:

The UN Register of Conventional Arms is an essential instrument to advance the principles of transparency, responsibility and restraint in the field of the transfer of conventional weapons. We remain fully committed to these principles and call upon all countries that have not done so, to submit relevant data to the Register.⁸⁷

CNAD and the "Code of Conduct"

Regarding NATO efforts to regulate defence trade between Alliance member-states, most of the preparatory work has fallen under CNAD's remit, specifically NIAG. Since 1990, NIAG has been addressing the issue of defence trade co-ordination within NATO, and seeking to establish a "code of conduct", dubbed the NATO-GATT, for its membership. The initial driving force behind the code came from William Taft IV, US Ambassador to NATO, whose original proposal for a defence trade GATT - with the long term goal of establishing a NATO Defence Trade Committee - resulted in the creation of a draft code.⁸⁸ On 24 October 1990, the National Armaments Directors (NADs) established a Task Force on Alliance Defence Trade, whose aim was to conduct an exhaustive examination of current obstacles to defence trade, specifically protectionism and technology transfer restrictions. The Task Force's Phase 1 Report, of 10 March 1991, recommended an in-depth study into removing political and administrative barriers to technology transfer.⁸⁹ On 23 April 1991, the Progress Report was discussed, and the "code of conduct" received general approval.⁹⁰ At the end of July 1991, the NATO Council gave the go-ahead to the continuation of internal studies aimed at drafting the code.

The evolution of the code requires analysis since it highlights a number of critical issues pertaining to the significance of marked national differences of opinion, the North American-European "divide", and the role played by industrialists. From interviews with a number of defence industrialists,⁹¹ many of whom are NIAG representatives, it is apparent that NIAG devoted much time and effort in seeking to establish a code, and strongly supported the creation of a legally-binding code. However, no legally-binding code emerged. Since the USA is very much the driver of many Alliance initiatives,

attention naturally focuses on the American position in the negotiations, and whether this provides an insight into why no legal code emerged. It is apparent, as highlighted above, that initially Taft was an enthusiastic supporter of the code, but then the USA started "back-peddalling", wishing to avoid establishing a binding code. For the Europeans, this was hardly surprising since they were aware that if America was going to accept such a code, fundamental changes would be necessary to US law: the repeal of the "Buy America Act" would be required. Once the USA backed-off, fearing the flood of European equipment at home, the most likely result was a tame watered-down political statement. This is exactly what emerged: the code contains a number of exclusion clauses and a compromise on equipment phases. It demonstrates that America is still calling the shots within CNAD. This would appear to validate the argument that the USA - through Taft - was using the code idea in CNAD to discuss "export potential": the USA was only interested in protecting its unique defence supplier position, and once that position appeared threatened, it slowed the proceedings down, seeking a different result. Despite the fact that only a political statement resulted from the proceedings, this should not detract from the fact that it is still a step in the right direction.⁹²

The transitional period is likely to be three years, and then the issues will doubtlessly be reviewed. It is interesting to note that the special group commissioned to examine defence trade has now been disbanded by the Council, and the issue has been handed back to CNAD. It does seem reasonable to ask the question "Why ?", and to attempt to answer it. On the one hand, it could be argued that the group has executed its mission successfully, and now CNAD will deal with future developments; on the other hand, it could reflect a lack of enthusiasm on the part of the most influential players, who wish to stall the proceedings.

Regarding whether or not the code proves to be a "quality" initiative, it seems logical that the means of assessing this institutional output should be based upon whether or not it changes the way governments award defence contracts. Success could be measured by analyzing the number of opportunities for companies to compete. This, as a NADREP⁹³ highlighted in March 1993, is probably not the only way, since analysis could also focus on instances of neutral and preferential treatment. The views of defence industrialists on the efficacy of the code will probably be different on both sides of the Atlantic since, as a result of the various exclusion clauses, American companies still enjoy a form of protected status, and do not face such a European industrial threat. Given

the exclusion clauses, and the non-binding nature of the code, it is hardly surprising that the code has been described by a leading European defence industrialist as "a piece of gruyere cheese".⁹⁴

3.4 The Independent European Programme Group

Background

Towards the end of 1985, the IEPG commissioned a study from a group chaired by Henk Vredeling, a former Dutch Defence Minister, to examine defence procurement and competition. The Vredeling Group effectively recommended that the British approach to competition, dubbed "Levenism",⁹⁵ should be extended on a European scale. The Vredeling Group argued that it was within a government's power to create a more open arms market by the general conditions upon which they awarded their defence contracts. To this end, the report said: IEPG governments should first let collaborative contracts on the basis of competitive fixed-price tenders by rival international consortia; and second, each should publish tenders to inform firms of bidding opportunities external to their home base, and establish a register of their defence contractors to help companies across Europe select foreign partners.⁹⁶ The aim of this latter proposal, as Nick Colchester and David Buchan⁹⁷ point out, was to fill the deliberate gap left in the Rome Treaty exempting weapons from EC rules, and in particular from the requirement that large public-sector contracts be advertised throughout the Community. Given the sensitivity of defence sales, it was hardly surprising that it took until late 1988, before governments were willing to agree to such measures.

The "Action Plan"⁹⁸

Adopted in November 1988, the "Action Plan" attempted to incorporate many of the defence industrial issues discussed above. The key areas can be summarized as follows: IEPG governments taking steps to allow contracts to be placed "more readily with suppliers in other countries", in addition to more competitive bidding across frontiers; "comprehensive and systematic co-operation in research and technology" becoming the "centrepiece for the creation of a European Armaments Market; recognizing that the "introduction of cross-border competition depends on individual countries receiving a fair return", the IEPG will measure such fair returns by recording the pattern of cross-border contracts; and furthermore, fledgling defence industrial countries - such as Greece and Turkey - would also receive special protection.⁹⁹

A number of issues arise from the above. First, regarding the "fair return" objective, it is important to recognize that the IEPG's industrial policy perspective - based upon the principle of *juste retour*, as enshrined in Vredeling and the Action Plan - does in fact conflict with the open-market scheme of the EC's Commission, and is arguably impeding efforts to create a more rational, more competitive and efficient defence industrial sector in Europe. Second, the level of difficulty in getting all IEPG nations to agree on a definition of what constitutes "fair competition" in the arms business is very high, and should not be under-stated. The existence of "hidden subsidies" will present immense problems. Nick Colchester and David Buchan¹⁰⁰ highlight this problem, citing the potential scenario of a British company competing for an Italian defence contract, who loses out to a local Italian firm which was assisted by state aid - the British company's only recourse is to appeal to the hardly neutral referee of the Italian Defence Ministry. There is no military equivalent of the European Commission to investigate complaints, nor a military division of the European Court to rule on such complaints. It is "a nice example of the way free trade leads on to supranationalism."¹⁰¹

The third major point which has to be addressed concerns the specific Action Plan requirement that the more advanced defence industrial nations should encourage the industrial development of lesser advanced nations. It also affords these developing defence industrial players with a special transition period during which their industries will not be subject to the full breadth of liberalization. In TQM terms - mirroring the commercial perspective - the implementation of such a measure is highly damaging for existing defence companies on two counts. Firstly, by directly investing in the lesser advanced defence industrial countries - particularly where there is no justification for doing so, on the grounds of comparative advantage - such measures only serve to fuel potential competition in the export market, having particularly severe ramifications for helicopter manufacturers, such as Britain's WHL, since the helicopter sector is characterized by over-capacity. Secondly, by shielding these new players from competition, the IEPG is in effect, encouraging the growth of non-competitive industries in Europe. The measure is flawed, or as TQM demonstrates - via the CoQ - there is a built in cost of non-conformance: the high CoQ will manifest itself in the form of a weakened European defence industry to confront the American export drive.

Beyond The "Action Plan": The Defence Equipment Market and the IEPG's incorporation into the WEU.

Following the WEU's Council's decision on 20 November 1992 to conclude WEU's enlargement process and to accept a possible transfer of IEPG functions to WEU,¹⁰² it can be assumed that ongoing IEPG defence trade matters will proceed under a new banner. The guiding principles for the operation of a more open European defence equipment market (EDEM) are laid down in the Action Plan and also in the Policy Document of 1990. The IEPG recognizes that no organization "should be closed to the implications of new circumstances and conditions", and thus accepts that given the political changes in the 1990s, EDEM principles have to be subject to continuing review.¹⁰³ Since 1990, there have been significant changes in the security and defence environment which have potential consequences for the policy areas of *juste retour* and DDI support. Regarding the additional issue of Trans-Atlantic defence trade, the IEPG has long recognized the potential benefits arising from a lowering of trade barriers and an increase in technology transfer on an Alliance-wide basis,¹⁰⁴ and wishes this to proceed in parallel with NATO's defence trade initiatives. The Trans-Atlantic dimension is significant because it highlights the issue of "transparency": how transparent is defence equipment likely to be in the post-integration European defence market?¹⁰⁵ Will the IEPG's Action Plan render the member-states' defence procurement processes more receptive to tenders from American and Canadian suppliers, and not just to European firms?¹⁰⁶ It is interesting to recall the initial reaction of states following the IEPG's Action Plan: existing European companies were understandably concerned about opening the door to American penetration of the market - when many of them viewed the USA as a protected domain; and the Americans were pre-occupied with measures to storm what they perceived as "Fortress Europe", fearing Euro-Protectionism. A marketing deficiency was clearly evident.

3.5 The United Nations

Background

Although the UN is not one of the key institutions examined in this thesis, it is discussed below because of its important arms register measure, which was instigated largely by British Prime Minister John Major. The United Nations General Assembly (UNGA) has been greatly concerned by the illicit arms trade, viewing it as a:

most disturbing and dangerous phenomenon, because of its destabilizing and destructive effects, particularly for the internal situation of affected States and the violation of human rights,...

The UN has urged member-states to ensure that they have in place an "adequate body of laws and administrative machinery for regulating and monitoring effectively their transfer of arms."

The "Conventional Arms Register"

On 9 December 1991, UNGA voted to establish a "universal and non-discriminatory Register of Conventional Arms". Under the Register's terms, UN member-states are requested to report voluntarily, and on an annual basis, their arms imports and exports in a number of categories. The Register is not a "transfer" register, but - as its name indicates - a "Register" of arms. It is also important to recognize that although the Register is not designed to control the flow of arms, the mere fact that it will increase publicly available information on weapons imports and exports, could restrain "excessive and de-stabilizing accumulation of arms", as paragraph 12 of the UN resolution states.

The UN's intention was for the Register to be implemented in two stages: in stage one, the governments report all their arms imports and exports for 1992 and 1993; stage two, commencing in 1994, could see a possible extension of the Register to include data on military inventories, military equipment production, technology transfer and weapons of mass destruction. There are strong arguments favouring arms transfer regulations within a UN framework in preference to other institutional arrangements. Sir Anthony Parsons, former British Ambassador to the United Nations (1979-1982), contends that, whereas EC or American-sponsored arms export control initiatives would probably cause great resentment in the Third World - where proliferation and production are now major problems - since they would be viewed as "imperialist acts", those of the UN would be viewed much more favourably. UN measures are perceived to be more palatable, since the UN's membership is greater in number and hence more representative. These initiatives also have the potential to be more effective, since the UN contains the World's leading arms exporters, in contrast with the EC which only contains Britain, France and Germany. Parsons suggests that as a means of cutting military expenditure and controlling arms exports, the disarmament machinery of the UN and the development machinery

need to work in tandem.¹¹³

Although the overwhelming majority of the UN voted for the Register - 150 votes to 0, with two abstentions (Cuba and Iraq) - a number of states were not entirely satisfied with the provisions.¹¹⁴ This could present problems in the future over compliance with the Register's provisions. To date, the UN has experienced a number of difficulties with the initiative:

- a) China refused to take part in the initial vote;
- b) China continued to press for restrictions on exports of Western aircraft and naval vessels if Chinese missile sales to the Middle East were restricted;¹¹⁵
- c) the Chinese government suspended, but did not withdraw from, its participation in the P5 process (ongoing discussions on arms transfers and the proliferation of weapons of mass destruction), when the USA announced the sale of 150 F-16 Fighters to Taiwan;¹¹⁶
- d) a number of countries have been very unenthusiastic about releasing details of quantities of equipment held in existing inventories.¹¹⁷

Whilst the Register initiative undoubtedly represents a step in the right direction towards achieving greater "transparency" in the arms trade, it is deficient in a number of areas. Firstly, the information requested from governments is extremely limited for the Register does not provide a precise definition of an "arms transfer". Secondly, it is confined to equipment deliveries rather than agreements or contracts and no precise information is required concerning the types or versions of systems transferred. Thirdly, the Register focuses on the number of systems transferred, not their value, although governments are "encouraged" to provide more information. Fourthly, the Register can easily be undermined, since both suppliers and recipients, particularly those enjoying a close customer-relationship, could agree to circumvent or side-step it. Fifthly, the procedure is open to abuse, since arguably the open access policy to information could affect the national security of some states and also affect some companies: enemy states could analyze a neighbouring state's military inventory and, combining this with its own intelligence data, mount an attack; regarding the companies, it is arguable that many would feel uncomfortable having their sales history out in the open, in terms of it assisting competitors and possibly undermining future deals. It is very difficult to guard against this Register being used as part of an intelligence-gathering exercise.

Notwithstanding the above, it is important to recognize the level of support for the Register: during its first year seventy-eight nations participated.¹¹⁸ This is a significant improvement on earlier UN data-collection exercises: the largest number to report under the standardized reporting of military expenditure in any year is twenty-nine.¹¹⁹ At this juncture it is too early to assess the "quality" of the Register initiative, but it is arguable that provided it receives continued national support and modifications are made, it potentially can lead to greater transparency thus contributing to lowering the military CoQ.

CONCLUSION

The above examination of national and institutional initiatives in the defence trade sector has highlighted that: a) there is a recognized need within the international community to regulate the trade in weapons, particularly to reduce the potential for proliferation; b) whilst national regulations remain significant, the locus of power has shifted on this issue to international and institutional fora; and c) there is a legitimate service provided by defence companies in supplying weapons, in that many states depend on arms imports to assure a reasonable level of security and to exercise their right of self-defence, recognized in the UN Charter.

The involvement of a large number of institutions in the export regulatory sphere does in itself present problems. A proliferation of institutional initiatives could prove to be self-defeating, ineffective and of a duplicatory nature, unless each initiative has a distinctive aim or area of competency. It is also important to recognize that most of the institutional initiatives in the defence regulatory field - specifically those of the EC - make the same flawed assumption that defence contractors can satisfy their business needs by solely concentrating their market activities within the parameters of the respective institutional membership area. Given the fact that traditional markets have declined dramatically, this is clearly an unrealistic assumption on the part of the institutions. Western companies are looking to legitimate defence sales in new markets as a means of survival. The Asia-Pacific region, for example, which does contain nations non-hostile to Western interests - is a growth area for defence equipment and also for commercial aircraft - but it is geographically outside of the institutional frameworks (apart from the UN initiative): does this mean that countries will not be able to export as freely to these nations ? If flawed initiatives are implemented, companies will find it increasingly

difficult to conduct their ordinary business interests. Clearly, certain institutional initiatives seem oblivious to the economic and defence industrial realities of the post-Cold War market-place.

Additional points on the issue of "regulation" concern the objective(s) behind it, and whether or not it is targeting the major malefactors. If the objective of "regulation" is to minimize the potential for widespread proliferation - of the Iraq variety - then there has to be transparency in the trade, but regulations are defective, in that they do not prevent the illicit arms traders from meeting the demands of nations, hostile to the West, through supplying "second-hand" surplus equipment. Regulation, through legitimate national and institutional fora, only affects legitimate arms traders who already comply with the guidelines. The dangers of proliferation will only be addressed adequately when the darker side of the arms trade is targeted by the international community. Putting defence companies "on the rack" is not the perfect solution, if there is in fact a perfect solution. Linked to this point is the fact that acquiring a better understanding of "who is buying what from whom" is not synonymous with having control over the flow of arms, and/or their usage. It is arguable that most weapons systems - even those that some may deem more dangerous than others - are perfectly harmless until detonated, fired, launched etcetera. It is political decisions, "policy" that is the driving force behind their use - as Colin Gray argues:

The point cannot be made too often that there has never been an aggressive weapon, only aggressive owners and operators of weapons.¹²⁰

In the interests of international peace and security, any measures which aim to minimize the dangers of "arms-abuse" are to be welcomed. However, given that targeting legitimate defence interests does not eliminate the problem, it is important to recognize that arms registers and other institutional mechanisms are only the first phase of a mission, which is arguably impossible to perform, since it involves a fundamental change within mankind.

CHAPTER FOUR ENDNOTES

1. George Bernard Shaw, MAJOR BARBARA, Act III, in **THE WORKS OF BERNARD SHAW**, Vol.II, (London: Constable & Co. Ltd., 1930), p.335. For an interesting discussion of the Undershaft Maxims, see Bernard Dukore, "*The Undershaft Maxims*", in Rose Zimbardo (ed), **TWENTIETH CENTURY INTERPRETATIONS OF MAJOR BARBARA**, (New Jersey: Prentice-Hall, Inc., 1970), pp.58-67.
2. The fact that the state of Iraq was able to amass a substantial military arsenal - most of which originated from the West - and direct that arsenal against allied coalition forces, was a major embarrassment for the West and a cruel irony of the Gulf War. For an interesting article on this Gulf War issue, see Mark Harvey, "*Arms Export Control: An Analysis Of Developments Since The Gulf War*", **RUSI JOURNAL**, Vol.137, No.1, February 1992, pp.35-41.
3. See Colin Gray, "*Traffic Control For The Arms Trade ?*", **FOREIGN POLICY**, No.6, Spring 1972, p.158. Also see Colin Gray, "*The Arms Race Phenomenon*", **WORLD POLITICS**, Vol.24, No.1, October 1971, pp.39-79.
4. Mary Kaldor, **EUROPEAN DEFENCE INDUSTRIES: NATIONAL AND INTERNATIONAL IMPLICATIONS**, (Sussex: University of Sussex, ISIO Monographs, Series 1, No.8, 1972), p.30.
5. Michael Brzoska and Thomas Ohlson, **ARMS TRANSFERS TO THE THIRD WORLD, 1971-1985**, (Oxford: Oxford University Press/SIPRI, 1987), pp.68-69.
6. *ibid.* p.68.
7. **SIPRI, SIPRI YEARBOOK 1993: WORLD ARMAMENTS AND DISARMAMENT**, (Oxford: Oxford University Press, 1993), p.443.
8. This is highlighted by Saadet Deger and Somnath Sen, in "*World Military Expenditure*", **SIPRI, SIPRI YEARBOOK 1992: WORLD ARMAMENTS AND DISARMAMENT**, (Oxford: Oxford University Press, 1992), p.189.
9. See **THE FINANCIAL TIMES**, 1 October 1991; as cited in British Aerospace Defence, **DEFENCE BRIEFING**, (Surrey: BAe DMO, Issue No.11, February 1992), p.3.
10. **SIPRI YEARBOOK 1993**, *op.cit.* p.445. (Table 10.11).
11. Mark Harrison, "*India set to order Hawks from BAe*", **THE INDEPENDENT**, 4 June 1992, p.33.
12. See "*BAe Preparing For The Next Century*", **ASIAN DEFENCE JOURNAL**, December 1993, p.89.
13. The British Aerospace 125-800 aircraft is strictly speaking a commercial aircraft, but since it is often employed in a SAR capacity - a function generally performed by a country's armed forces - sales of this aircraft are recorded in the military aircraft transfers section, Appendix 3.
14. See Appendix 3.
15. **British Aerospace PLC Annual Report And Accounts 1991**, p.14.
16. *ibid.* p.15.
17. *ibid.* p.12.
18. For an interesting article on Airbus, see Kenneth Labich, "*Airbus Takes Off*", **FORTUNE**, Vol.125, No.11, 1 June 1992, pp.26-32.
19. *ibid.* p.29.
20. See Dori Jones Yang, "*Why Boeing Doesn't Have The All-Clear Yet*", **BUSINESS WEEK**, (International Edition), No.3254-584, 11 May 1992, p.79.
21. See "*European Airframe Makers Maintain Production, Pursue New Programs*", **AVIATION WEEK & SPACE TECHNOLOGY**, Vol.136, No.11, 16 March 1992, pp.56-57.
22. **Westland Group PLC Annual Report 1990**, p.9.
23. Under the terms of the "Ditchley Park Agreement", European helicopter production was rationalized: Britain and Italy were given the medium-heavy helicopter category; France and Germany were to focus efforts on the

light-medium helicopter market.

24. The tandem-rotor "Chinook" is manufactured in the USA, and under licence in Italy. Up to 44 troops can be carried in the cabin, and large loads can be slung. The international military version is the Model 414; the "Sea Stallion/S-65A" is a heavy assault transport helicopter, which first flew in 1964. It can carry vehicles or 55 troops. The CH-53E "Super Stallion" - a three-engined amphibious assault transport helicopter - has been developed from the CH-53 - and can carry up to 56 troops; the "Sea Knight" operates as a shipboard and land-based assault transport, carrying 25 troops or freight. For more details on these helicopters, see Derek Wood, **JANE'S WORLD AIRCRAFT RECOGNITION HANDBOOK**, (Surrey: Jane's Information Group Ltd., 1992, 5th ed.), pp.590-591, 600-601.
25. Francis Tusa, *"Europe's Airmobile Concepts Meshing Under New Division"*, **ARMED FORCES JOURNAL INTERNATIONAL**, May 1992, p.35.
26. Chapter One: Context, p.11.
27. This is based upon data in **Westland Group PLC Annual Reports, 1989, 1990 and 1992**.
28. Chapter One, op.cit.p.12.
29. Frederick Pearson, *"The question of control in British defence sales policy"*, **INTERNATIONAL AFFAIRS**, Vol.59, No.2, Spring 1983, p.213.
30. An interesting comment from Robert Mann, President of Alenia Aircraft who, on being asked "What made the difference between Italy and the USA/U.K. in defence exports?" quipped, "Well, the U.K. had the best saleswoman in the form of Margaret Thatcher, and the U.S. has [government supported] Foreign Military Sales." As cited in *"Stray Voltage"*, **ARMED FORCES JOURNAL INTERNATIONAL**, February 1992, p.54.
31. See Sir Ronald Ellis, *"Defence Sales"*, **RUSI JOURNAL**, Vol.124, No.2, June 1979, p.3.
32. Michael Brzoska and Thomas Ohlson, op.cit.p.74.
33. *ibid.*p.75.
34. *ibid.*pp.74-75.
35. See *"ECGD Privatisation"*, **BUSINESS BRIEFING**, Vol.3, Issue 49, 13 December 1991, p.8.
36. See Richard Bridges, *"Rough waters across the seas"*, **THE DAILY TELEGRAPH**, 24 February 1992, p.29.
37. Saferworld, **REGULATING ARMS EXPORTS: A PROGRAMME FOR THE EUROPEAN COMMUNITY**, Saferworld Report, September 1991, p.6.
38. *ibid.*p.8.
39. COCOM was terminated on 31 March 1994. American officials and their counterparts in NATO are currently putting the finishing touches on a successor regime; see Barbara Starr, *"US arms control options reviewed"*, **JANE'S DEFENCE WEEKLY**, Vol.21, No.14, 9 April 1994, p.29.
40. The Fergusson Report, **Report drawn up on behalf of the Political Affairs Committee on arms procurement within a common industrial policy and arms sales**, Document 1-455/83, 27 June 1983.
41. *ibid.*(30).
42. *ibid.*(32).
43. *ibid.*(75).
44. See European Parliament, *"Arms exports and armaments industry"*, Resolution A3-0260/92, 17 September 1992, **OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES**, Vol.35, 2 November 1992, (Luxembourg: Office for Official Publications of the European Communities), No C 284/140.
45. *"EC moves to tighten rules"*, **JANE'S DEFENCE WEEKLY**, Vol.17, No.5, 1 February 1992, p.144.
46. *ibid.*
47. Commission of the European Communities, *"Proposal for a Council Regulation (EEC) on the control of exports of certain dual-use goods and technologies and of certain nuclear products and technologies"*, COM (92) 317 Final, (Luxembourg: Office for Official Publications of the European Communities), 31 August 1992; as highlighted in **SIPRI YEARBOOK 1993**, op.cit.p.462.
48. *ibid.*

49. European Parliament, "Arms exports and armaments industry", op.cit.
50. *ibid.* p.143.
51. *ibid.*
52. See European Parliament, "*Resolution on disarmament, the conversion of defence industries and arms exports*", Document B3-1176/90, 13 July 1990, **OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES**, Vol.33, 17 September 1990, (Luxembourg: Office for Official Publications of the European Communities), No C 231/209-210.
53. See European Parliament, "*Resolution on the arms trade*", 18 April 1991, **OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES**, Vol.34, 20 May 1991, (Luxembourg: Office for Official Publications of the European Communities), No C 129/139-140.
54. European Parliament, "Arms exports and armaments industry", op.cit.
55. *ibid.* p.140.
56. *ibid.* p.143.
57. As argued in **SIPRI YEARBOOK 1993**, op.cit.p.461.
58. As cited in *ibid.*
59. *ibid.*
60. *ibid.*
61. As quoted in JAC Lewis, "*EC export control scheme planned*", **JANE'S DEFENCE WEEKLY**, Vol.15, No.23, 8 June 1991, p.987.
62. Mark Harvey, op.cit.p.39.
63. **SIPRI YEARBOOK 1993**, op.cit.p.462.
64. European Parliament, "Arms exports and armaments industry", op.cit.p.142.
65. See Anthony Sampson's interview with Sir Anthony Parsons, in **THE TWO EDGED-SWORD**, Part II, "Money and Gunpowder", BBCTV (BBC2), 20 December 1991.
66. Catherine Guicherd, **A EUROPEAN DEFENSE IDENTITY: CHALLENGE AND OPPORTUNITY FOR NATO**, (Congressional Research Service: CRS Report, 12 June 1991), p.28.
67. Further discussion of the "subsidy" issue can be found in Laura D'Andrea Tyson, **WHO'S BASHING WHOM?: TRADE CONFLICT IN HIGH-TECHNOLOGY INDUSTRIES**, (Washington, D.C.: Institute for International Economics, 1992), Chapter 5.
68. Laura Tyson, *ibid.* p.157.
69. *ibid.*
70. Excerpts from the 1979 GATT Agreement on Trade in Civil Aircraft are provided in Laura Tyson, *ibid.* p.200.
71. *ibid.*
72. *ibid.*
73. Boeing was particularly concerned when Airbus secured a major sale with Pan Am in 1984: it was of great symbolic significance, since Pan Am was an established Boeing customer, and had a reputation for launching new aircraft in the American air transport sector.
74. Laura Tyson, op.cit.pp.155-156.
75. As highlighted by John Appleby and Edward Foster, **UP IN THE AIR: EUROPEAN UNION AND TRANSATLANTIC DEFENCE INDUSTRIAL CO-OPERATION**, (Royal United Services Institute: Whitehall Papers No.23, 1993), p.26.
76. *ibid.*
77. *ibid.*
78. *ibid.*

79. The maximum allowable direct subsidy rate of 33% for the development cost of a new aircraft is clearly a compromise; see Laura Tyson, *op.cit.*p.207.
80. These are based upon Laura Tyson, *ibid.*pp.207-209.
81. *ibid.*p.209.
82. *ibid.*pp.203-204. (Footnote 41).
83. Laura Tyson, *ibid.*p.215.
84. "Caution over EC plans for export credit", **THE DAILY TELEGRAPH**, 25 October 1993, p.23.
85. As quoted in *ibid.*
86. **ATLANTIC NEWS**, 19 October 1990, p.1; as cited in Ian Anthony (ed), **ARMS EXPORT REGULATIONS**, (Oxford: Oxford University Press/SIPRI, 1991), p.211.
87. See "Statement issued at the meeting of the North Atlantic Co-operation Council", Athens, 11 June 1992; as cited in "Documentation", **NATO REVIEW**, Vol.41, No.3, June 1993, p.35.
88. See Barbara Starr, "Breaking down the barriers", **JANE'S DEFENCE WEEKLY**, Vol.16, No.5, 3 August 1991, p.210.
89. Theresa Hitchens, "NATO Seeks Improved Arms Trade", **DEFENSE NEWS**, 22 April 1991, pp.1 & 29.
90. See "NATO Defence Trade", **NATO's SIXTEEN NATIONS**, Vol.36, No.3, May/June 1991, p.88.
91. Private interviews conducted by S.P. Allmark with senior personnel from British defence companies.
92. Private interview conducted by S.P. Allmark.
93. Stein Wilhelm Weber, Assistant Defence Adviser to the Norwegian Permanent Delegation to NATO and the WEU, private interview conducted by S.P. Allmark, 1 March 1993, NATO HQ, Brussels, Belgium. It should also be noted that, given the differences of opinion between the USA/major European manufacturers/smaller players, which manifested itself during the negotiations, the type of code which emerged was inevitable. Through understanding the differences of opinion, we are provided with an insight into the code's evolution and some indication of its future success. The USA/France/UK wanted to limit the code to off-the-shelf procurements (thus excluding all development programmes and subsequent procurements), and in their opinion, only the participating nations should enjoy the work-share. The smaller nations contended that such protectionism for development programmes was unacceptable, since they paid for their share of development costs through the unit price of the equipment. The final outcome was that nations were allowed to limit the application for off-the-shelf procurements in special circumstances such as emergencies and national imperatives. This was highlighted to me by Stein Wilhelm Weber, in a fascimile (NATO unclassified), 27 May 1994.
94. Alan Nicholson-Florence, Marketing Director, BAe SEMA, private interview conducted by S.P. Allmark, 28 May 1993, Esher, Surrey.
95. Peter Levene was Head of Defence Procurement at the MoD. One of the products of his "competition-orientated" reforms was an agreement on reciprocal purchasing with his French counterpart at the DGA in 1987. For additional information, see **RUSI Working Group, 1992: PROTECTIONISM OR COLLABORATION IN DEFENCE PROCUREMENT**, (Royal United Services Institute: Whitehall Papers No.6, 1990), p.30.
96. As highlighted in Nicholas Colchester and David Buchan, **EUROPE RELAUNCHED: TRUTHS AND ILLUSIONS ON THE WAY TO 1992**, (London: Hutchinson Business Books Limited/The Economist Books Limited, 1990), p.125.
97. *ibid.*
98. This was also discussed earlier in Chapter Two.
99. See Nicholas Colchester and David Buchan, *op.cit.*p.125.
100. *ibid.*p.126.
101. *ibid.*
102. See Assembly of Western European Union, "Activities of the IEPG", WEU Document 1359, 4 February 1993, (Paris: WEU), p.2.
103. *ibid.*p.3.
104. *ibid.*p.4.

105. As highlighted in Andrew Latham and Michael Slack, **THE EVOLVING EUROPEAN DEFENCE SECTOR: IMPLICATIONS FOR EUROPE AND NORTH AMERICA**, (York University, Toronto: Center for International and Strategic Studies), p.57.
106. *ibid.*
107. United Nations General Assembly, "Resolutions on General And Complete Disarmament", 65th Plenary Meeting, 6 December 1991, 31 **INTERNATIONAL LEGAL MATERIALS (ILM)**, 469 (1992)+, p.476.
108. *ibid.*p.477.
109. See United Nations General Assembly Document, A/RES/46/36L, 9 December 1991; excerpts of this Resolution are reproduced in **SIPRI YEARBOOK 1992**, *op.cit.*pp.305-307.
110. For information on weapons categories, see **SIPRI YEARBOOK 1993**, *op.cit.*p.538.
111. *ibid.*p.536.
112. See **THE TWO-EDGED SWORD**, *op.cit.*
113. *ibid.*
114. Argentina, Brazil, Egypt and Pakistan all opposed the UN First Committee version; as highlighted by Herbert Wulf, **SIPRI YEARBOOK 1993**, *op.cit.*p.535.
115. See Barbara Starr, "*Chinese exports causing concern*", **JANE'S DEFENCE WEEKLY**, Vol.17, No.25, 20 June 1992, p.1043.
116. **PEACE** (Beijing), No.28, December 1992, pp.16-17; as cited in **SIPRI YEARBOOK 1993**, *op.cit.*p.461.
117. See **JANE'S DEFENCE WEEKLY**, 26 October 1991.
118. See Ian Anthony, "*Assessing the UN Register of Conventional Arms*", **SURVIVAL**, Vol.35, No.4, Winter 1993, p.114.
119. *ibid.*
120. Colin Gray, **WEAPONS DON'T MAKE WAR: POLICY, STRATEGY AND MILITARY TECHNOLOGY**, (Kansas: University Press of Kansas, 1993), p.45.

CHAPTER FIVE

THE MILITARY-OPERATIONAL, DEFENCE & SECURITY DIMENSION

The most difficult military problem to resolve is that of establishing a security system, as inexpensively as possible in time of peace, capable of transforming itself very rapidly into a powerful force in case of the danger of aggression.¹

INTRODUCTION

This chapter constitutes the final policy section of Part II. Its objective is to examine and assess institutional initiatives in the broad military and security domain. In view of the dramatic events the international arena has hosted since 1989 - the collapse of the USSR, the Gulf War, continuing Balkans crisis and tensions in East Asia, to name but a few - it is not surprising that collectively these events have exerted a severe strain on the established pillars of Europe's security architecture.² It is apparent that the post-Cold War security environment is not synonymous with a greater degree of stability. In fact, there are arguably immense challenges and risks confronting institutional and national actors, since greater uncertainty abounds. The juxtaposition of multi-dimensional risks with reduced defence expenditure means governments are having "to do more with less". This has ramifications for the military, the institutions and the defence companies. At the institutional level, NATO has made solid progress, quickly re-evaluating its role in the new political environment of the 1990s, and adapting its force structures accordingly. The emergence of the EC actor with a "security" interest and the WEU's resurgence has presented additional structural problems, which have had to be addressed. There appears to be a proliferation of institutional actors in the defence and security domain, and the consequences of this are discussed below.

Due to the plethora of issues under the defence and security umbrella, it is inevitable that this chapter covers a broad spectrum of "operational" areas in the military

and civil domain. Section 1 examines the complex area of force planning, highlighting its significance vis-a-vis defence procurement. In section 2, another variable affecting procurement decisions - arms control - is assessed, with analysis focusing on the implications of the CFE Treaty. Section 3 is devoted to selected institutional initiatives. Important issues to be addressed include: the competency of the institutions to deliver a quality output; the current status of the "security" marketplace, and whether its demands will be sufficiently large to sustain all the institutions vying for the contract; and the extent to which the institutional activities are complementary as opposed to contradictory and conflicting.

1. FORCE PLANNING AND OPERATIONAL REQUIREMENTS

1.1 Background

Before we can begin to understand the intricacies of, and reasoning behind, defence procurement decisions, it is necessary to focus on events back down the customer-supplier chain, examining the complex area of force planning. Given the fact that uncertainty is perhaps the only certainty in the process, it is not surprising that defining missions, determining operational requirements and ensuring adequate military supply is a complex exercise. There are a number of frameworks or methodologies which force planners can employ to facilitate sound force choice decisions, and these are discussed below. It is useful to begin by defining what constitutes force planning. According to Richmond Lloyd and Dino Lorenzini, it can be defined as:

the process of establishing military requirements based on an appraisal of the security needs of the nation, and selecting military forces to meet those requirements within fiscal limitations.³

1.2 Force Planning Methodologies

Conceptually, one of the first challenges confronting the force planner is to decide which methodologies or framework will expedite sound force choice decisions. Figure 17. overleaf details the most common approaches.⁴ An example of a Top-Down approach is provided in Figure 18. Whichever methodology is adopted by the force planners will have ramifications for defence contractors.

Figure 17.

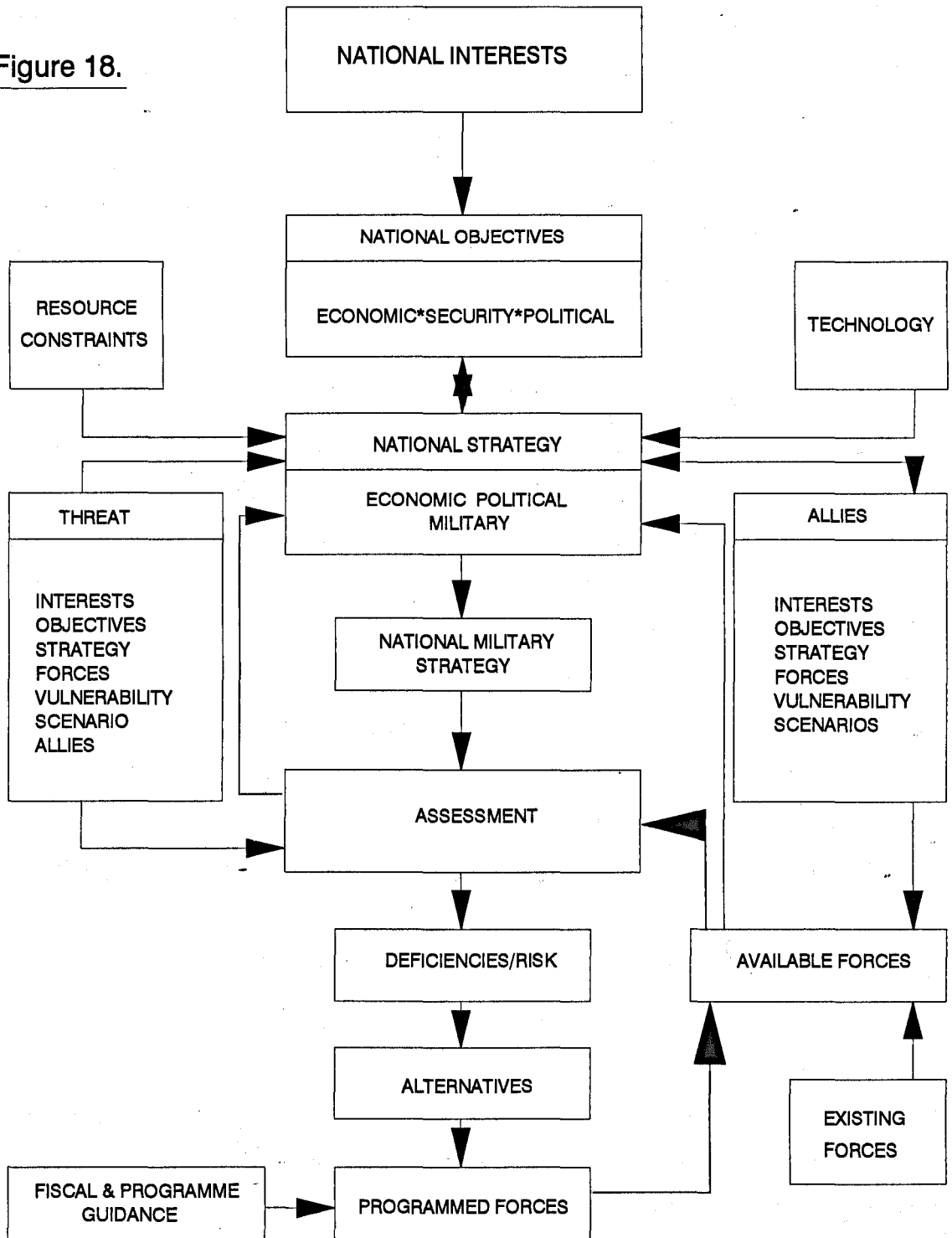
Force Planning Methodologies

APPROACH	PRIMARY FOCUS	OTHER EMPHASIS	COMMENTS
TOP DOWN	OBJECTIVES	LONGER TERM	a) Emphasis placed upon 'ends' and systematic manner in which force requirements are thought through. b) Tendency to be captured by future oriented concepts/programmes at the expense of current capability.
BOTTOM UP	CURRENT CAPABILITY	SHORTER TERM	a) Emphasizes 'real' world, thus mitigating effects of the mind-set pre-occupied with future capability. b) Tendency to lose sight of whole picture: local/theatre considerations can dominate, when integrated view is required.
SCENARIO	CIRCUMSTANCES	OPPORTUNITIES AND VULNERABILITIES	a) Limitations: 'real' world does not generally conform to chosen/planned circumstances. b) Scenarios tend to be threat-reactive: not seizing the initiative. c) Develop own life: planners reluctant to re-assess earlier assumptions.
THREAT	OPPONENT CAPABILITY	NET ASSESSMENT	a) Keeps focus on the threat at the macro level of overall balances and at the micro level of individual weapons systems. b) A potential pitfall is to use balances as justification for force choices out of context with objectives/strategies/scenarios.
MISSION	MISSION AREA PRIORITY	MISSION AREA BALANCE	a) Functionally-driven, thus making it well-suited to assessing the balance of capabilities across war-fighting functions. b) Danger of disconnecting force choices from objectives/strategies. c) Functional activities can also become too threat-oriented.
HEDGING	UNCERTAINTY	FLEXIBILITY	a) Can lead towards worst case and least cost-effective force choices. b) Balances resources across the continuum of warfare. c) Greatest merit when results of being wrong could be catastrophic.
TECHNOLOGY	TECHNOLOGICAL SUPERIORITY	TECHNOLOGICAL OPTIMISM	a) Planners concerned with high technology concepts which have potential as force multipliers. b) Problem of investing a great proportion of defence resource into a few specialized programmes at the expense of balanced/flexible forces.
FISCAL	BUDGET	DOLLAR CONSTRAINED	a) Benefits derived from focusing on efficiency/effectiveness. b) May not be realistically related to the threat in the long run. c) The 'How Much Is Enough?' question is particularly relevant.

SOURCE: Based upon Henry Bartlett, "Approaches to Force Planning", in Force Planning Faculty, Naval War College (ed), FUNDAMENTALS OF FORCE PLANNING, VOLUME 1: CONCEPTS, (Newport, R.I.: Naval War College Press, 1990), pp.443-451.

Force Planning Framework: A Top-Down Methodology

Figure 18.



SOURCE: Richmond Lloyd, in FUNDAMENTALS OF FORCE PLANNING, Vol.1, op.cit.p.107.

1.3 Force Planning and the Defence Industrial Dimension

The above sections have highlighted the most common approaches to force planning. Three important factors, each of which has defence industrial implications, have to be recognized. First, during the actual planning cycle, some or all of the methodologies will be used to arrive at a decision. Second, the approach which dominates will depend on circumstances such as a change in the government or a technological breakthrough. Third, different approaches can lead to alternative solutions and different combinations of methodology will also lead to different results. From an aerospace perspective, the approach or combination of approaches, which result in the selection of aeroplanes and helicopters to meet established military requirements will obviously benefit contractors at both the prime and sub-contractor levels.

If the Technological approach to force planning is adopted and aerospace technologies dominate scientific breakthroughs, then aerospace companies will benefit. Additionally, even if the breakthrough is not in the aerospace field but in another defence industrial sector, aerospace could still benefit since air transport may be required to carry the equipment. Whilst the Technology approach undeniably can benefit the aerospace industry, it can also damage it. As highlighted above, a deficiency of this methodology is a danger of pumping a higher percentage of defence resource into a few, or one, select programme(s). If programmes are non-aerospace, then it means less investment for aerospace technologies. Those force planning methodologies which balance forces across a spectrum of warfighting capabilities - such as the Hedging approach - at least offer a minimum role for aircraft, and thus provide business for aerospace contractors.

2. CONVENTIONAL ARMS CONTROL: THE CFE FACTOR

2.1 Background to CFE - The Negotiations

The preceding section focused on force planning and examined its implications for defence contractors. Another factor which also has to be considered in the context of post-1989 defence procurement is that of arms control. This has an obvious impact upon certain categories of weapons system when it entails compliance with weapons ceilings. This section focuses on the CFE Treaty and its effects on the aircraft industry.

The catalyst for much of the attention devoted to the issue of conventional forces in 1989-1990 was the signing of the Intermediate-Range Nuclear Forces Treaty (INF) in

1987.⁵ Having reached an agreement on land-based intermediate range missiles, attention shifted to conventional force imbalances between the two blocs. As NATO officially concluded that the balance of conventional forces continued to be in a state of disequilibrium, conventional arms control was thus viewed as the most appropriate solution to reduce 'perceived' WTO superiority in Central Europe. Within the CSCE framework, negotiations commenced on Conventional Armed Forces in Europe (CFE) reduction on 6 March 1989. In a mandate signed two months earlier (10 January 1989), the participating states had agreed that the objectives of the CFE negotiations were to establish a stable and secure balance of conventional forces, to eliminate disparities prejudicial to stability and security, and to eliminate - as a matter of priority - the capability to launch surprise attacks, and to initiate large-scale offensive action.⁶

Five rounds of negotiations were conducted between March 1989-February 1990. During these negotiations, the two alliances engaged in a war of definitions, treaty parameters, and verification and monitoring issues. Aircraft proved particularly difficult to define, because Soviet and NATO doctrines differ about air power.⁷ Round Five (12 January-22 February 1990) is highly pertinent to this analysis for, in addition to being the precursor to the eventual signature of the Treaty, it also exemplified the problems which had arisen during the earlier rounds in the aircraft and helicopter spheres and highlighted how the issues were finally resolved. In February 1990, NATO moved closer to the WTO's position on aircraft, specifically reducing the alliance-wide combat aircraft to 4,700 - the level proposed by the WTO in September 1989. In another concession, NATO proposed a new limit of 500 for air defence interceptor aircraft: air defence interceptors above the 500 limit were allowed to be counted as part of the 4,700 allowed for combat aircraft.⁸ NATO spokesmen also suggested that some WTO trainer aircraft would be permitted outside the CFE limits. Earlier, NATO had insisted that all combat-capable aircraft should be counted regardless of designated mission, but apparently, Soviet and NSWTO assurances that aircraft would be available for on-site inspections persuaded NATO officials that some aircraft could be assigned trainer or purely defensive aircraft status.⁹

Regarding attack helicopters (AHs), the WTO states included helicopters in their 23 May 1989 proposals, during the second round of the CFE negotiations.¹⁰ America's President Bush persuaded fellow Alliance members to include helicopters in NATO's proposals of 13 July 1989. NATO was somewhat embarrassed to discover how many

helicopters its inventory contained - much more than initially estimated.¹¹ This problem was eventually circumvented by raising limits and re-defining helicopters in several different categories.¹² By Round Five NATO had re-defined combat helicopters as those equipped with anti-tank and air-to-air missiles.¹³

2.2 The Emergence of the CFE Treaty

On 19 November 1990, at the CSCE's Paris Summit meeting, the CFE Treaty was signed. It limited five categories of equipment deployed by the two alliances in the area stretching from the Atlantic to the Urals (ATTU). In addition to the Treaty, eight separate Protocols were compiled, providing instructions on how states should dispose of equipment exceeding CFE limits, data- and information-exchange schedules, an inspection schedule, and a mechanism designed to resolve the discrepancies in data exchanges and ambiguities in Treaty interpretation and compliance.¹⁴

Figure 19. overleaf provides data on aircraft and helicopter holdings by NATO and the WTO, and the effects the Treaty has upon inventories. With regard to "combat aircraft",¹⁵ the CFE Treaty limits each group of alliance member-states to 6,800 aircraft, with a single-country limit of 5,150. Regarding helicopters, only AHs are subject to CFE limits. They comprise two sub-groups: specialized attack helicopters and multi-purpose attack helicopters.¹⁶ A separate Protocol lays out provisions for disarming and re-categorizing helicopters, and thus outside of Treaty limits.¹⁷ During the helicopter negotiations, ceilings were raised to 2,000 for each alliance, with a single-country limit of 1,500. A major point of contention throughout the Summer of 1990 had been the Soviet claim that the Mi-24 helicopter¹⁸ - which NATO considered to be a dedicated AH - was largely used for reconnaissance and fire control missions. Eventually, NATO agreed to permit the USSR a special allowance of 100 Mi-24s equipped for reconnaissance. Excess Mi-24s would be limited, and counted as specialized AH, regardless of how they are equipped.¹⁹

2.3 CFE's Impact Upon Aircraft and Helicopter Holdings

It is important to recognize that much less equipment will be destroyed as a result of the Treaty than had been originally expected because the then-USSR transferred most of the excess Soviet Treaty-Limited Equipment (TLE) from the ATTU zone before it was signed.²⁰ In fact, Soviet railways/roads were congested for months due to the large quantity of equipment moved beyond the Urals. Thus, as Jane Sharp comments, it

appears that little material will be destroyed as the states "have been rather ingenious in relocating, converting and recategorizing equipment."²¹ In order to avoid destruction of their most-modern equipment, NATO Defence Ministers agreed in principle to "cascade" modern TLE in excess of CFE limits down to their less well-endowed allies, who in turn agreed to destroy older equipment.²²

	COMBAT AIRCRAFT	ATTACK HELICOPTERS
CFE LIMITS		
ATTU	13,600	4,000
Each Alliance	6,800	2,000
Country (*)	5,150	1,500
NOV 1990 HOLDINGS		
ATTU	14,311	3,437
Total NATO (inc:UK)	5,939	1,736
UK country holding	842	368
Total WTO	8,372	1,701
USSR	6,445	1,330
NSWTO	1,927	371
ATTU ZONE		
CFE cuts	711 (**)	(563+)
AGREED CUTS		
Total NATO cuts	(723+)	(264+)
To convert		
To destroy		
Total WTO cuts	1,572	(299+)
To convert	827	
To destroy	745	
Notes:		
1. (*) = WTO agreed lower single-country limits for the USSR.		
2. (**) = 711 is the net cut in ATTU zone combat aircraft: the WTO must cut 1,572, but NATO has headroom to add 723 aircraft.		
Source:		
SIPRI, SIPRI YEARBOOK 1991: WORLD ARMAMENTS AND DISARMAMENT, (Oxford: Oxford University Press, 1991), p.425. (Table 13.7.) and p.426.(Table 13.8.)		

Figure 19. CFE Treaty Implications for NATO and WTO Combat Aircraft and Attack Helicopter Forces.

The Treaty requires no cuts in NATO air power, but there will be cuts in former Soviet and NSWTO inventories (Figure 19.). According to the data exchanged at the signature of the CFE Treaty, NATO had 5,939 combat aircraft in the ATTU zone and the WTO had 8,372, of which 6,445 were Soviet and 1,927 NSWTO. NATO can thus add 723 combat aircraft and 264 AHs to its holdings in the ATTU zone. This is probably not the result anticipated by the Soviet policy-makers who argued vociferously for inclusion of air power in the CFE negotiations ! Whilst CFE does require cuts in WTO aircraft, each state can disarm and reclassify up to 550 aircraft - of which no more than 130 can be MiG-25Us²³ - Protocol on Procedures Governing Reclassification of Aircraft

- so of the 1,295 aircraft the ex-USSR must reduce, only 745 need to be destroyed, and of the 277 the NSWTO states must reduce all can be converted.

2.4 CFE: the Final Hurdles

Although the CFE Treaty was generally welcomed by the negotiating states - in terms of setting ceilings for conventional weapons systems - the elation was ironically interrupted by the Cold War's conclusion and the USSR's and WTO's collapse, which resulted in elements of uncertainty entering the arena. In the Treaty there was a clear commitment to further force reductions, but with no USSR or Eastern Bloc to negotiate with - there were understandable Western concerns about future interlocutors, and whether this Treaty would be ratified and complied with by the successor states. These issues proved to be less problematic than initially envisaged. Following the CIS's formation, the Tashkent summit meeting (15 May 1992) saw agreement reached on the TLE allocations between the former Soviet Republics.²⁴ These allocations were presented to the relevant CIS capitals immediately after the meeting, and later to the High Level Working Group (HLWG) in Brussels on 25 May. On 2 June, the Joint Consultative Group (JCG) in Vienna, negotiated and agreed the language changes required in the 1990 Treaty text to accommodate the new republics. On 5 June, the twenty-nine CFE signatories formally approved these changes - and the TLE allocations among the CIS states - at a special NACC meeting held in Oslo.²⁵ The CFE Treaty entered into force de facto on 17 July 1992, and entered in force de jure on 9 November 1992, ten days after the last signatory deposited their instruments of ratification in The Hague.²⁶

3. INSTITUTIONAL MANOEUVRES IN THE MILITARY & SECURITY DOMAIN

3.1 Introduction

This section examines selected institutional initiatives, and assesses whether they constitute a "quality" service. Whilst focusing particularly on NATO's traditional - and successful - role as guardian of Europe's security interests, and its future contribution to a new security framework, the section also examines the EC's and WEU's role in the post-Maastricht era.

3.2 NATO

Background to the Military Committee

The Military Committee (MC) is the highest NATO military organ under the

political authority of the North Atlantic Council (NAC) and the Defence Planning Committee (DPC). It comprises all Chiefs-of-Staff of the NATO countries, except France - represented instead by a military mission to the MC - and Iceland, which has no military forces and is consequently represented by a civilian. At the Chiefs-of-Staff level, the Committee meets at least three times a year, or whenever it is deemed necessary. The NAC assigns the MC with the peacetime mission of recommending those measures deemed necessary for the common defence of the NATO area. It is to this body that the Major NATO Commanders (MNCs), the Supreme Allied Commanders, report. The MC is a very important customer within the NATO-network: in 1990, for example, it recommended a fundamental review of NATO's military strategy and "operational art", which subsequently became the blueprint for future Alliance actions: the "New Strategic Concept".

The International Military Staff (IMS) is the MC's executive agent, and is tasked with ensuring that MC policies and decisions are implemented as directed. In addition, the IMS prepares plans and recommends policies on matters of a military nature referred to NATO or the MC specifically. IMS divisions include: Plans and Policy, Operations, and Logistics and Resources. There are also a number of military agencies under the IMS.²⁷

The Gulf War Experience: Missions and Messages

Although the Gulf War occurred outside of NATO's Treaty area - and was not an Alliance mission - member-states were involved heavily.²⁸ For the allied coalition, operation Desert Storm holds important military and political lessons²⁹ for the future employment of air power in support of global and US-European allied operations. As Jacqueline Davis³⁰ contends, Desert Storm revealed force posture deficiencies that relate to NATO military planning as well as to out-of-area contingency planning. A substantial proportion of allied forces deployed to the Gulf demonstrated insufficient flexibility for operations over desert terrain and during adverse weather conditions. On more than one occasion, bad weather forced coalition aircraft to return to their operating bases fully loaded because of an inability to acquire targets.³¹ Once the euphoria of the Desert Storm success had subsided, governments found themselves faced with important questions on weapons procurement and systems deficiencies.

a) Tornado: Systems and Tactical Deficiencies

Since Britain's Tornado aircraft were originally configured to operate in the sophisticated air defence environment of the European theatre, modifications had to be made to the aircraft before Gulf deployment including the incorporation of essential electronic equipment.³² Additionally, some of the requirements for new systems were recognized only when the low-flying tactics - adopted by the RAF for its NATO role in Central Europe - proved redundant against Iraqi air defences. The comparatively high number of Tornados lost in the Gulf - as compared to other allied aircraft led British commanders to try to adapt their tactics by ordering their aircraft to fly over Iraq at medium, or higher, altitudes.³³ This, however, could only be executed when the aircraft were appropriately equipped. Britain obtained "Rockeye" cluster bombs from USAF stocks. The main weapons employed by Britain's Tornado and Jaguar aircraft are the JP 233 airfield-denial systems and the BL 755 cluster bombs, both of which have to be discharged at low level and thus were unsuitable for revised Gulf tactics. If stand-off versions of these had been available, RAF pilots could have performed their missions flying at low levels without "flying down the teeth of enemy defences."³⁴

b) Air Transport Capability

In any conflict or crisis it is essential to have the air transport capacity to move both troops and equipment quickly to the combat- or threat-zone, at short notice, and later for logistic supply, reinforcement or withdrawal operations. During the Gulf War, serious deficiencies in airlift capability came to light: although the USA had C-141 Airlifters and C-5 Galaxies - and the benefit of years of experience of moving troops to NATO-Europe - civilian carriers had to be requisitioned in order to ensure the mission was completed.³⁵ For the first time in its twenty-eight year history, the USA activated its Civil Reserve Air Fleet (CRAF)³⁶ to make up for a shortfall in strategic airlift: thirty-eight CRAF aircraft were used to move the 82nd Airborne Division.³⁷ The Europeans also lacked air transport capacity: in one mission, it is understood that the Dutch made eighty flights with various aircraft; if they had sufficient numbers of C-5 Galaxies the operation could have been completed in fifteen flights.³⁸ In view of newly-perceived security risks - many distant from Europe's territory - and accordingly-adapted national and Alliance force structures - long-haul strategic air transport is an area which requires investment, otherwise the external failure costs could be very high. However, it has to be acknowledged that the urgency of this strategic air transport investment is at its greatest only whilst speed of deployment is important. Once operational requirements

alter, both equipment specifications and the funding direction change with it.

c) Helicopters

During the war approximately 2,300 helicopters were deployed by coalition forces, in a variety of roles, ranging from attack and anti-tank missions (Apache and Cobra), electronic warfare (specialized Black Hawks, and the new French battlefield surveillance Super Puma) and transport operations (Chinooks).³⁹ At the beginning of the conflict, commanders preferred to use helicopters, rather than fixed-wing aircraft, to attack crucial enemy radar sites because they wanted to be sure that the targets attacked had in fact been destroyed.⁴⁰ Additionally, the helicopters' versatility proved an invaluable asset: attacking Iraqi armour and artillery; moving the US 101st Airmobile Division (as part of the XVIII Airborne Corps); long range tactical intelligence; providing a C2 base to monitor the rapid movement of troops; providing laser support for precision-guided munitions (PGMs) and evacuation missions.⁴¹

Helicopter operations benefitted from the employment of the NAVSTAR Global Positioning System (GPS) in the Gulf, since this increased their survivability through ensuring silent and extremely accurate navigation. British Puma helicopters were outfitted with GPS, and, according to Squadron Leader Smyth, commander of the 33rd Air Rescue Squadron:

[GPS is] essential now, especially for night flying in the desert. I am sure with GPS we will lose fewer helicopters.⁴²

It is essential that survivability during night-flying operations is enhanced, since this was identified as an allied deficiency in the Persian Gulf.

Helicopters made a valuable contribution to Gulf operations, but a few operational areas were identified as deficient: night-flying, identification of friendly ground-forces, and refuelling.⁴³ During refuelling operations, AHs were accompanied by larger CH-47Ds, but these sometimes were too slow and vulnerable. With faster refuelling helicopters, faster pumps and improved bladder tanks, the efficiency of helicopter operations could be significantly enhanced.⁴⁴ Regarding night-flying, there is a clear need - notwithstanding the advent of intensive training with night-vision goggles - for the speedy development and acquisition of an obstacle avoidance system. Following a number

of reported incidents of coalition vehicles being destroyed and crew casualties resulting from casual missile use, efforts need to be made to develop a reliable system for identification of friendly forces by ground support aviation,⁴⁵ and this area is being addressed. An additional factor requiring further examination is the extent to which climatic conditions affect operational performance: strong winds and a sandy environment complicated maintenance programmes and affected performance.⁴⁶

NATO Strategy and "Operational Art" in the post-Cold War era

In 1990 the MC recommended a fundamental review NATO's military strategy, as a response to the new politico-military environment. Guidelines for the new allied strategy were established during the London (July 1990) summit, culminating in the publication of NATO's "New Strategic Concept" (NSC), announced on 7 November 1991. NATO's NSC represents a significant shift in Alliance strategy and thinking: moving away, as Douglas Stuart⁴⁷ comments, from the heavy concentration of forces around the Central Front - which characterized the Cold War - to a reduced, more complex and multi-directional defence posture. It is arguable that this defence posture could amount to no defence posture at all, given the flexibility incorporated within it.

Operational concepts emphasize flexibility and mobility, which could lead to a new generation of weapons, since there is a need for maintaining the capacity to respond adequately (at lower force levels) to new threats. This is vital for protecting future NATO security interests, given that force reductions - driven on by international arms limitation agreements - juxtaposed with a redeployment of military resource rearwards, have contributed to uncertainty regarding responses to threats inside and outside NATO's treaty area. In NATO's NSC, members identified that the ability to respond flexibly to meet the challenges and risks presented by the new order means that emphasis must be placed upon:

effective surveillance and intelligence, flexible command and control, mobility within and between regions, and appropriate logistics capabilities, including transport capacities.⁴⁸

In accordance with this new "mobile" defence posture, NATO is developing both immediate reaction forces and more rapid reaction forces. NATO has also accorded a high priority to the development of multinational forces. The advantages of such forces

are that: a) they provide a way of "deploying more capable formations than might be available purely nationally"; and b) they help "to make more efficient use of scarce defence resources."⁴⁹ Furthermore, in the longer term, as General Vigleik, Chairman of NATO's MC, has commented, multinationality could also encourage some movement - with associated budgetary attractions - towards greater role-specialization among the member-states, although this is not currently an acknowledged objective.⁵⁰

New Force Structures

The composition and organization of future forces will be based upon three principal groups: Main Defence, Reaction and Augmentation Forces. The Main Defence Force (MDF) will form the backbone of NATO's military capability. In the event of major and protracted conflicts, the basis for reconstituting and reinforcing NATO's defence capability to its full strength will reside in lower-readiness MDF formations and Augmentation Forces, with flexibility remaining the key to achieving success. Reaction Forces - comprising ground, air and maritime elements at relatively high readiness - will form a small part of NATO's total available military resources: less than 10% in the case of ground forces.⁵¹ In conjunction with some MDF elements - the regional Ready Manoeuvre Forces: established for primary defence at short notice - the Reaction Forces are specifically designed as mobile and flexible crisis-management tools, which offer NATO's leadership a range of military options in periods of tension. The Reaction Force has particular relevance to the future shape and role of Britain's armed forces, in view of the U.K.'s contribution to the Allied Command Europe Rapid Reaction Corps (ARRC).

The U.K. and the ARRC⁵²

In October 1992, the Headquarters of 1 (BR) Corps in Bielefeld, Germany became the nucleus of the Headquarters for the ARRC.⁵³ In addition to providing the corps commander and HQ personnel, the British contribution to the ARRC comprises: corps troops, including communication, armoured reconnaissance, depth-fire and air defence units; the 1st (UK) Armoured Division; the 3rd (UK) Division; and 24 (Airmobile) Brigade. The 24 (Airmobile) Brigade is part of the air-mobile Multinational Division (Central): the British contribution consists of two infantry battalions and two aviation regiments each equipped with twelve Lynx anti-tank helicopters, ten Lynx light battlefield helicopters and twelve Gazelle helicopters for reconnaissance missions.⁵⁴ It is understood that the MoD plans to replace the Lynx in the anti-tank role with a dedicated AH from

December 1998.⁵⁵

Doubts have been expressed as to whether Britain's helicopter inventory - particularly in the area of support/transport helicopters - is currently adequate for reacting rapidly and effectively. Much of this concern stems from the Gulf War experiences: whilst British (and allied) forces performed admirably, U.K. forces were stretched, and eighteen Sea King helicopters were 'borrowed' from the Royal Navy (RN) to join Army helicopters supporting just one armoured division. It is therefore apparent that if the 24 (Airmobile) Brigade is to reach its true potential, the RAF's support helicopter fleet will have to be enhanced.⁵⁶

Revised Command Structures

In parallel with the above mentioned force restructuring - and thus in line with functional integration - NATO's command structure is also being adapted. The number of MNCs is being reduced from three to two, leaving Supreme Allied Commander Europe (SACEUR) and Supreme Allied Commander Atlantic (SACLANT).⁵⁷ Subordinate headquarters will also be rationalized, with command boundaries altered to reflect changes in the new world order. From a TQM perspective, it is important to recognize that this revised command structure does provide for workable interfaces between the various external customers: between NATO and the WEU, as the future defence arm of the EC. Without effective practical mechanisms to ensure compatibility between the respective Alliance and Euro-defence organizations, the potential for duplication and structural inability to perform effective actions is high. In TQM terms this is highlighted by the CoQ concept, specifically in the form of external failure costs: with limited military resources available - and the need for clear leadership paramount - it is of vital importance to maintain an integrated military structure, that allows for flexible tasking, including "double-hatting" when necessary.

The Franco-German Dimension: EUROCORPS

The Eurocorps is not an Alliance initiative. President Mitterand and Chancellor Kohl announced the creation of the 35,000 strong Eurocorps at their Rochelle summit (21 May 1992), marking yet another chapter in Franco-German military co-operation in the post-Cold War era.⁵⁸ The corps, based in Strasbourg, is expected to be operational in 1995, and comprises the Franco-German Brigade,⁵⁹ France's remaining German-based armoured division and a German mechanized division of 2-3 brigades. It is open to

participation by other WEU members, and a number of states are examining its possibilities, although the British initially decided against participation.

Eurocorps' existence has raised fundamental questions about future European security arrangements. Britain's initial unenthusiasm is attributable to a number of factors:⁶⁰ a) NATO is still regarded as the key security institution, and consequently it is hardly surprising that more importance is accorded to the successful development of NATO's RRC than to putting any eggs in the solo-Euro basket; b) the Gulf War experience highlighted Europe's current 'immature' state vis-a-vis a European foreign and security identity, which thus made the later Eurocorps proposal appear as yet another attempt to avoid frank political discussion; c) it was presented as a *fait accompli* to WEU members, rather than as an issue for multilateral negotiation; d) it is most unlikely that Britain would join any newly created entity in which she had not been involved in the conception; and e) its creation only served to aggravate already ambiguous European security arrangements. At this juncture, it is too early to draw firm conclusions as to whether Eurocorps will contribute to enhancing security - having a distinct area of competency - or only serve to add to the high institutional CoQ - duplication of NATO's work, a deterioration of British relations with France and Germany, and the establishment of new (perhaps unnecessary) command structures. However, providing that it is not going to be in direct competition with NATO's multinational units, its future may be a little less precarious than sceptics originally envisaged, and more states may decide to join.

The NATO "Out-of-Area" (OOA) Debate

Somewhat ironically, the Cold War's conclusion brought an added intensity to the OOA debate: the traditional Soviet threat to the Treaty area had gone, but international events, particularly the Balkans crisis - and NATO's potential peacekeeping role - focused attention on the institution's capacity for action outside of the Treaty area. The argument favouring an OOA role for NATO runs as follows: the diverse nature of security risks today - ethnic violence, terrorism, to name but two - inside, and external to, the European area - will have negative effects on the security of Alliance members, and thus NATO should act, and can do so, for Articles 2 and 4 permit it. Experts⁶¹ critical of an OOA role either argue that NATO is an inappropriate institution for future missions because of its identification with the Cold War era, or contend that it is prohibited from acting OOA because of geographical treaty delimitations arising from Article 6 of the

North Atlantic Treaty.⁶²

With regard to the above issues, two points have to be considered: first, NATO is the only institution today with the infrastructure and experience to deal with major security contingencies; second, Article 6 should not be read in isolation from Articles 2 and 4. Article 6 does define the area in which provisions of Article 5 apply, but it does not imply that events occurring outside of the Treaty area cannot be the subject of consultation within NATO or of concerted action by countries in that area. Any international crisis is likely to have an effect on the preservation of peace and security in the Treaty area, and thus a capacity to act OOA was built-in to the Treaty. To those who argue that NATO has neither the structural competency or experience to act OOA, it should be noted that NATO has an extensive historical record of inter-Alliance diplomacy relating to OOA issues.⁶³ As Douglas Stuart⁶⁴ highlights, by the late 1980s, NATO governments had developed a three-step process for co-operation on OOA issues, based on their common commitment to promoting international peace and stability, in accordance with Article 2 of the North Atlantic Treaty: consultation among the allies (Article 4); co-ordination where appropriate; and compensatory deployments to maintain the necessary force levels for deterrence in the event that individual Alliance member-states felt compelled to use NATO-designated assets to respond to a crisis outside the Treaty area. The quality of these arrangements was clearly evident when Alliance governments co-ordinated their contributions to the Persian Gulf Armada (1987-1989), and also in the subsequent allied response to the Iraqi invasion of Kuwait (1990).⁶⁵

NATO's Future Interests ?

Whilst there are a vast array of scenarios which NATO could be involved in, the intention in this short section is to consider some of the most likely activities the Alliance will perform.

i) Peacekeeping

In June 1992, Alliance Foreign Ministers declared that NATO and the North Atlantic Co-operation Council (NACC) would be available to the UN/CSCE for peacekeeping activities, on a case-by-case basis.⁶⁶ NATO's SACEUR said the ARRC would be prepared for peace-keeping and humanitarian tasks requested of it by those organizations.⁶⁷ NATO expertise and resource in the aerial surveillance, and command and control (C2) areas, will provide useful assets and support for peacekeeping

operations. However, it is not envisaged that NATO will initiate peacekeeping operations; instead, it will provide support for them when they are mandated and established by CSCE/UN.⁶⁸

John Kriendler⁶⁹ has identified the key drivers for Alliance involvement in peacekeeping:

- a) the existence of too many problems, which if left unresolved could pose a major threat to NATO security;
- b) NATO's established military infrastructure, experience and tradition of multinational operations, which facilitates effective participation;
- c) political and military weight of sixteen allies;
- d) newly-adapted force and command structures which enhance flexibility and mobility - characteristics essential for peacekeeping operations;
- e) given NACC's existence, NATO has a mechanism to keep the Co-operation Partners on-board.

Amongst the constraints, which Kriendler⁷⁰ also highlights, are:

- a) the complexity and intractability of these problems;
- b) the delays caused by cumbersome CSCE procedures;
- c) persistent reservations in some UN circles over NATO's future role, which somewhat diminishes NATO's credibility;
- d) the complexity and sensitivity of C2 arrangements;
- e) the financial burden.

In overall terms, NATO clearly has the capacity to offer much to the peacekeeping cause,

but it can be to little avail if a credible policy and the political will to implement that policy are lacking.⁷¹

Douglas Stuart contends that the ongoing crisis in the former Yugoslavia "can be viewed as a baptism of fire for the newly transformed NATO."⁷² On the technical and military side, NATO has done well in the Bosnian crisis: "On a military level", as Helmut Sonnenfeldt argues, "the institution has performed very effectively. What has not

happened are the political decisions that trigger action."⁷³ NATO has contributed in a variety of ways to the UN effort. It has enforced the no-fly zone over Bosnia-Herzegovina, in addition to the UN arms embargo of Serbia and Montenegro. NATO also offered to provide protection for UN peacekeeping troops, including the use of air strikes should the UN so request.⁷⁴ Whilst militarily, NATO can deliver, it is in the wider political domain that the problems persist. As George Graham contends:

If Bosnia is the model for the kind of regional and ethnic conflict that will replace the monolithic threat of the Warsaw Pact in NATO's strategic planning, it has posed uncomfortable questions that have received few good answers.⁷⁵

Whilst it should be noted that it is unrealistic and unfair to expect a regional organization like NATO to single-handedly resolve the Balkans challenge - when its members are unwilling or unable to enforce the international will, it is possible - though tragically ironic if it should happen - that a festering Bosnian crisis could cloud NATO's future.

ii) Relations with former adversaries: NACC

Although the Cold War is over, developments in the former USSR and Eastern Bloc countries continue to be of importance to NATO, since Alliance security interests are inseparably linked to that of other states in the area.⁷⁶ NATO has a valuable role to play in helping to promote a sense of security and confidence in these "emerging" democracies, and to strengthen their ability to fulfil their commitments under the CSCE process. In July 1990, at their London Summit Meeting, NATO member-states extended the "hand of friendship" to their former adversaries, establishing regular diplomatic liaison with them. NATO and its new partners signed a Joint Declaration in November 1990, in which they stated they were no longer adversaries. One year later, when NATO Heads of State and Government met in Rome, they decided to "concretize" these steps towards partnership, and to develop a more institutional basis for consultation and co-operation on political and security issues. Foreign Ministers of the Central and East European governments were invited to attend a meeting with Alliance counterparts to launch a new era of partnership. The first NACC meeting took place on 20 December 1991.⁷⁷

Since then, NACC has become the forum for pan-European discussions relating to a plethora of security and related issues.⁷⁸ Meetings between NACC Foreign and Defence Ministers have helped to maintain the momentum for approval and compliance with the CFE Treaty, and other arms control agreements.⁷⁹ It is likely that future consultations and co-operation will continue to focus on areas in which NATO members can offer expertise and experience, such as defence planning, scientific and environmental affairs, civil/military co-ordination of air traffic management, and defence conversion and diversification.

Since the Cold War's conclusion, the former WTO states have been asking for full NATO membership. Extending security guarantees to these countries presents many problems, and accounts for NATO's reluctance to welcome them to the fold as full members. At the Brussels Summit (January 1994) NATO adopted the "Partnership for Peace Plan" - first announced by President Clinton in November 1993 - which offers military and defence relationships to the former WTO states. (Appendix 5. details signatories to the plan). This plan was a US-designated compromise between full Alliance membership (requested by countries such as Poland and Hungary, supported by Germany) and the risk of alienating the conservative and military factions in Russia.⁸⁰ Whilst Alliance member-states are anxious to avoid a new division of Europe - which would not enhance security in the region - there are understandable concerns about embroiling NATO in potential conflicts in former Eastern Europe by extending security guarantees.

NATO and Air Traffic

NATO's Committee for European Airspace Co-ordination (CEAC)

Established in 1955, CEAC comprises high-ranking military and civilian representatives from Alliance countries, with active participation of NATO's military authorities. CEAC's general aim is to promote safety and economy in flying without impinging unduly upon the requirements of the military authorities. For over 35 years it has promoted standardization and compatibility of civil and military Air Traffic Control (ATC) in NATO-Europe. It is an active participant in the "Action Programme" of the Transport Ministers of the "European Civil Aviation Conference" (ECAC), which aims to harmonize European ATC systems. It fills an important gap in international aviation co-operation, harmonization and standardization, especially because military aspects are excluded from the "International Civil Aviation Organization" (ICAO) Charter.

Due to the multiple impacts of the opening-up of former Eastern Europe, the creation of the Single European Market, and the number of combat aircraft still remaining after CFE (6,800 each for NATO and the former WTO), Europe is confronted by increased ATC problems in the short-medium term. CEAC has sought ways to reduce congestion in the skies. On 26-27 September 1991, CEAC held its 80th Plenary Session: much of the proceedings were dominated by a review of its contribution to ECAC's "Action Programme", as well as projected future Alliance military requirements - including those of the Rapid Reaction Force - and their likely implications.⁸¹ Within a month - reflecting the seriousness of the ATC issue - a special follow-up seminar on the civil and military co-ordination of Air Traffic Management (ATM) was held at NATO HQ (24-25 October 1991), with high-level representation from the former WTO members. In his opening remarks, Manfred Worner, underlined the significance of this seminar as a symbol of the new Europe of co-operation and transparency.⁸²

It is apparent that considerable challenges lie ahead in establishing an ATM system to cope with the increased growth in traffic. The former WTO states will need to make substantial investment in modernizing facilities and training over 15,000 air traffic controllers in the English language - a necessity for controlling international air traffic. CEAC has made urgent recommendations to individual member-countries, aviation organizations, and the European Commission to consider the provision of assistance to these countries as they strive to harmonize their systems with Western ATC.⁸³

CEAC has also highlighted the potential opportunities created by the opening-up of new routes through Central and Eastern Europe to the Far East, Pacific and Western Europe: relieving international air congestion, whilst at the same time promoting tourism and air transport in Central and Eastern Europe.

From a TQM perspective, it is important to recognize the significance of the changed composition and character of the air traffic customer-base - former WTO states are new customers plugged into the existing customer-network - since there are benefits and risks associated with its future management: with the Cold War's conclusion, ATM could be significantly improved, in terms of benefits accruing from co-operation, shared resources and expertise, and mutual investment, but if this opportunity is not utilized effectively, there could be a high CoQ - specifically external failure costs - in the form

of reduced overall standards (safety risks), and also lost opportunity costs vis-a-vis future commercial development.

NATO's Dual-Use Infrastructure

During the Cold War, a substantial proportion of NATO's infrastructure requirements were developed on a commonly-funded basis for collective defence under the Infrastructure Programme:⁸⁴ investment by members-states has been on-going for over forty years,⁸⁵ resulting in a range of facilities and equipment on land made available by host-nations. This infrastructure traditionally included facilities for use in war, such as HQs, air defence and warning installations, missile sites, and military airfields, to name but a few. Whilst it is true that under NATO's new strategy, elements of the existing infrastructure may no longer be relevant, it is also apparent that the largest proportion of NATO's inventory will play a vital role in any defence of Alliance territory, in crisis-management or in peacekeeping operations, and should therefore be maintained.

Following the Cold War's conclusion, the double-impact of pressures to reduce defence budgets and high financial costs of moving to a smaller, flexible force structure, have limited the funds available for infrastructure. In view of reduced resources - and the potential commercial benefits to be accrued from shared civil/military use of facilities⁸⁶ - the "Shared Usage of NATO Infrastructure" (SUNI) concept has been developed. It has the potential to cover a broad spectrum of possibilities, including: a) leasing a surplus facility at a military site to the private sector; b) NATO actively using civilian radars for air defence surveillance;⁸⁷ c) allowing an entire military facility to be taken over by the private sector, with future Alliance use limited to access in times of crisis. The possibilities are endless, and as Herpert van Foreest⁸⁸ highlights, they all share that common denominator: financially, it suits both NATO and the civil user to share facilities. The SUNI concept is not confined to vacated Alliance military infrastructure: it also includes shared use by NATO of non-military installations when this offers a more cost-effective solution for providing a military capability.⁸⁹ Whilst the concept is attractive, it is important to recognize that not every facility lends itself to private sector use and/or commercial exploitation, since some may have unique design characteristics - having met special customer needs.

In TQM terms, it is important to consider whether all the customers in this particular inter-Alliance network would benefit from, or be disadvantaged as a result of,

the widespread implementation of SUNI. It may become apparent that there is a high CoQ arising from this concept, in the form of additional problems which outweigh potential benefits. Regarding the military - arguably the most important customers in the network, given the fact defence of the Alliance is part of its mission statement - they could be the recipients of a poorer quality service, if external failure costs existed: up to now, NATO military requirements have been met by constructing specially designed facilities - often to higher operational standards than in civil sectors - to meet specific military functions, but shared usage could entail compromising requirements. If this was to jeopardize the successful accomplishment of either the military or the civil mission, or both, it would be contributing towards a high CoQ, that would be unacceptable. However, there is no guarantee that this would occur. It is important to consider that external failure costs - in the form of lost opportunity costs - would also accrue, if such a concept was not at least tested, since it is logically sound and cost-effective.

From a private sector perspective, although companies are used to accepting commercial risks, they may be unwilling to embark on a commercial venture when NATO could totally, or partially, at short notice, repossess a site, possibly resulting in heavy financial losses for the firm. In view of the potential problems confronting both civil and military operators, all conditions - such as advance warning times for vacation of a facility, and security arrangements for joint facilities - for shared usage - must be carefully planned, probably on a case-by-case basis. Given the different commercial practices, traditions, and industrial levels within NATO, it is clear that there can be no generalization with regard to national conditions of use: consequently, there are no agreed standard Alliance procedures for shared usage. In principle, the concept offers much, particularly since it has the potential to satisfy simultaneously the needs of both the military and non-military customers. However, there are practical problems, and it would seem that a case-by-case analysis of SUNI's efficacy would be essential before any conclusions could be drawn as to whether it was a quality initiative or a contributor to raising NATO's overall CoQ.

3.3 European Community

Background to the EC

Historically, the EC has played a negligible role in the security domain, although the unsuccessful 1950s EDC initiative and the Fouchet Plan⁹⁰ of the 1960s were examples of failed EC efforts at attaining a common security policy. It was Article 30 of the Single

European Act (SEA)⁹¹ which gave the EC the legal and political jurisdiction to involve itself in security matters, with Section 6(a) explicitly sanctioning readiness "to co-ordinate...positions more closely on the political and economic aspects of security". The SEA also brought European Political Co-operation (EPC)⁹² - which had run parallel to the European Community, but was not fully integrated into the decision-making structure - into the EC treaties system. Although the EPC framework does not provide for discussion of the military aspects of the co-ordination of defence policy, some discussions have taken place, such as in October 1983 when the Foreign Ministers in EPC discussed the INF talks in Geneva, and the NATO policy of cruise and Pershing missile deployment.⁹³ There have also been notable failures, including the absence of a common reaction to the Reykjavik debacle in 1987.

Developments and Negotiations pre-Maastricht

It is useful to consider the run-up to the Maastricht 1991 negotiations, since it provides an insight into national positions and explains post-Maastricht problems. It is important to recognize that from 1990 onwards, none of the major national actors had an entirely coherent position, and many often found themselves in different partnerships on the various issues.

Britain and the Netherlands have traditionally been the most strongly committed to the preservation of existing Atlantic structures. Britain supported initiatives to strengthen the WEU, provided that it did not undermine the priority of NATO commitments, or weaken the American commitment to a common defence in Europe. As Anand Menon et al⁹⁴ highlights, the British style in negotiations stressed "practical" measures rather than rhetorical declarations. In contrast, the French continued through most of the period to maintain their traditional suspicion towards NATO, its Integrated Military Structure (IMS), and what they perceived as the institutionalized American leadership within it. French Ministers were particularly vociferous in their calls for the inclusion of "defence" within the Union, as exemplified by the statement made by Foreign Minister, Roland Dumas, in October 1991, that a European defence identity necessarily meant "the defence of Europe by Europeans", not just - as the British were prepared to concede - a common defence policy for Europeans.

The Germans shared the British and Dutch Atlanticism, but also welcomed the pro-European sentiments expressed by the French. Later, the two found themselves

together in the Franco-German corps, and were equally disgruntled by the decision to give the ACE RRC command to Britain. Belgium, Luxembourg and Spain could best be described as being closest to the French way of thinking, whilst Italy was committed to the principle of EU but unhappy about the now emerging "exclusiveness" of the Franco-German position. Britain and the Netherlands later divided over institutional questions, with the British and the French later in agreement over an intergovernmental structure for foreign and defence policy.

After numerous meetings under EC, WEU and NATO banners, the Heads of Government finally arrived in Maastricht, but a number of issues remained unresolved. Of these, the most fundamental concerned the linkage between the Union, the WEU and NATO. Additionally, there was confusion surrounding the WEU's role in "defence" matters, and concern over whether it should operate in a clear division of functions only outside of the NATO area, or possibly within it. Problems also surrounded the drafting of the WEU Declaration to be attached to the Treaty - at British insistence - but with its content not yet agreed.

Expressed in TQM terms, the above problems highlight the importance of establishing, and maintaining, an effective external customer network - with clearly defined areas of responsibility - in order to achieve provision of a quality output: that is: meeting customer requirements every time. However, it is important to recognize that problems arise when:

- a) customers do not know what they want;
- b) customers have identified their requirements but for some reason are unable to express them;
- c) the customer's requirements are in fact detrimental to their interests and/or those of the supplier;
- d) on receipt of the customer's requirements the supplier is unable or unwilling to deliver;
- e) competition exists between the suppliers, with an additional problem of some being unable to deliver, as highlighted above.

In the complex situation above, there is ambiguity surrounding competency of the institutions and an absence of agreement concerning the nature of their inter-institutional

relationships. Each of the institutions obviously wishes to justify its existence through operating in a select niche, but the proliferation of actors with potential competency in the broad "security" area increases the difficulty of achieving this: a straightforward institutional market carve-up may be the most logical solution from a TQM point of view, but rationalization in practice is far from easy to achieve.

NATO wants to maintain its market-share of "security", and given its track-record - with over forty years of quality service, meeting customer requirements - it would be illogical to allow any other organization, which inevitably would lack the operational experience and infrastructure, to mount a take-over of this vital sector. However, the emergence of new players, or old players wanting to indulge in new pursuits, is a perfectly natural occurrence, and for an organization like the EC, defence is viewed as a logical extension of its activities.⁹⁵ It is ironic however, that at the Cold War's conclusion, more institutions are vying to defend Europe. From a TQM perspective, if existing units or organizations are able to deliver a quality output, there would appear to be no reason to pass the responsibility for delivering the "security" service to someone else. In other words, if "Europe Inc." is happy with NATO, then why waste valuable time and resource trying to create some new super-structure to perform the same task, which could not necessarily achieve the same success rate? The alternative view would be that since the market - in which the service was previously provided - has dramatically changed, the nature of the service has changed, and thus customer requirements have changed, necessitating a new approach. Consequently, Europe has to have a more distinctly "European" entity providing the service. Both arguments are valid, and are discussed throughout this chapter.

The utility of the TQM analytical approach is clearly demonstrated above, as it focuses attention on the nature of the security constituency, and the problems confronting (potential) suppliers in providing a service in a rapidly changing environment where often the customers are unsure of what it is they want defending from. Appendix 6. provides a descriptive and prescriptive account - via the HoQ vehicle - of institutions and the provision of a "defence" service.

Maastricht and Beyond ?

Following the Maastricht Summit (European Council Meeting) of 9-10 December 1991, the Treaty on European Union emerged - signed on 7 February 1992 - which

declared as one of its five principal objectives:

the implementation of a common foreign and security policy including the eventual framing of a common defence policy, which might in time lead to a common defence.⁹⁶

Whilst there was much talk about a common European Foreign Policy, there was very little talk about its substance and objectives. One of the fundamental questions which should be asked - and this has TQM relevance - is "what are the common interests of the Community members ?", since the institution's ability to deliver a quality output is very much dependent on a common objective and shared benefits (risks). In the case of the EC, there appears to be an absence of agreement on a number of issues (discussed below), and diverse national interests. Anthony Hartley⁹⁷ contends that "Inequality of interest must mean inequality of commitment", which in the international security/foreign policy context certainly does not portend well for ensuring provision of a quality service. However, it is arguable that those contributing less may nonetheless be satisfied with the return on their investment, and have no concerns about increasing their stake.

Maastricht itself failed to resolve the wider defence and security debate. "Defence" and "security" are not synonymous. In recent years, the EC Commission's broad, at times pathetic, overtures in the security/defence/foreign and external policy areas - "fudging" the real issues at stake - have in fact only contributed towards a high institutional CoQ. It is hardly surprising therefore that there is much ambiguity within the Maastricht Treaty, particularly where "defence" (as strictly defined) is concerned: the language promises much but delivers little. In parts, it is more akin to rhetoric than to reality. The distinctions among the categories of defence, defence policy, security policy and foreign policy, as Anand Menon *et al*⁹⁸ highlights, is a matter of almost theological dispute - reflecting the sensitivity of extending the integration of the Community's civilian external relations into areas of high politics which the USA and others - specifically Britain - consider as the proper domain of NATO. However, on the positive front, as John Major highlighted, Maastricht does at least:

preserve the benefits of what we already have. It maintains the primacy of NATO while building up the European role within NATO.⁹⁹

This reinforces the above comments pertaining to Britain's support of institutional security initiatives providing they do not undermine NATO.

In addition to addressing the sensitive area of defence policy and military integration, Maastricht also considered co-operation in the security policy area. Article J3 provided for decisions to be taken by weighted majorities - rather than by unanimity or consensus - on a limited range of issues agreed to be subjects for "joint action", listed in a separate declaration, which included arms control, CSCE questions, and arms transfers to the Third World. However, how far moves towards political union should extend from security into defence was one of the most sensitive issues of the Inter-Governmental Conference (IGC).

Regarding the possibility of a EC common defence policy, the omens do not portend well if the member-states' "responses" to the Balkans Crisis is an indication of the institution's capacity to act in this policy area. As J.A.C. Lewis¹⁰⁰ highlights, perhaps the strongest doubts on Europe's capacity to craft a common military policy was raised by its response to the civil strife in former Yugoslavia. This crisis has indeed exposed the deep divisions between Community countries on international issues, particularly where the use of force is concerned. Furthermore, the splits can surely only widen if Europe's economic, political and moral crisis breaks the EC into a two, three or four-speed Community with each part having a different idea of Europe's security interests and how to protect them.¹⁰¹

Should the above scenario occur, it would, to use the TQM terminology, represent a fragmentation of the EC customer-base: the EC comprises a number of customer- and supplier-states, who no longer wish to be recipients of the EC's service, and who are also unwilling to meet the requirements of the new marketplace. It is important to recognize, however, that it is possible that the particular "service" can no longer be provided, and that it is also possible that unrealistic demands are being placed upon the institution in terms of providing that service. If either of these are true, that is: the "service" is no longer required or the institution lacks the capacity - infrastructure, mechanisms, political will to name but a few essential factors - to perform the function, then certainly from a TQM perspective, the institution should not be attempting to provide the service. Just as in the commercial world, where a company concentrates on its niche markets - doing what it is best at, and providing goods and services which it knows will sell - so too,

should any institution, finding itself in this position, revert to traditional markets and functions, and not be striving to enter new markets. If it decides to follow the contrary route, the CoQ would be so high, that its ability to perform other functions effectively would be reduced, and its internal and external customers would not receive a quality output.

Public Opinion¹⁰² within the EC

In the above section TQM added direction to the institutional analysis. TQM has highlighted the importance of inter- and intra-institutional customer networking, and the problems of institutional structural inadequacies. Within TQM, it is important to always remember the central ethos: customer-orientation first and always. Thus, having explored some of the EC's structural deficiencies, the next area for TQM-targeting is the institution's customer-feedback mechanisms, or expressed simply, public opinion and debate within the EC on defence, security and foreign policy matters. Whilst it is not the author's intention to wax lyrical on the merits and de-merits of "public opinion" as such, for the purposes of this analysis it is useful to consider briefly the opinions of the "public", who are the EC's customers - often passive customers in the decision-making process (although they have played influential roles in the Maastricht ratification processes) - and to consider the extent to which issues are manipulated by the institution before public consumption.

Public debate within the EC over defence, security, and foreign/external relations matters has all but ended now, as more pressing parochial matters have come to the fore, or being brought to the fore by national governments. However, it is interesting to note that according to an 1990 Opinion Survey (Eurobarometer), which questioned over 12,000 people in the Community, 61% felt that there should be a common European defence organization - but in Denmark, over 50% voted against - and just 51% favoured a joint Community Foreign Policy.¹⁰³ Whilst such figures may convey the notion of majority support for issues, they should not - and must not - be viewed as indicative of general Community public approval, since many variables are suspect: the small sample interviewed, the phrasing of the questions, the timing of the survey (post-Gulf War), and the organization behind the survey. The results should indeed be treated with caution and scepticism. As with all issues - not just security - and as with all organizations - not just the EC - it is important to be aware of the fact that issues can be "brought" quickly into the public arena for debate - a form of institutional marketing and advertising: market

manipulation - and then just as quickly disappear.

3.4 Western European Union

Background to the WEU

As highlighted in Chapter Two, the WEU was formed after the failed EDC initiative. Anthony Eden's idea of using the Brussels Treaty to bring Germany and Italy into a European framework, whilst at the same time enabling Germany to become an equal partner in NATO, was formalized in the Paris Agreements, which modified the Brussels Treaty.¹⁰⁴ On paper, as David Garnham¹⁰⁵ highlights, the WEU has broad scope, and arguably a more explicit collective security obligation than that contained in the North Atlantic Treaty, with Article 5 of the WEU Treaty stating:

If any of the High Contracting Parties should be the object of an armed attack in Europe, the other High Contracting Parties will, in accordance with the provision of Article 51 of the Charter of the United Nations, afford the Party so attacked all the military and other aid and assistance to their power.

It was intended that the WEU would support NATO, which Article 4 makes clear.

In the late 1960s and early 1970s, after France had withdrawn from NATO's integrated command, but prior to Britain's entry into the EEC, the WEU provided a useful forum for meetings among the principal European players. It is interesting to note that, in the late 1960s, Britain's Labour Government tried to use the organization to discuss foreign policy issues, and to keep its EEC application alive, but this provoked a French boycott of the WEU.¹⁰⁶ When Britain eventually joined the EC, this Euro-forum function evaporated, and the WEU became moribund. As Alfred Cahen comments, the WEU "slipped into a kind of lethargy."¹⁰⁷ Evidence of its inactivity, and the lack of support and recognition from member-states, is provided by the fact that between 1973-1984, there were no Ministerial level meetings of the WEU.

After more than a decade in the institutional wilderness, the WEU was reactivated in 1984. Willem van Eekelen¹⁰⁸ contends that the organization was perceived as a way out of the deadlock on the Genscher-Columbo proposals, to discuss security and defence issues in the framework of EPC. Additionally, it should be recognized that the WEU's

reactivation is attributable to a number of factors, including the volte-face on INF, European - particularly French - fears of American de-coupling, as well as the burden-sharing debate. France keenly promoted the WEU vehicle, whereas the British and Dutch adopted a somewhat less enthusiastic approach. Britain's first loyalty was to NATO. According to Christopher Coker, the British assented reluctantly,

in the hope of restoring something of their European image which had been tarnished if not permanently damaged, by years of acrimonious debate over Britain's budget rebates in the European Community.¹⁰⁹

The WEU was re-born in the Rome Declaration, 1984, which brought Defence Ministers to the WEU Council. The dual objective enumerated in the Declaration was to define a European security identity and to harmonize member-states' defence policies.¹¹⁰ In October 1987, the WEU approved the common "Platform on European Security Interests", which was seen as an affirmation of NATO-Europe's quest for a common position on principal European security issues. Apart from the re-asserted WEU commitment to work alongside their North American allies, members also agreed to reinforce the NATO-European pillar, and to enlarge Euro-defence co-operation by all practical measures. Additionally, the Platform recognized the specific role of Britain and France - with their nuclear forces - and the valuable contribution the two countries would make to overall deterrence and security. Both were delighted with this specific reference; Italy was not so thrilled, but eventually did concur with the majority view on the Platform's merits. The Platform coincided with the first instance of operational co-ordination in the Gulf, marking a new era for the organization. The creation of the WEU Institute for Security Studies in 1990 further stimulated the debate on Europe's security, and contributed to, what Willem van Eekelen termed, the creation of a "European strategic culture."¹¹¹

The WEU and life after Maastricht ?

The current European security debate has been pre-occupied with which institutions should be doing what and where.¹¹² Following Maastricht, the WEU is now regarded as an essential part of the process leading to EU, but is also firmly entrenched in NATO. The origin of the compromise reached at Maastricht is found in three separate texts: a WEU Ministerial Document (22 February 1991) on the role and position of the WEU; the Anglo-Italian Declaration (4 October 1991) emphasizing the special

relationship of Western Europe and the USA, expressed through NATO as "a key element of the European identity"; and the Mitterand-Kohl letter (14 October 1991), on which paragraph 2 of Article J.4 relating to the CFSP of the Maastricht Treaty on EU is mostly based. Emphasis was placed upon the WEU to "elaborate and implement decisions which have defence implications". An organic link is to be created between the WEU and the Union through closer co-operation between the respective staffs and initiatives to complement the co-operation already existing in NATO.

In addition to the European Treaty agreed at Maastricht, Ministers also agreed in setting out a series of measures designed to enhance the WEU's operational role, including the establishment of the WEU's Planning Cell, and military units answerable to the WEU. The Petersberg Declaration of 19 June 1992¹¹³ represents the culmination of months of intense activity by WEU countries to translate elements of the Maastricht Treaty into reality. The Declaration consisted of three parts: a) WEU and European security; b) strengthening WEU's operational role; and c) relations between WEU and other European member-states of the EU or NATO. At their meeting, Foreign and Defence Ministers discussed the progress made in developing the WEU's role as the EU's defence component and as a means of strengthening NATO's European pillar,¹¹⁴ in accordance with the Maastricht European Council Declaration of 9-10 December 1991.

WEU members also declared their willingness to make military units available - from the entire gamut of conventional armed forces - for military tasks conducted under the authority of the WEU.¹¹⁵ Member-states agreed that decisions to use military units answerable to the WEU would be taken by the WEU Council, in accordance with the provisions of the UN Charter. Participation in specific operations still remains a sovereign decision of individual states, in accordance with national constitutions.¹¹⁶ Apart from contributing to the common defence, in accordance with Article 5 of the Washington Treaty and Article V of the modified Brussels Treaty respectively, military units under WEU authority could also be employed for humanitarian and rescue tasks, and peacekeeping. Regarding the exact equipment and personnel, WEU members would be supplying for missions, it would be unrealistic, as Admiral Bathurst¹¹⁷ contends, for all WEU nations to provide forces for all operations. Much obviously depends upon the nature of the crisis: out of those nations immediately interested - or affected by it - one will probably emerge as the "lead nation".

Regarding command arrangements, the "lead nation" will provide the majority of forces, and will also be asked to provide a Joint HQ, Joint Commander and Theatre Joint Force Commander. This is a logical proposal, and also demonstrates the merits of positive integration. In effect, existing national command structures will be employed in a WEU operation, and countries will be invited to nominate facilities which could be made available. Because the number of suitable HQs is limited, it makes sense to declare them early. Britain has already taken the initiative, by proposing Northwood and High Wycombe as possible joint HQs for WEU operations. Just as the MNCs report to NATO HQ in Brussels, so too will the joint WEU Commander report to the WEU Permanent Council in Brussels. At this juncture, it is important to recognize that proposals for operational and enhanced roles are very much in their embryonic stages, and that too much should not be expected too soon.

The WEU's Planning Cell

The Petersberg Declaration contains the Council of Ministers' agreement on the terms of reference for the WEU's Planning Cell.¹¹⁸ It will be responsible for preparing contingency plans for the employment of forces under WEU auspices, preparing recommendations for the necessary C³ arrangements, and keeping an updated list of units and combinations of units which might be allocated to the WEU for specific operations.¹¹⁹ Regarding possible forces answerable to the WEU, it is worthwhile noting, as Lt. General M. Caltabiano highlights,¹²⁰ that some multinational units already exist, such as the United Kingdom-Netherlands Amphibious Force (UK/NL AF), and the Franco-German Eurocorps, which could all be deployed under WEU authority. A major Cell priority area is the preparation of rules of engagement (ROE) for use in WEU military operations. At this embryonic planning stage, it is important that commonality with NATO ROE is achieved, in order to avoid the real dangers of ambiguity and duplicatory effort. The WEU's strenuous efforts to achieve this commonality would reduce the CoQ to a more bearable level. In the longer term, it is understood that the Cell will have a responsibility to formulate an exercise policy.¹²¹

Having moved to Brussels, new organizational structures are being developed to meet the requirements of the Maastricht and Petersberg Declarations. The Planning Cell's Brussels location should help to ensure that there is the necessary degree of transparency with the NATO Military Staffs. From a TQM perspective, it is important that there is appropriate customer-interfacing between the institutions, and that each has its own niche

in which to operate. The CoQ concept reinforces the view that WEU tasks should augment, and not duplicate what is already being executed by NATO. It is clear that complementarity with NATO must be maintained, and that there has to be close consultation and co-ordination with NATO at both the political and military level. It is imperative that initiatives minimize - and preferably avoid altogether - the creation of separate structures or command arrangements which, instead of increasing the organization's efficacy - and enhancing European security - only serve to duplicate the efforts of existing players, and contribute to a high CoQ due to ambiguity and duplication.

WEU and the Military-Operational dimension

Since 1987, WEU activities have gradually taken on an operational dimension. The WEU played an important role in "concerting" European naval efforts in the Gulf in 1987-88.¹²² In the Gulf Crisis, 1990-91, the organization played a more substantive co-ordinating role in the organization of several aspects of the member-state's operations. In both Gulf missions, as Willem van Eekelen argues, the WEU demonstrated:

its ability to act as an effective European forum for political concertation and practical co-operation in crisis situations.¹²³

Indeed, Article VIII of the modified Brussels Treaty calls upon the WEU Council to consult with regard to any situation which may constitute a threat to peace or to economic stability 'in whatever area this threat should arise'.¹²⁴ The WEU's competence thus provides a framework for concerted action by Europeans and ad hoc co-operation between European and North American nations.

Since June 1991, the WEU has monitored closely the deteriorating Balkans crisis. Member-states contributed to the framing and eventual implementation of UN Security Council resolutions, particularly with regard to the enforcement of economic sanctions and naval embargo against Serbia/Montenegro.¹²⁵ Members deployed naval units in the Adriatic, as part of a parallel operation with NATO. However, the existence of two separate patrols highlighted the ambiguous situation we have regarding the various institutions, all jockeying for new responsibilities and areas of competency. The French promoted the WEU strongly, managing to collect warships from Italy, Portugal and Spain

to join them in WEU patrols, operating separately from NATO in the Adriatic, and reporting to a different commander.¹²⁶ It was soon realized that this was exactly the wrong way to utilize the WEU, and on 15 June 1993, WEU and NATO forces were integrated into a common force that has worked successfully since. Perhaps the fundamental reason for the initial ambiguity was the confusion surrounding whether or not the Adriatic was in NATO's area or OOA (and thus a WEU operation). Since NATO has subsequently re-defined its role, the parameters of WEU-NATO co-operation have become clearer. The initial ambiguity surrounding the WEU's role illustrates one of the problems of TQM: it can mean "all things to all men".

WEU's Satellite Data Interpretation Centre

Following the Gulf War, the WEU Assembly highlighted the importance of satellite technology, and recommended to the Council that it urgently establish a WEU centre for satellite data interpretation, as a first step towards setting up a European observation satellite agency.¹²⁷ The role of intelligence in the Gulf conflict demonstrated the value of a European independent satellite observation system.¹²⁸ Apart from crisis surveillance, such a system could contribute to arms control verification and environmental monitoring. The WEU has now established an experimental satellite data centre in Torrejon, Spain. At a cost of some thirty million ECU, this is the largest operational task of its type undertaken by the WEU. The WEU has already completed the first stage of a study of an autonomous Euro-intelligence satellite system for treaty verification and crisis management. It is understood that this system could begin to be operational by the year 2000, at a cost of \$3.8 billion.¹²⁹

3.5 Independent European Programme Group

This organization is fundamentally concerned with fostering and co-ordinating defence industrial co-operation, and does not have a military-operational dimension as such.

CONCLUSION

In order to confront effectively the multi-dimensional problems plaguing post-Cold War Europe today, it is arguable that future peace and security will increasingly depend

upon a framework of interlocking - not interlocking - institutions, that complement each other. The above analysis has highlighted that it is NATO which is best-equipped to deal with military-related matters, benefitting from an agreed mission statement, appropriate internal machinery and procedures for conducting a security function, and well-established internal and external customer-networks. If the EC is striving for a solo-Euro defence identity, it is attempting commercial suicide: entering a defence market - already containing players with the relevant experience and expertise - for which it is incapable of providing a quality service itself. Its deficiencies have been highlighted throughout this chapter.

Maastricht has not removed the cloud of ambiguity and confusion hanging over Europe's existing security architecture. Important questions still remain unanswered. In fact some of them have never been properly addressed: where does security policy and defence policy begin? Can foreign policy, security policy and defence policy realistically be treated as three distinct entities, since that would appear to be what Articles J.4.1., 2. and 3. of the Treaty collectively say? Furthermore, regarding the WEU's future role - notwithstanding its important institutional "bridging" function - it is important to recognize, as Sir John Killick¹³⁰ highlights, that there is no purely military need for it: whilst it is true that the WEU lent its name to a minesweeper force in the Gulf, that force could just as well have been assembled by its European contributors working ad hoc within NATO HQ.¹³¹ The WEU's best contribution to European security would be to stand between NATO and the EU, as a link between them, giving full weight to the policies of both. Neither it nor the EC/EU should attempt to usurp NATO. The EC has a distinctive area of competency - a purpose or mission centred mainly on economic security - and NATO has a military-operational function, in addition to its political-diplomatic manoeuvrings. If NATO and the EC do remain within the realms in which they were originally designed to function, then, as Alan Lee Williams argues, "there will be no reason to fear the WEU performing a middling role between the two."¹³²

Throughout this chapter, the TQM analysis of institutional actions has highlighted the importance of institutions only attempting to provide services in areas in which they were originally designed to operate, and in which they have the competency to perform. As TQM demonstrates - via the CoQ vehicle - without the appropriate infrastructure and mechanisms, the institution's ability to produce a quality output will substantially be weakened, and it will be contributing to the organization's overall CoQ, in terms of

higher external failure costs reaching the customers. Furthermore, within the EC, the absence of shared values - the lack of a common mission statement - and a proven inability to formulate a common approach to crisis situations, all reduces this organization's ability to produce a quality output. Consequently, the most logical conclusion to be drawn from this analysis is that NATO is the best-equipped security organization, both militarily and politically, to confront the risks ahead, with the WEU closely-aligned to it - which can also act in OOA crises - and that the EC should be focusing on the political-economic aspects of security. The most acceptable arrangement would be one of interlocking complementarity, and not rival institutional, interblocking and confrontation.

CHAPTER FIVE ENDNOTES

1. Andre Beaufre, **STRATEGY FOR TOMMORROW**, (New York: Crane, Rusak, 1974), p.71; as cited in Richmond Lloyd, *"Force Planning for the 1990s"*, in Force Planning Faculty, Naval War College (ed), **FUNDAMENTALS OF FORCE PLANNING, VOLUME 1: CONCEPTS**, Newport, R.I.: Naval War College Press, 1990), p.105.
2. In the post-Cold War era, there has been extensive use of the architectural metaphors: the new security architecture often described as "interlocking". Architectural metaphors are perhaps of limited use, since before considering which institution should perform which function, there is a prior matter to be resolved, that of considering what needs to be done. This is highlighted in a recent discussion document by the London Security Working Group, **EUROPEAN SECURITY**, (London: Text published by The Atlantic Council of the United Kingdom, Text 109, November 1992), p.3.
3. Richmond Lloyd and Dino Lorenzi, *"A Framework for Choosing Defense Forces"*, **NAVAL WAR COLLEGE REVIEW**, January/February 1981, p.46; as cited in Henry Bartlett, *"Approaches to Force Planning"*, in Force Planning Faculty, Naval War College (ed), **FUNDAMENTALS OF FORCE PLANNING, VOLUME 1: CONCEPTS**, op.cit.p.443.
4. Figure 1. is based upon Henry Bartlett, *ibid*.pp.443-451. For additional information on force planning and defence, the standard texts are Force Planning Faculty, Naval War College (ed), **FUNDAMENTALS OF FORCE PLANNING**, 3 vols. (to date), (Newport, R.I.: Naval War College Press, 1990-1993).
5. The INF Treaty was signed in Washington, USA, on 8 December 1987.
6. See Jane M.O. Sharp, *"Conventional arms control in Europe"*, SIPRI, **SIPRI YEARBOOK 1990: WORLD ARMAMENTS AND DISARMAMENT**, (Oxford: Oxford University Press, 1990), p.478.
7. See Jane M.O. Sharp, *"Conventional arms control in Europe"*, SIPRI, **SIPRI YEARBOOK 1991: WORLD ARMAMENTS AND DISARMAMENT**, (Oxford: Oxford University Press, 1991), p.417.
8. See *"NATO offers concessions on aircraft and tanks"*, **INTERNATIONAL HERALD TRIBUNE**, 9 February 1990; as highlighted in Jane M.O. Sharp, **SIPRI YEARBOOK 1990**, op.cit.p.499.
9. See *"US drafts compromise to speed East-West accord on military planes"*, **INTERNATIONAL HEARLD TRIBUNE**, 1 February 1990; as highlighted in Jane M.O. Sharp, *ibid*.p.500.
10. Information on the individual CFE negotiating rounds is provided in Jane M.O. Sharp, **SIPRI YEARBOOK 1990**, op.cit.pp.480-500.
11. As highlighted in Jane M.O. Sharp, **SIPRI YEARBOOK 1991**, op.cit.p.418.
12. Definitions were agreed on 17 October 1990; *ibid*.
13. See Jane M.O. Sharp, **SIPRI YEARBOOK 1990**, op.cit.p.500.
14. See Jane M.O. Sharp, **SIPRI YEARBOOK 1991**, op.cit.p.407.
15. For CFE Treaty purposes, the term "combat aircraft" is defined as: a fixed-wing variable geometry aircraft armed and equipped to engage targets by employing guided missile, unguided rockets, bombs, guns, cannons, or other weapons of destruction, as well as any model or version of such an aircraft which performs other military functions such as reconnaissance or electronic warfare; Treaty as cited in **SIPRI YEARBOOK 1991**, *ibid*.p.463. (NB. Primary trainer aircraft are excluded).
16. "Attack helicopters" are defined as: combat helicopters equipped to employ anti-armour, air-to-ground, or air-to-air guided weapons and equipped with an integrated fire control and aiming for these weapons. AHs include the following: "specialized attack helicopters", which are AHs designed primarily to employ guided weapons; and "multi-purpose attack helicopters", which are AHs designed to perform multiple military functions and equipped to employ guided weapons; *ibid*.
17. Protocol on Helicopter Recategorization; see **SIPRI YEARBOOK 1991**, op.cit.p.410.
18. The Mil Mi-24 "Hind" is a heavily-armed assault and gunship helicopter; for more information on specifications and role, see Derek Wood, **JANE'S WORLD AIRCRAFT RECOGNITION HANDBOOK**, (Surrey: Jane's Information Group; 1992, 5th ed.), p.583.
19. See K. Remme, R. Forsberg and R. Leavitt, "Update on helicopters", Vienna Fax, No.22, 10 September 1990; as cited in Jane M.O. Sharp, **SIPRI YEARBOOK 1991**, op.cit.p.418.

20. SIPRI YEARBOOK 1991, op.cit.p.422.
21. *ibid.*p.410.
22. *ibid.*p.426. For additional information on "cascading", see Barbara Starr, "Winners and losers in the NATO CFE share out", JANE'S DEFENCE WEEKLY, Vol.16, No.1, 6 July 1991, p.18.
23. The MiG-25 "Foxbat" is a high-performance interceptor aircraft, capable of speeds of between Mach 2.5 and 3.0. The MiG-25U "Foxbat C" is a two-seat trainer aircraft; for additional information, see Derek Wood, op.cit.p.120.
24. See CIS, "Agreement on the Principles and Procedures of Implementation of the Treaty on Conventional Armed Forces in Europe", [The Tashkent Document], unofficial translation; as cited in SIPRI, SIPRI YEARBOOK 1993: WORLD ARMAMENTS AND DISARMAMENT, (Oxford: Oxford University Press, 1993), Appendix C, pp.671-677.
25. SIPRI YEARBOOK 1993, *ibid.*p.598.
26. *ibid.*p.591.
27. Additional information can be found in NATO, THE NORTH ATLANTIC TREATY ORGANIZATION, FACTS AND FIGURES, (Brussels: NATO Information Service, 1989, 11th ed.).
28. As discussed in Chapter One.
29. It is important to recognize as Lt.Col. Jeffrey McCausland highlights, that the lessons learned from the Gulf War must be seen as insights rather than immutable rules. "'Lessons learned' is an over-simplification suggesting that the study of military conflict is simply a matter of 'data reduction'. This overlooks 'the fog of war' that surrounds every conflict and those factors unique to any war." See Jeffrey McCausland, The Gulf Conflict: A Military Analysis, ADELPHI PAPER 282, (London: Brassey's for the IISS, 1993), p.4. This paper provides an excellent examination of the military aspects of the Gulf War.
30. Jacquelyn Davis, "Reinforcing Allied Military Capabilities in a Global-Alliance Strategy", in Richard Shultz, Jr. and Robert Pfaltzgraff, Jr. (eds), THE FUTURE OF AIR POWER IN THE AFTERMATH OF THE GULF WAR, (Maxwell Air Force Base, Alabama: Air University Press, 1992), p.196.
31. *ibid.*
32. *ibid.*p.203.
33. See Jeffrey McCausland, op.cit.p.31.
34. Michael Smith, "RAF 'Locked' into European Tactics", THE DAILY TELEGRAPH, 9 March 1991.
35. As highlighted in Assembly of Western European Union, Weaponry after the Gulf War - new equipment requirements for restructured armed forces, WEU Document 1272, 14 May 1991, (Paris: WEU), p.15.
36. The USA's CRAF is a system established by law which requires civilian airlines to make available a total of 506 cargo and passenger aircraft when called upon by the DoD in time of crisis or war. These aircraft made a significant contribution to the allied coalition's excellent performance in the Gulf, and were the primary means of moving troops.
37. US News and World Report, "TRIUMPH WITHOUT VICTORY", pp.112-146; as cited in Jeffrey McCausland, op.cit.pp.11-12.
38. As highlighted in Assembly of Western European Union, Weaponry after the Gulf War, op.cit.p.15.
39. *ibid.*p.16.
40. *ibid.*
41. See Jeffrey McCausland, op.cit.p.59.
42. Capt Mark Brown, "British Totally Sold on GPS", SPACE TRACE: THE AIR FORCE COMMAND MAGAZINE, April 1991, p.7; as cited in Lt. Gen Thomas Moorman, Jr., "Space: A New Strategic Frontier", in Richard Shultz, Jr. and Robert Pfaltzgraf, Jr. (eds), THE FUTURE OF AIR POWER IN THE AFTERMATH OF THE GULF WAR, op.cit.p.242.
43. See Assembly of Western European Union, Weaponry after the Gulf War, op.cit.pp.16-17.
44. *ibid.*p.17.
45. *ibid.*p.16.

46. See Jeffrey McCausland, *op.cit.* p.59.
47. Douglas Stuart, "NATO's future as a pan-European security institution", *NATO REVIEW*, Vol.41, No.4, August 1993, pp.16-17.
48. See North Atlantic Treaty Organization, "The Alliance's New Strategic Concept", NATO Press Communiqué, S-1 (91) 85, 7 November 1991, p.14, (para 53).
49. *ibid.* p.15, (para 54).
50. See General Vigleik Eide, "The military dimension in the transformed Alliance", *NATO REVIEW*, Vol.40, No.4, August 1992, p.23.
51. *ibid.* p.22.
52. For additional information on the British Army's role, specifically regarding the ARRC, see the following: Cm 1595, **OPTIONS FOR CHANGE: ARMY - REVIEW OF THE WHITE PAPER, BRITAIN'S ARMY FOR THE 90s**, Third Report From The Defence Committee, HC 45, Session 1991-2, (London: HMSO, 1992); Cm 306, **BRITAIN'S ARMY FOR THE 90s: COMMITMENTS AND RESOURCES**, Second Report From The Defence Committee, Session 1992-3, (London: HMSO, 1993); Cm 2270, **DEFENDING OUR FUTURE: STATEMENT ON THE DEFENCE ESTIMATES 1993**, (London: HMSO, 1993); Colin McInnes, **THE BRITISH ARMY AND NATO'S RAPID REACTION CORPS**, (London: Brassey's for The Centre For Defence Studies, No.15, March 1993); Cm 2550, **STATEMENT ON THE DEFENCE ESTIMATES 1994**, (London: HMSO, 1994); and Major General S. Lytle, "British Army Aviation In The 1990s", *RUSI JOURNAL*, Vol.139, No.2, April 1994, pp.28-31.
53. See Ian Kemp, "Reaction force HQ activated", *JANE'S DEFENCE WEEKLY*, Vol.18, No.15, 10 October 1992, p.11; and also see Ian Kemp, "Up the road from 'Options' ", (JDW Special Report: The British Army), *JANE'S DEFENCE WEEKLY*, Vol.20, No.10, 4 September 1993, p.43. As of 1 April 1994, HQ AARC is relocated at the Rheindahlen Military Complex; see Major-General Pieter Huysman, "Airmobility in NATO: The New MND (C)", *RUSI JOURNAL*, Vol.139, No.2, April 1994, pp.45-50.
54. See Ian Kemp, "Up the road from 'Options'", *ibid.* p.44.
55. See Chapter One.
56. Ian Kemp, "Up the road from 'Options'", *op.cit.* p.45.
57. See North Atlantic Treaty Organization, Defence Planning Committee Communiqué, 12-13 December 1991, (para 8); as cited in *NATO REVIEW*, Vol.40, No.1, February 1992, p.31.
58. For additional information on EUROCORPS, see Alan Lee Williams, **THE FRANCO-GERMAN CORPS**, (London: The Atlantic Council of the United Kingdom, Text 088, August 1992), pp.1-4.
59. Established in 1987, and inaugurated in 1990, this Brigade represented a small-scale attempt to create a truly integrated military force. However, it was plagued by difficulties arising out of marked national differences.
60. This is based largely upon material in Alan Lee Williams, *op.cit.* p.3.
61. As highlighted by Douglas Stuart, *op.cit.* p.15.
62. For Article 6 text, see North Atlantic Treaty Organization, **NATO HANDBOOK**, (Brussels: NATO Office of Information and Press, 1992), p.14.
63. As highlighted by Douglas Stuart, *op.cit.* p.15.
64. *ibid.* p.16.
65. *ibid.*
66. See North Atlantic Treaty Organization, **A New Chapter In The History Of The North Atlantic Alliance**, (Brussels: NATO Office of Information and Press, no date); and also see Johan Jorgen Holst, "Pursuing a durable peace in the aftermath of the Cold War", *NATO REVIEW*, Vol.40, No.4, August 1992, p.11.
67. As quoted in Ian Kemp, "Reaction force HQ activated", *op.cit.* p.11.
68. Johan Jorgen Holst, *op.cit.* p.11.
69. John Kriendler, "NATO's changing role - opportunities and constraints for peacekeeping", *NATO REVIEW*, Vol.41, No.3, June 1993, pp.21-22.
70. *ibid.* p.22.

71. *ibid.*
72. Douglas Stuart, *op.cit.*p.18.
73. As quoted in George Graham, "*Quest for a strategy*", **THE FINANCIAL TIMES**, 31 August 1993, p.14.
74. Douglas Stuart, *op.cit.*p.18.
75. George Graham, *op.cit.*
76. In military, political and economic security terms, the security of NATO members and those countries of the ex-WTO are inextricably linked. Whilst a military threat from the former USSR is most unlikely in the present climate, it is important to recognize the security dangers presented by instability and crises in these areas. The prospect of a military threat from a resurgent Russia - and the impact of crises in Central Europe - is discussed in an excellent article by Charles Glaser, which examines these scenarios in the context of institutional capacities to respond effectively to them; see Charles L. Glaser, "*Why NATO is Still Best: Future Security Arrangements for Europe*", **INTERNATIONAL SECURITY**, Vol.18, No.1, Summer 1993, pp.5-50.
77. For the timetable of events, see North Atlantic Treaty Organization, **A New Chapter In The History Of The North Atlantic Alliance**, *op.cit.*
78. For information pertaining to NACC and economic matters, see Daniel George, "*NATO's economic cooperation with NACC partners*", **NATO REVIEW**, Vol.41, No.4, August 1993, pp.19-22.
79. See Douglas Stuart, *op.cit.*p.17.
80. See Marc Rogers, "*NATO Summit produces a mix of compromise and coercion*", **JANE'S DEFENCE WEEKLY**, Vol.21, No.3, 22 January 1994, p.13.
81. See North Atlantic Treaty Organization, "*CEAC's 80th Plenary Session: 26-27 September 1991*", PR (91) 67, 27 September 1991, (Brussels: NATO Press Service).
82. Cited in North Atlantic Treaty Organization, "*Committee for European Airspace Co-ordination*", PR (91) 83, 28 October 1991, (Brussels: NATO Press Service), p.1.
83. *ibid.*p.2.
84. Common funding allows the MNCs to determine Alliance priorities and to balance regional needs, irrespective of host nation economic constraints.
85. The cost of the infrastructure commonly-funded by NATO members throughout this period exceeds \$20 billion; as highlighted by Herpert van Foreest, "*Shared civil/military usage of NATO infrastructure*", **NATO REVIEW**, Vol.41, No.4, August 1993, p.23.
86. This is not a new approach: a recent example of shared usage is that of the Karup airfield in Denmark, where a consortium of Danish and international companies have leased NATO infrastructure which is surplus to the immediate requirements of the Royal Danish Air Force; for additional information, see Herpert van Foreest, *ibid.*p.24.
87. For an interesting article on this issue, see Julian Moxon, "*NATO to study airspace shareout*", **FLIGHT INTERNATIONAL**, Vol.139, No.4265, 1-7 May 1991, p.11.
88. Herpert van Foreest, *op.cit.*p.24.
89. *ibid.*
90. The Fouchet Plan was put forward by President de Gaulle in the 1960s with the aim of establishing a political organization of Europe on an intergovernmental basis. The Plan failed because France's partners felt it would jeopardize EC integrated institutions, weaken NATO, and subject the Community to French domination; see Catherine Guicherd, **A EUROPEAN DEFENSE IDENTITY: CHALLENGE AND OPPORTUNITY FOR NATO**, (Congressional Research Service: CRS Report, 12 June 1991), p.76.
91. The SEA came into effect in July 1987. Title III on Provisions on European co-operation in the sphere of foreign policy constituted an important landmark in the evolution of the EC's role in security matters; see Juliet Lodge, **EC SECURITY POLICY TOWARDS 2000: RHETORIC OR REALITY ?**, (University of Hull: ECRU, 1991), p.2.
92. EPC was established in 1970, when the six Community member-states - Belgium, France, Italy, Luxembourg, the Netherlands and West Germany - initiated a mechanism designed to co-ordinate, and when possible to unify, their foreign policy positions.
93. See Emil J. Kirchner, "*Has The Single European Act Opened The Door For A European Security Policy ?*", **JOURNAL OF EUROPEAN INTEGRATION**, Vol.XIII, No.1, Autumn 1989, p.3.

94. See Anand Menon, Anthony Forster and William Wallace, *"A common European defence ?"*, SURVIVAL, Vol.34, No.3, Autumn 1992, p.104.
95. Whilst the EC itself may regard it as a logical extension of its activities, from a TQM perspective, it is important to ascertain whether this function is in the customers' interests.
96. See Article B, Title One of Treaty on European Union. (Brussels: CEC, 1992), p.7.
97. Anthony Hartley, *"Maastricht's problematical future"*, THE WORLD TODAY, Vol.48, No.10, October 1992, p.182.
98. Anand Menon et al, op.cit.p.99.
99. John Major's speech to the UK Presidency Conference; as cited in *"Good for Britain and good for Europe"*, THE FINANCIAL TIMES, 8 September 1992, p.2.
100. J.A.C. Lewis, *"Old divisions work against Europe's quest for unity"*, JANE'S DEFENCE WEEKLY, Vol.18, No.17, 24 October 1992, p.24.
101. *ibid.*
102. For an interesting article on the significance of public opinion, and international opinion and foreign policy-making, see Kjell Goldmann, *"International Opinion and World Politics: the case of the INF Treaty"*, POLITICAL STUDIES, Vol.XLI, No.1, March 1993, pp.41-56.
103. See Eurobarometer Opinion Survey; as cited in Commission of the European Communities, EUROPE: WORLD PARTNER - THE EXTERNAL RELATIONS OF THE EUROPEAN COMMUNITY, (Luxembourg: Office for Official Publications of the European Communities, 1991), pp.6-8.
104. For additional information, see William C. Cromwell, op.cit.p.12; and also see Willem van Eckelen, WEU ON THE WAY BACK TO BRUSSELS, RIIA speech at Chatham House, 22 September 1992, (London: The Atlantic Council of the United Kingdom, Text 082, 1992), pp.2-3.
105. David Garnham, THE POLITICS OF EUROPEAN DEFENSE CO-OPERATION, (Cambridge, Massachusetts: Ballinger Publishing Company, 1988), p.116.
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109. Christopher Coker, BRITISH DEFENCE POLICY IN THE 1990s: A GUIDE TO THE DEFENCE DEBATE, (London: Brassey's Defence Publishers, 1987), p.78.
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112. For an interesting assessment of the WEU's position vis-a-vis NATO and the EC, see Julia Myers, THE WESTERN EUROPEAN UNION: PILLAR OF NATO OR DEFENCE ARM OF THE EC ?, No.16, (London: Brassey's for The Centre For Defence Studies, March 1993).
113. See WEU, Petersberg Declaration, 19 June 1992, (London: The Atlantic Council of the United Kingdom, Text 067, 1992), pp.1-8.
114. *ibid.p.3.*
115. *ibid.p.5.*
116. *ibid.*
117. Admiral Benjamin Bathurst, *"Western European Union: A Military Perspective"*, RUSI JOURNAL, Vol.137, No.5, October 1992, p.10.
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120. Lieutenant General M. Caltabiano, *"The Military Dimension Of The WEU"*, RUSI JOURNAL, Vol.138, No.3,

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121. *ibid.* p.9.
122. See Eric Grove, *MARITIME STRATEGY AND EUROPEAN SECURITY*, (Brassey's, 1990).
123. Willem van Eekelen, *op.cit.* p.5.
124. As cited in van Eekelen, *ibid.*
125. As discussed in *ibid.*
126. As highlighted in "*Breaking Free: A Survey of Defence in the 21st Century*", *THE ECONOMIST*, (Supplement), Vol.324, No.7775, 5-11 September 1992, pp.22-23. However, there have been recent changes to these arrangements: with regard to Sharp Guard operations in the Adriatic, the two organizations have now decided to reinforce their co-operation by forming a single command structure for their participating vessels, under the joint direction of the Councils of both institutions; see NAC Communique, 10 June 1993 (para 9), as cited in *NATO REVIEW*, Vol.41, No.3, June 1993, p.32.
127. See Assembly of Western European Union, *Weaponry after the Gulf War*, *op.cit.* p.2.
128. Willem van Eekelen, *op.cit.* p.6.
129. See G. de Briganti, "*WEU's satellite system may fly in 2000*", *DEFENSE NEWS*, 1-7 February 1993, p.4.
130. Sir John Killick, *MAASTRICHT - FOREIGN & SECURITY POLICY*, (London: The Atlantic Council of the United Kingdom, Text 108, February 1993), p.4.
131. This has in fact occurred: in the 1970s, Belgium, France and the USA mounted an operation in Kolwezi; as highlighted by Sir John Killick, *ibid.* p.5.
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Part III

C A S E - S T U D Y

CHAPTER SIX

THE BRITISH AIRCRAFT INDUSTRY

In both its civil and military roles, nations...have come to rely on aerospace and the services it provides. National defence requires adequate air power; international business and mass tourism could not function without civil aviation and space-based telecommunications.¹

INTRODUCTION

The preceding chapters have highlighted that the aircraft industry faces a period of considerable chaos and change. Post-Cold War developments and institutional/national initiatives will continue to affect its size, shape, strategic orientation and success, but the industry nonetheless has a future for it remains an integral part of civilian and military life. This chapter assesses the impact of institutional and national policies on the British aircraft industry, focusing on BAe and WHL. In addition to examining the effects of the institutional output in each of the policy areas discussed above, this section also assesses major industrial issues affecting defence companies in the post-Cold War environment.

1. THE IMPACT OF PROCUREMENT AND REGULATORY MECHANISMS ON THE BRITISH AIRCRAFT INDUSTRY: SUSTAINING OR SLAYING THE DRAGON ?

1.1 Introduction

As Chapter Two illustrated, most of the procurement and regulatory mechanisms in this period have emanated from the EC, but it is important to recognize that both NATO and the modified WEU-(IEPG) have also been considering proposals which affect the manner in which defence industrial business is executed. Additionally, national regulatory mechanisms cannot be neglected, since they have a major impact on the day-to-day operations of business.

1.2 National Procurement: "Off-the-shelf" Implications

The MoD's continuous quest for "value for money" coupled with its desire for competition in all stages of procurement could result in a policy of more "off-the-shelf" weapons purchases. These would not necessarily be British. It is important to recognize that this policy does have an impact upon other policy areas. The current debate on the Hercules replacement aircraft (discussed in section 5) illustrates this point, since the MoD's preference for "off-the-shelf" equipment of its military aircraft has major implications for national competition policy. Genuine competition, as Keith Hartley and Nick Hooper² highlight, requires free entry into the market. A preference for an "off-the-shelf" purchase automatically excludes other options: in the case of the military transport aircraft, the FLA would be excluded. Britain would thus be restricted in its choices and consequently in its opportunities for obtaining good value for money. Although at the superficial level "off-the-shelf" procurement appears attractive, it is important to recognize, that such a policy is not "cost-free": Britain will not avoid contributing towards R&D costs, since it will indirectly pay for R&D through higher prices for spares or through prices paid on follow-on orders.³

1.3 Armaments Planning

Regarding Alliance initiatives, if the CAPS does eventually lead to a conventional armaments plan, it will offer benefits to industry: it offers NATO the means of replacing a mainly random approach to armaments co-operation with a more disciplined process, thus facilitating opportunities for dialogue between the customers in the procurement network. Through its emphasis on priority military needs, and focus on measures to reduce duplication of effort, companies will have a clearer image of the environment in which they operate.

1.4 Rationalizing Arms Procurement: A European Agency ?

As Chapter Two discussed, the idea of rationalizing arms procurement in Europe through a single agency is back on the institutional agenda. As highlighted earlier, important questions arise about the exact composition of the agency and its terms of reference. A number of hurdles, including the national sovereignty issue and agreement on mechanisms to deal with technical problems, also have to be tackled successfully before an agency could function effectively. In addition, it would not be sensible to have a new agency duplicating existing national or intergovernmental arrangements. Given the fact that the creation of such an agency - if it ever materializes - depends largely on the

final institutional arrangements of the EC and WEU-(IEPG), it will be some time before any decisions are taken on establishing such an agency. This contributes further to the uncertainty afflicting defence contractors, since creating a European Procurement Agency or European Defence Union would have major ramifications for defence business. Until agreement can be reached on the objective of a Euro agency - value for money or support for industrial policies which strengthen the industrial base - an agency could miss both goals caught in a wasteland of compromise.

1.5 The "Single Market": Too Many Regulations ?

Whilst, at a superficial level, EC efforts to harmonize existing regulatory frameworks, approximate standards and moves towards more open procurement procedures are to be welcomed, such measures can, of course, have damaging effects if they are structurally flawed or incorrectly implemented so that they impede day-to-day business operations. There are fears within the defence industry in Britain that the "political" nature of EC regulations will have detrimental effects for companies.⁴ Some measures will have positive implications: efforts to harmonize the legal framework for companies should prove to be beneficial if they do succeed in removing the fiscal hurdles to the creation of European firms. This is particularly relevant to the defence industries in Europe, since "defence" is a trans-national business and also because structural changes within the industry do indicate that "Euro-concentration" within certain industrial sectors could lead to the formation of Eurocompanies. It is, however, within the wider domain of EC competition policy that arguably the greatest obstacle to defence companies exists. Over the years the EC's jurisdiction over mergers has not always produced smooth results.⁵ Aerospace analysts⁶ have highlighted the danger of the Merger Control Regulation (MCR) being blindly applied to aerospace manufacturing, since it could prevent the formation of large European trans-national consortia, which are needed in order to compete with American firms. Although mergers may be dealt with on a case-by-case basis, there is a danger, as highlighted earlier in Chapter Two, that the vetting procedure could become a tool in the hands of Brussels Eurocrats to shape the future aerospace industry.

It should also be noted that the drive towards "internal competition", as promoted by the EC, is not necessarily synonymous with an industry that is globally competitive.⁷ It is arguable that the ability of some European firms to compete in the global marketplace may be weakened by Community measures.

2. THE IMPACT OF RESEARCH & DEVELOPMENT AND TECHNOLOGICAL INITIATIVES ON THE BRITISH AIRCRAFT INDUSTRY: (UNDER)INVESTING FOR TOMORROW ?

2.1 Introduction

Chapter Three highlighted that an internationalization and institutionalization was continuing to take place within the technology domain. However, as the chapter also demonstrated, national developments are still significant since the locus of action has not shifted totally from national players to international entities. British companies are still heavily influenced by developments at the national level, particularly in the R&D domain since there is increasingly a need to work more closely with the national research agency - the DRA.

2.2 Reduced Government Investment and Increased Defence Industrial Investment

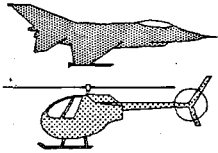
As budgetary pressures on Her Majesty's Government (HMG) continue to drive a reduction of national support for military R&D, British aircraft companies will have to shoulder a bigger share of the costs and risks. Due to spiralling R&D costs some firms may be unable to invest in and/or pursue specific technological developments. It is arguable that in the long term, a high CoQ will be paid, since the nation's defence industrial capability could be undermined. There is no guarantee that certain valuable military technologies will emerge from civilian R&D. It is therefore increasingly likely that British companies will look to collaborative teaming arrangements, in which they can pool their resources and manage the risks. British companies are already participating in a number of collaborative European and Trans-Atlantic projects: Figure 20. overleaf provides details of selected collaborative air systems programmes involving British companies. Whereas in the past, the civil aerospace sector predominantly benefitted from advances in the military sector, it now seems likely that the converse will be true.

2.3 Technology Demonstrators

The preceding examination highlights the need for industry and government to share a long-term commitment to technology, if industry is to retain the technological capacity to deliver sophisticated high-tech equipment when a government requests.⁸ The development of the Eurofighter aircraft - notwithstanding the political problems of 1992-1993 - is an excellent example of what can be achieved when there is a strong

Figure 20.

Selected Collaborative Air Systems Programmes Involving the United Kingdom at 01/04/92

 AIR SYSTEMS PROGRAMME	COUNTRY				
	FRANCE	GERMANY	ITALY	SPAIN	USA
IN PRODUCTION OR SERVICE					
Jaguar aircraft	▲				
Lynx helicopter	▲				
Puma helicopter	▲				
Gazelle helicopter	▲				
Tornado aircraft		▲	▲		
Harrier AV-8B/GR5 aircraft					▲
IN DEVELOPMENT OR EARLIER STUDY PHASES					
Airborne radar demonstration system	▲				▲
European Fighter Aircraft (now Eurofighter 2000)		▲	▲	▲	
EH101 helicopter			▲		
RTM322 helicopter engine	▲				
Allied Standard Avionics Architecture Initiative	▲	▲			▲

SOURCE: STATEMENT ON THE DEFENCE ESTIMATES 1992, p.60.

commitment to advanced technology projects. As Robert Sheldon, MP, Chairman of the House of Commons Public Accounts Committee (PAC), stated in the PAC report:

Technology Demonstrator Programmes in support of EFA cost MoD about £190 million but saved £850 million and reduced EFA development by one year. The useful lessons learnt from this spending should be applied to future programmes.⁹

Since 1990, the British aircraft industry has repeatedly called for technology demonstrator programmes, including a baseline 21st century combat aircraft demonstrator.¹⁰ From interviews conducted with senior industrial and institutional figures, it is apparent that technology demonstrator programmes are viewed as an essential part of future defence industrial development.¹¹

In the short-medium term, it is unlikely that expenditure on military aerospace R&D and technology will equal or exceed the peak spending levels of the Cold War era. However, through its support for technology demonstrators and civil research via the CARAD vehicle, HMG has signalled to industry its acknowledgement that some government assistance to R&D is necessary, if industry is to deliver high-tech equipment. At the same time it has also communicated to industry that companies should take an increasing responsibility for R&D and technology investment. Given the fact that there will probably be opportunities for this technology to be commercially exploited, it is not so unreasonable.

2.4 Inappropriate EC Investment

From the analysis in Chapter Three it appears evident that a certain contradiction exists within the EC's R&D strategy: whilst a number of Community reports acknowledge deficiencies in specific R&D and technology sectors, EC money does not appear to have been targeted in the most appropriate sectors. Furthermore, although the EC recognizes the need for greater consistency between national and Community policy, the institution's *modus operandi* has not been adapted to facilitate this move. Additionally, the fact that the EC is still trying to employ traditional working practices to cope with today's very different problems, inevitably presents problems for aerospace companies, since commercial research requirements - juxtaposed with the speed of technological change - necessitates a more dynamic and fluid set of procedures. In

fairness to the EC, this has been recognized in a recent report,¹² but change is slow - too slow for industry operating in a fast-moving market-environment. An additional factor which has to be considered concerns the fact that today's aerospace industry is increasingly dependent on innovatory breakthroughs to sustain their market-share. Industry is not helped by the existence of major Community handicaps - preventing research policy responding fully to current technological challenges - such as the reduced effectiveness of research programmes resulting from the fact that more than two years is required for their adoption.¹³

2.5 NATO Specialist Studies Equals More Opportunities ?

As highlighted in Chapter Three a number of NATO agencies have competency in the R&D and technology areas, and have been pursuing a variety of initiatives which support a spectrum of technologies. From a British aviation perspective, the work of NIAG is of particular importance, since "UK Inc." is represented via relevant trade associations, thus providing industry with an input into the decision-making processes of the organization. NIAG is a very useful vehicle which British industry can utilize for influencing the developing institutional fora that affect their business. Furthermore, through their numerous Pre-Feasibility Studies, such as those for the Future Multi-Role Combat Aircraft, various technologies will be identified, many of which could present future commercial opportunities. The NATO commitment to aerospace technology, as epitomized by the support AGARD receives, is also of immense benefit to British companies, since through their studies into mobility, flexibility and verification technologies, new opportunities could emerge for British industrial participation.¹⁴

3. THE IMPACT OF AEROSPACE TRADE INITIATIVES ON THE BRITISH AIRCRAFT INDUSTRY: SECURING PANDORA'S ARMOURY ?

3.1 Introduction

This section assesses the effects of national and institutional initiatives on the aerospace trade, analyzing the implications for aircraft manufacturers in Britain. It focuses mainly on the impact of institutional regulatory mechanisms on defence aerospace exports, but also assesses efforts to alleviate trade friction in the civil aerospace sector.

3.2 The Danger of "Over-Regulation"

Regarding military equipment sales, there are pressures at the national and

institutional levels - following the Gulf War - to regulate the transfer of arms, so as to minimize the dangers of proliferation and the threat it poses to international peace and security. However, it is imperative that over-regulation is avoided since this could restrict the legitimate trade in defence equipment, and hence jeopardize a nation's right of self-defence if it cannot purchase equipment from overseas. British aircraft companies have not been adversely affected by measures to date. Regarding the UN's Register of Conventional Arms, provided that there is compliance from the widest possible industrial membership, no British companies should be at a disadvantage. With regard to NATO's code of conduct, an assessment can only be made after the transitional period expires, and the code properly implemented. However, as highlighted in Chapter Four, the code in its present form does not benefit European defence companies, through the continued "protection" which it directly affords to the USA's defence industrial base.¹⁵ Regarding EC defence trade manoeuvres, a major concern of British companies is the extent to which Community regulations will hamper legitimate business through increased bureaucratization, resulting in possible losses of sales where non-EC/overseas competitors are vying for contracts.¹⁶

3.3 Towards Greater Trade Reciprocity: Reducing the Two-Way Street Imbalance ?

As highlighted in Chapters Two and Four there is a significant imbalance in trade between the USA and NATO-Europe, favouring American sales. When assessing the "quality" impact of institutional trade initiatives upon British companies, it is necessary to consider the effect they will have on alleviating this trade imbalance. Regarding EC forays, it is important to firstly establish how any EC-regulated defence market will relate to the global market, and to agree on the model most likely to constitute EC behaviour. David Henderson¹⁷ has observed that a single regional EC market could mean two very different things: either a market based on common rules of competition for those inside it, but closed to those outside it; or one that is open to global multilateral competition on the same terms. Whilst the SEA points in the latter direction, it remains to be seen whatever the market will be in relation to military equipment.

Both the NATO and EC trade initiatives discussed above face a difficult mission ahead: that of breaking down the USA's "Fortress" mentality in the armaments sphere. The US market, as Francois Heisbourg¹⁸ observes continues to operate specific national rules which preclude large-scale co-operation with Alliance partners. "Black

programmes" - which represent about 50% of United States Air Force (USAF) procurement spending - are inaccessible even to NATO partners. Ordinary programmes are only occasionally open to non-US bidding. In contrast to the virtually 'closed' system in the USA, British requirements are genuinely open to all bids: the already cited British Attack Helicopter requirement demonstrates the openness, since it included strong bids from the Americans (independent or in co-operation with a British firm), and also one from South Africa. It is also important to recognize, as Heisbourg¹⁹ highlights, that the acquisition of defence firms in the USA remains extraordinarily difficult, whereas the USA enjoys a major share of arms procurement within NATO, and in several European countries - particularly Britain - has real rather than 'proxy' *entree* to the local defence industry.

Whilst the above is undoubtedly true, it should be acknowledged that British companies perform much better than their European partners in selling to the Americans. As highlighted in Chapter One, due to skilful strategic partnerships, BAe and the Westland Group, have enjoyed success in the USA. The importance of linking up with a US company and going-in under an American prime contractor cannot be over-stated: through collaborating with McDonnell Douglas on the T-45 Goshawk - acting as principal sub-contractor - BAe has penetrated the American market, and a Hawk variant will now be operated by the US Navy. The British company will build all of the airframe except for the forward fuselage. Successes in the American market do not always depend upon having an "American card" to play: this is demonstrated on the civil aircraft side by Westland Engineering, who were awarded the contract to manufacture engine-mounting pylons for Boeing's 747 aircraft.²⁰ In view of the fact that relations between the USA and the EC are very strained in the civil aircraft sector - as exemplified by Boeing-Airbus wrangling through GATT - this contract award by an American company is highly significant. Important messages for British aircraft companies can be drawn from the above examples: first, although the Americans overwhelmingly enjoy more success in Britain than British firms enjoy in North America, the situation is improving; second, British companies are well-placed to enter the USA's market through partnerships with American companies; third, particularly because of the (mis)perceptions of a "Fortress Europe", American companies are looking to British firms to help them secure European orders. There are opportunities for British companies to seize the trade initiative, and to secure vital work-shares in future projects and to maximize their export potential.

3.4 Export Credit

At the national level changes in export credit arrangements do not appear to have hampered British aircraft companies' exports. As highlighted in Chapter Four, following the privatization of ECGD's short term business to a Dutch company, concerns were expressed at the time as to whether foreign ownership of a trade insurer would jeopardize British companies' chances of competing overseas. From interviews conducted with a number of British aerospace industrialists,²¹ no problems have been experienced to date with the Dutch company. However, whilst changes in national arrangements have not affected companies in Britain, it is possible that developments at the institutional level could affect their business. The interest shown by the EC in 1993 to harmonize the credit re-insurance market could have a very positive effect if measures succeed in removing "hidden subsidies", but if they fail, British companies will continue to be at a disadvantage compared to their state-subsidized European rivals.

3.5 The Increasing Importance of Countertrade

As highlighted in Chapters One and Four aircraft companies are targeting the rich Asia-Pacific region, but they are also aware of the equipment requirements and demands of the poorer developing world. Although the developing world often lacks the hard currency to purchase Western equipment, that does not prevent contracts being signed. Countertrade²² provides the fiscal solution, and will play an increasingly important role in international arms sales. Misunderstood by many, and viewed as being on the "fringe" of international trade, it is in fact a common feature of arms deals. It is particularly prevalent in the aerospace industry because of the high costs of equipment. Since companies are desperate to secure export orders to sustain their defence industrial existence - and keep their shareholders on-side - they will conclude contracts with an offset clause if that is required by the purchasing nation. Obviously companies would prefer the hard currency, but rather than lose the deal to a foreign competitor - who may be state-subsidized and thus more favourably placed to sell cheaper - many British firms accept these terms. There are a number of aerospace countertrade examples to date: aside from the Al Yamamah contract with Saudi Arabia, examples include BAe's arrangement with India's HAL - in which a production line for the ATP twin-turboprop airliner was offered as part of the package for Hawk trainers - and McDonnell Douglas' arrangement with the Ugandan Government, which involved large consignments of pineapple concentrate.²³

3.6 "Customized" or "Off-the-shelf" Equipment ?

The regulatory mechanisms discussed in Chapter Four still permit the trade in arms to continue. British companies are targeting new export markets to offset dwindling traditional markets. A number of important issues arise from this fact. Is being export-focused necessarily synonymous with producing advanced high-technology products for security needs ? If not, does it mean that the British Armed Forces are prepared to accept standard "off-the-shelf" equipment, to forego the specialized customized high-technology equipment which they traditionally sought ?²⁴ The answers to these questions have major ramifications for the British aircraft industry: should industry now concentrate on creating weapons of a more "general" appeal, rather than meeting individual customer requirements ? It is possible that there could be a trade-off between customized and "off-the-shelf" equipment.

3.7 Civil Aerospace Trade Friction ?

As Chapter Four highlighted, the large commercial jets sector has become increasingly competitive with Airbus and Boeing vying for the number one manufacturer's position. Figure 21. overleaf illustrates the regional market penetration achieved by Airbus Industrie at November 1993. Given the number of Airbus aircraft in airline service, it is hardly surprising that trade tensions are running high. Whilst the intention of the bilateral trade agreement of 1992 was to reduce the level of acrimony, it is apparent that the rivalry will remain because these jet sales are viewed as the "bread and butter" of the civil industry. The European position is weaker than the USA's because American aerospace companies are able to exert greater pressure on their government, much greater pressure than European firms could ever wield vis-a-vis their respective governments. This is illustrated by the American negotiating team's decision to reject the inclusion of an enlarged version of the bilateral trade agreement in the wider GATT multilateral agreement of 1993.²⁵ In fact, the aircraft issue was postponed yet again. Until the indirect subsidy issue is addressed properly, the civil industry's inherent problems will remain. Neither British nor their European aerospace neighbours will ever gain from a GATT agreement which continues to allow American airframe companies and secondary (supplier) companies to benefit from indirect government support through NASA budgets.²⁶ GATT will only benefit British companies when it ceases to protect the strongest producer, namely the USA. For British company BAe, who have a large stake in the Airbus consortium, it is essential that the subsidy issue is resolved quickly and that the consortium's current market-share is maintained or exceeded. Given Airbus' successes

Regional Analysis of Airbus Aircraft in Airline Service at November 1993

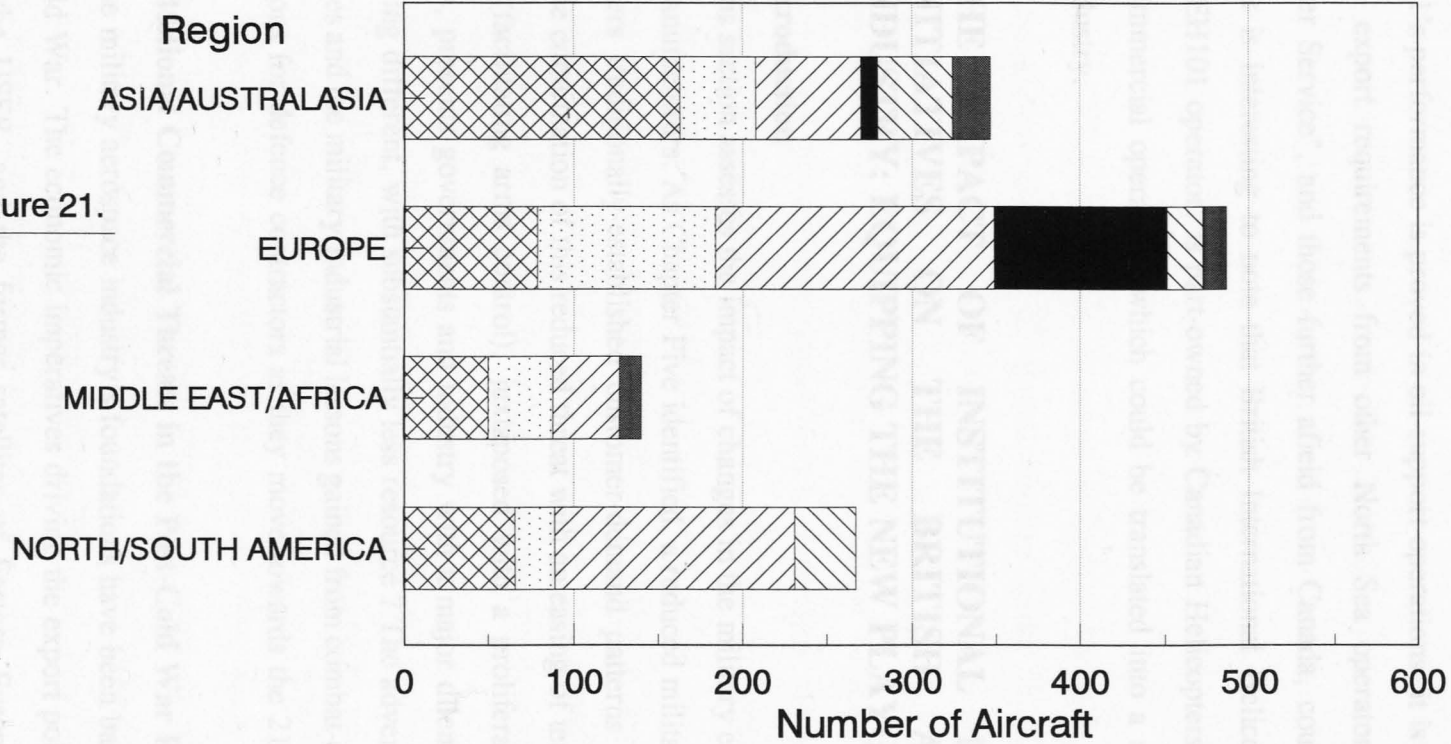
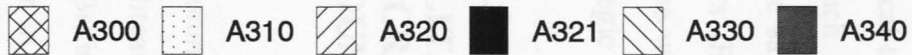


Figure 21.

NOTES:

- 1) A321/A330 AIRCRAFT ON FIRM ORDER, WAITING TO BE DELIVERED.
- 2) A340 AIRCRAFT FOR MIDDLE EAST/AFRICA ON FIRM ORDER, WAITING TO BE DELIVERED.



SOURCE: FLIGHT INTERNATIONAL, 1-7 December 1993, p.58.

to date, BAe will continue to reap the benefits from its share of the project.

In the civil helicopter sector it is anticipated that North Sea oil-support operators will procure new helicopters to replace existing machines and/or join fleets as part of expanded operations in the region. As Chapter One alluded to, there could be opportunities for Westland's EH101 helicopter. An initial batch of six orders is expected during 1994, by which time the aircraft would have received civil certification.²⁷ Once the EH101's performance is proved in oil-support operations, it is logical to assume that additional export requirements from other North Sea operators such as Norway's "Helikopter Service", and those further afield from Canada, could be satisfied by the EH101. It is interesting to note that British International Helicopters (BIH), another potential EH101 operator, is part-owned by Canadian Helicopters - the world's second largest commercial operator - which could be translated into a strategic advantage to British industry.

4. THE IMPACT OF INSTITUTIONAL MILITARY INITIATIVES ON THE BRITISH AIRCRAFT INDUSTRY: EQUIPPING THE NEW PLAYGROUND ?

4.1 Introduction

This section assesses the impact of changes in the military environment on British aircraft manufacturers. As Chapter Five identified, a reduced military threat from the ex-USSR alters traditionally-established customer-demand patterns of British and allied forces. The combination of this reduced threat with an easing of tension in the post-Cold War era (facilitating arms control), juxtaposed with a proliferation of new security challenges, presents governments and industry with a major dilemma: how to do more of something different, with substantially less resource ? The advent of new missions for the Services and the military/industrial lessons gained from combat-experience have major ramifications for defence contractors as they move towards the 21st century.

4.2 Additional Commercial Threats in the Post-Cold War Environment

The military aerospace industry's foundations have been badly shaken by the end of the Cold War. The economic imperatives driving the export policies of the successor states of the USSR, and the former satellites of Eastern Europe, represent a major commercial challenge to Western manufacturers. In the helicopter sector specifically, the

Russians have a number of aircraft which rate highly alongside Western machines, and the Russians are targeting Western operators. The main stumbling blocks at the moment are questionmarks hanging over reliability and their support facilities, and an absence of sophisticated marketing and sales techniques. Once they possess this expertise - and East-West collaborative ventures will facilitate this acquisition - they will be in a much stronger commercial position. Whilst the commercial threat has to be recognized from the East, it is also important to acknowledge that all threats can be converted to opportunities: the end of the Cold War has eliminated the bi-polarity in bloc sales, creating new market opportunities in the East for Western equipment. However, although new markets exist for Western companies, their future customers do not possess sufficient supplies of hard currency: this could perhaps open the door for either increased East-West joint ventures and/or increased countertrade in the region.

4.3 Agreed CFE Ceilings but sill scope to Expand Fleets ?

Although the existence of agreed ceilings under the CFE Treaty must be acknowledged, it is important to recognize, as Chapter Five highlighted, that NATO members are not required to make any air power reductions. Furthermore, since the CFE Treaty only applies to attack helicopters and combat helicopters (strictly defined), manufacturers and governments know which equipment can enter service without violating treaty provisions. NATO is more affected by other weapons categories reductions, but these could have a positive "knock-on" effect for other defence industrial sectors. Regarding future operational capabilities, a reduction in one military equipment category - resulting from compliance with CFE totals - will almost certainly be offset by air power developments, thus creating opportunities for aircraft manufacturing companies.

An additional dimension which has to be considered concerns the effect these CFE ceilings will have on the type and quantity of equipment which will be transported in the future.²⁸ In addition, as Hartley and Hooper²⁹ observe, the CFE Treaty may also induce countries to keep some equipment outside Europe, thus again influencing transport requirements. In view of the increasing importance being accorded to military airlift capability - particularly following the Gulf War - military transport aircraft will have to be procured by many NATO-European nations. This could benefit British company BAe if the FLA is selected as the Hercules replacement.

4.4 Military Transport Aircraft: Higher "Costs" for Procuring Non-European Equipment ?

Chapter Five highlighted the increasingly recognized deficiencies within NATO-Europe's air transport inventory. This section seeks to identify the industrial implications of the Hercules replacement decision in Britain. Should the FLA not be selected by the British Government to replace its Hercules aircraft, it will have major industrial implications for BAe and their suppliers. Until 1989, the MoD assumed that the Hercules replacement aircraft would be the FLA, with deliveries starting around 2004-2005. However, in 1989, as highlighted earlier, the British Government withdrew from the FLA programme - retaining "observer status" - in favour of an off-the-shelf procurement decision after the year 2000. This has inevitably caused problems for BAe - one of the founding partners in the consortium - who only retain their place in the programme by funding the British share of the Pre-Feasibility Studies themselves. In view of the present Government's procurement policy coupled with the absence of RAF enthusiasm for the FLA programme, it is unlikely, even if BAe were able, commercially, to fund the British share in FLA development, that the other European governments would allow the UK to retain a place in the programme beyond the Feasibility phase due to end in 1994.³⁰ John Weston contends that:

if the FLA goes ahead in Europe without British participation, the whole of the UK aerospace industry will miss the opportunity of a key role in a major European programme which would provide 10,000 jobs over a ten year period.³¹

In addition to the above socio-economic dimension, it is important to recognize the other "costs" of non-FLA selection. In TQM terminology there is a high CoQ to be paid by the British, comprising "external failure costs" and "lost opportunity costs". If the latter is examined first, it is important to recognize the export potential of the FLA, and the potential market opportunities lost through non-FLA selection: the EUROFLAG consortium estimate a total market for FLA of 450-700 aircraft between 2004-2005, suggesting export sales of 150-400.³² Even after taking into account the tendency of aircraft manufacturers to be over-optimistic about the potential of new aircraft, slightly reduced estimates still constitute commercially viable and healthy sales predictions. Such a loss, coupled with missing out on support work and follow-on orders/upgrades could prove to be very costly. An additional cost to be considered is the loss of technological

expertise in this large transport aircraft sector, which could eventually lead to a complete withdrawal from this defence sector by British companies.

Regarding external failure costs, these are best illustrated by the potentially damaging effects non-FLA selection and non-British participation in the project could have on BAe's position in the Airbus programme. As Keith Hartley and Nick Hooper³³ highlight, BAe currently specializes on advanced wing technology for Airbus, but if FLA proceeds without the British company another EC nation will undertake the wing work, thus threatening BAe's technical expertise and competitive position. Whilst it could be argued that if BAe regards FLA as profitable, it should continue to fund the programme privately, it is important to recognize that a private firm is highly unlikely to fund work themselves without guarantee of a domestic order.³⁴

Whilst the above section has focused mainly on the negative effects of non-FLA selection as the Hercules replacement, it should not be assumed that choosing the FLA is cost-free. The FLA is a higher risk aircraft than the C-130J rival, which is based upon a proven aircraft.³⁵ Waiting for the FLA will necessitate a significant repair programme to enable the RAF to run-on its existing C-130K fleet.³⁶ Furthermore, since the FLA is also a collaborative project, it should not be forgotten that the eventual aircraft to roll off the production line will be a "compromise" between the various nations, not necessarily reflecting the preferred requirements of one nation. It should also be recognized that a C-130J selection would bring benefits to Britain: an attractive offset package is likely to be proposed, offering employment, technology and import-savings benefits to the economy.³⁷ Even if global sales reached the lowest conservative estimate of 400 aircraft over the next fifteen years, Lockheed contend that more than 3,000 jobs would be guaranteed in Britain.³⁸ More than twenty British companies - including Dowty, Hunting, Lucas and Westland - have already teamed up with Lockheed, investing £60 million to fund development for a 15% share of the project.³⁹

The above sections have highlighted the industrial implications of the Hercules replacement decision - a decision which has wide economic, political and military effects. Given the fact that it seems logical to make a procurement decision only when the British Government know what missions their Armed Forces will have to perform - assessing the significance of airlift capability - delaying the decision and examining all the options seems most reasonable in the current security environment.

4.5 Changing Military Requirements: Industrial Risks or Opportunities ?

The earlier examination of threat (risk)-assessment and discussion of force planning highlighted the variables plaguing governments and defence contractors alike as they formulate strategies for the future. Procurement decisions taken today affect the capability of the Services to perform their missions tomorrow. At a time of increasing budgetary pressure coupled with uncertainty within the military as to what missions they will perform, it is logical to assume that domestic political considerations will largely dictate the development of future programmes even if at the expense of meeting military needs. The evolution of Eurofighter 2000 is a classic example of a programme whose development has been determined by political factors. As Chapter Five highlighted, the primary role of the aircraft as originally envisaged was to combat the threat embodied in the Soviet Sukhoi SU-27 follow-on aircraft, the "Flanker 2000", with its fire-and-forget missiles. Once the Cold War ended, the German Government (not the German Armed Forces) decided that such a sophisticated piece of military equipment was no longer required. However, the important point to be recognized is that whilst the threat may no longer emanate from the traditional enemy, the USSR, the capability of their Flanker aircraft has not changed, and it can be exported anywhere in the world. It is thus essential to have a sophisticated aircraft to match at least and exceed at best the Flanker in combat, irrespective of who the enemy is. The development of the Eurofighter 2000 and future upgrade work will benefit BAe and also smaller aerospace companies in Britain.

New opportunities could present themselves to airframe manufacturers following NATO's adoption of the NSC. In view of the new strategic direction and accordingly-adapted force structures, equipment requirements will be change particularly in the aerospace domain. The establishment of the RRC - with the emphasis on flexibility and quick response times - ensures that air mobility will be integral to NATO's operational requirements. It is debatable whether the pivotal role played by Britain in the RRC will enhance British aerospace companies' chances of winning contracts. However, it is apparent that the overall position of airframe manufacturers within NATO has been strengthened by the above customer requirements, and also by the fact that the currently promoted role of air forces in supporting operations necessitates a solid long-distance airlift capability.⁴⁰ It is also possible that additional aircraft will need to be procured for maritime missions, particularly if the naval embargo operations executed by the WEU in the Persian Gulf and Adriatic are the model for future missions. Opportunities could exist

for BAe and companies within the Westland Group for contract work on new Maritime Patrol aircraft (MPA).

4.6 Military versions of established Civil Aircraft

In view of the high costs of developing new aircraft, it is conceivable that more countries will consider the possibility of acquiring military versions of established civil aircraft. The French and German Armed Forces have been examining the possibilities of the development and procurement of military versions of the Airbus A-340 long-distance carrier for troop transport, and also for in-flight re-fuelling of combat aircraft operations.⁴¹ Given BAe's participation in the Airbus family programme, there could be opportunities for the company in this sector too, perhaps even exceeding wing manufacture.

5. THE STRATEGIC INDUSTRIAL ENVIRONMENT

5.1 Background

Within the defence industries of Europe co-exist a great variety of industrial forms, all adjusting to the changing demands of the new market-place. Specific structural designs depend upon a number of variables, such as the nature of the industrial sector, its political sensitivity, and the historical and current relationship between the government and industry. The aerospace industry in Britain, as Chapter One alluded to, has enjoyed a turbulent relationship with governments of both major political colours, but has managed to emerge as a leaner and meaner industrial enterprise, responsive to open competition and eager to engage in collaborative arrangements. The strategic conditions in Britain have also resulted in the creation and maintenance of a largely monopolistic industry. This section explores briefly the strategic industrial dimension vis-a-vis the aerospace industry in Britain, assessing collaboration and rationalization issues.

5.2 Collaboration

In Chapter One the well-known advantages and disadvantages of collaboration were discussed in the context of British airframe manufacturers. Collaboration is still the most popular form of industrial marriage within Europe, especially in aerospace where the manufacture of large high-technology platforms and systems are involved. Given the high costs of R&D and production risks of new equipment, the collaborative trend will continue. Inevitably accompanying such collaborative ventures will be the establishment

of new agencies or project management teams, as illustrated by Tornado and also Eurofighter 2000. This demonstrates another trend within the sector, that of de-nationalizing management of projects. However, as mentioned above, collaborative arrangements run the risk of producing equipment which could be a compromise between the partners' requirements, therefore contributing towards a high CoQ, specifically external failure costs, since the equipment produced may be second-best in combat. These projects could also be so heavily customized by each player that many of the collaborative benefits are lost. From a TQM perspective this latter point is not necessarily negative since manufacturers should be aiming to supply customers with exactly what they desire, if their industrial output is to be viewed as a "quality" procurement. However, it is important to recognize that these forms of industrial structure inevitably preserve national capabilities - thus within Britain it has contributed towards the preservation of a rotary-wing and fixed-wing manufacturing capability - and maintain national institutions and mechanisms.

5.3 Rationalization

The British aircraft industry has been under a rationalization cloud since the mid-1980s. There is more to come, due largely to the continued downturn in the civil market and by the pressures of dwindling military markets. The great unfinished business of today, as Kevin O'Toole⁴² contends, remains the rationalization of the regional aircraft manufacturers in Europe: the final pieces are expected to be in place when BAe decides exactly what options it has for its Avro and Jetstream business. The rationalization is being played out against a background of continuing depression across the civil airliner market. Figure 22. provides data on jet airliner output 1992-1995.

It can clearly be seen that world jet airliner production has slumped from nearly 800 in 1992 to around 620 in 1993, a figure predicted to drop even further by 1995. Analysts believe global output is on course to slide below the 450 mark before the predicted upturn at the end of the decade.⁴³

MANUFACTURER/TYPE	AIRCRAFT DELIVERIES/YEAR			
	1992	1993e	1994p	1995p
AIRBUS				
A300/310	44	38	30	25
A320	110	85	55	50
A321	0	0	10	10
A330	0	0	10	20
A340	0	25	30	30
Sub-Total	154	148	135	135
BOEING				
737	218	147	120	98
747	61	56	38	30
757	99	77	60	60
767	63	54	32	30
777	0	0	0	18
Sub-Total	441	334	250	236
MCDONNELL-DOUGLAS				
MD-80/90	84	41	35	27
MD-11	42	32	19	17
Sub-Total	126	73	54	44
BRITISH AEROSPACE/AVRO				
RJ/146	13	15	15	15
Sub-Total	13	15	15	15
FOKKER				
Jetline	58	52	35	35
Sub-Total	58	52	35	35
GRAND TOTAL	792	622	489	465

Notes: e = estimate, p = prediction

Source: FLIGHT INTERNATIONAL, Vol.144, No.4401, p.29.

Figure 22. WORLD JET AIRLINER OUTPUT 1992-1995

The upshot of the civil market slump and military market uncertainties will be continued rationalization: increased job losses but greater productivity and efficiency. The recent level of redundancies and site closures in Britain have been influenced by the Cold War's conclusion and the global recession, but it is important to recognize that changes in materials technologies, manufacturing techniques, working practices and cost-saving measures have also been key drivers.⁴⁴

CONCLUSION

The above sections have examined the effects institutional initiatives in key policy areas have on the aircraft industry in Britain. A number of points can be made pertaining to the majority of initiatives. First, most initiatives are directed at defence industries in

general, thus failing to recognize the distinctive characteristics and needs of specific defence sectors. Second, the problem of institutional proliferation has minimized the effectiveness of certain measures, since many will prove to be self-defeating. Third, an approach of "regulation" as a panacea for institutional inabilities to address defence industrial needs - as espoused by the EC - will only hinder development within the industry. Fourth, measures aimed at confining defence sales to the membership of relevant institutions fails to recognize that defence industrial firms cannot survive on a diet of uncertain national contracts and dwindling traditional markets.

It should not be forgotten that there are some positive effects of the initiatives. First, those aimed at harmonization, standardization and de-regulation which will be welcomed by industry. Second, those on the technological side providing opportunities for research into specific aerospace technologies, technologies, which could have escaped commercial exploitation if left solely in the private sector. Third, those aimed at increasing the competitive position of defence industries within global markets. Fourth, those aimed at facilitating points of contact for governmental, institutional, and defence industrial actors to discuss defence industrial issues. However, whilst some of the institutional initiatives undeniably have positive implications for the industry, it is important to acknowledge that many contribute little towards alleviating the pressures of persistent economic and structural challenges. Relevant to this debate is the point that most were probably not designed with this intention in mind, but if industry is expected to deliver the goods when government calls, then national and institutional actors must create an environment which nurtures industrial life, not stifles it.

The industry must adapt to sustain its existence, but the challenges confronting it are immense. First, it will have to cope with preventing cost increases, since that could mean higher prices and lost orders to international competitors. Second, the problem of over-capacity, particularly prevalent in the rotary-wing industry, will have to be addressed. Third, given limited resources, how can industry sustain required R&D investment levels to enable them to maintain leading-edge technological capabilities? Fourth, the emergence of new actors coupled with aggressive Russian exports will constitute a commercial threat. Fifth, how successful can industry be in reconciling the following dilemma: national politics and IR tends to be dominated by short term issues and considerations, but the reality of defence industrial business is long-term strategic planning.

If it is true that the defence of the realm is the first duty of government, as governments throughout the ages have acknowledged, then the nation obviously has to pay for the forces required. There has to be a greater national commitment towards R&D funding, just as there has to be a greater recognition of the export potential of aerospace technologies. Through investment in defence today, we insure against tomorrow's threats. All too often the cost of defence is discussed in terms of additional burdens on the British tax-payer, ignoring the contribution industry makes to the nation. It should not be forgotten, as a leading British defence industrialist has pointed out, that many aerospace companies providing defence for the United Kingdom are at the same time contributing towards the balance of payments and tax revenues.⁴⁵ The future health of the British aerospace industry will be dependent largely on the establishment and maintenance of a successful partnership between government and industry, with government acknowledging the benefits industry brings to the nation and taking a long-term view of the industry.

CHAPTER SIX ENDNOTES

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6. Pierre Condom, "*Europe's way ahead*", **AEROSPACE WORLD**, Vol.V, June 1991, p.26.
7. Private interview conducted by S.P. Allmark with a senior British defence industrialist.
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10. As highlighted by Nick Cook, "*Ball starts rolling on UK 'action plan'*", **JANE'S DEFENCE WEEKLY**, Vol.20, No.5, 31 July 1993, p.8.
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12. See Commission of the European Communities, **From The Single Act To Maastricht And Beyond - The Means To Match Our Ambitions**, COM (92) 2000 Final, 11 February 1992, (Brussels: CEC).
13. *ibid.*p.11.
14. John Scott-Wilson, Chairman AGARD, private interview conducted by S.P. Allmark, 3 December 1993, Manchester.
15. See Chapter Four for additional information.
16. John McGowan, Group Director of Strategic Planning, Westland Group, private interview conducted by S.P. Allmark, 12 November 1993, Yeovil, Somerset.
17. David Henderson, "*International economic integration: progress, prospects and implications*", **INTERNATIONAL AFFAIRS**, Vol.68, No.4, October 1992, pp.648-649.
18. Francois Heisbourg, "*The European-US alliance: valedictory reflections on continental drift in the post-Cold War era*", **INTERNATIONAL AFFAIRS**, Vol.68, No.4, October 1992, p.672.
19. *ibid.*p.673.
20. See "*Industry*", **FLIGHT INTERNATIONAL**, Vol.144, No.4399, 8-14 December 1993, p.24.
21. From the various private interviews conducted by S.P. Allmark with senior British defence industrialists (including John McGowan, *op.cit.*), there would appear to be general agreement on this issue.
22. "Countertrade" is the umbrella term used to describe all agreements involving the reciprocal purchase of goods and services from the foreign country as a condition of sale of military (-related) exports. "Offset" is becoming a common feature of the arms trade: direct offset allows for compensation in related goods, permitting the country to produce in-country certain components of a weapons system; indirect offset is associated with goods unrelated to the equipment being sold, and requires the supplier (exporter) to purchase a certain money-value of the buyer's manufactured products, services or raw materials. For a most informative article on countertrade, see Stephanie Neuman, "*CoProduction, Barter, And Countertrade: Offsets In The International Arms Market*", **ORBIS**, Vol.29, No.1, Spring 1985, pp.183-213.
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 26. See Letter from Syd Gillibrand, Chairman of the European Aerospace Industry Council, "Letters To The Editor", **THE TIMES**, 29 December 1993, p.13.
 27. See Kevin O'Toole, "Well-Balanced Westland", **FLIGHT INTERNATIONAL**, Vol.144, No.4400, 15-21 December 1993, p.19.
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 33. *ibid.*p.75.
 34. *ibid.*p.43.
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 36. *ibid.*p.79.
 37. *ibid.*p.76.
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 41. See Assembly of Western European Union, **Weaponry after the Gulf War - new equipment requirements for restructured armed forces**, WEU Document 1272, 14 May 1991, (Paris : WEU), pp.24-25.
 42. See Kevin O'Toole, "Forecasts: Manufacturing", **FLIGHT INTERNATIONAL**, Vol.144, No.4401, 22 December 1993-4 January 1994, p.29.
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CONCLUSION

Good order is the foundation of all good things.

Edmund Burke, 1791

INTRODUCTION

The preceding examination of post-Cold War institutional behaviour has highlighted the immense problems afflicting institutional and national policy-makers in the 1990s. The clarity, certainty and "stability" of the 1970s-1980s has been usurped by ambiguity, apprehension and confusion following the end of the Cold War. The geopolitics has altered; the route-map changed. Everyone is looking for somewhere to go, but unsure of the final destination and the correct direction to head in.

Paradoxically, in a time of uncertainty we look to former constants for reference points: the institutions, most of which have survived the post-Cold War shake-up. When this research was conceptualized, four key institutional actors had competency in the area identified for examination. As this research reached its conclusion, institutional casualties were mounting, and institutional rivalry was permeating all policy areas under examination. The agreement on transferring IEPG functions to the WEU - probably to be followed by the WEU subsuming Eurogroup - can be seen as a logical rationalization exercise. It should, however, be recognized that the IEPG provided a specialist service for NATO-Europe, distinct from those provided by EC-Europe. Given the fact that the IEPG forum had certain structural advantages which facilitated provision of a quality output, the WEU will have to recreate this if it is to achieve similar successes. The EU's birth in the period has been accompanied by the inevitable "demands" of a player wanting a bigger share of the security action. This has two dimensions: the defence component and the defence industrial element. Regarding the latter, irrespective of the fate of Article 223, the organs of the Community will be able to affect defence industries either directly or indirectly. With regard to the military-operational element, Chapter Five highlighted

the extent to which the Community is developing an external security arm.

The preceding discussion focused on institutional behaviour and change post-1989. This concluding section highlights both methodological and institutional findings. An evaluation of the methodology employed is provided in Section 1. This part returns to the systems and TQM questions raised earlier, assessing the utility of the new agenda. It also addresses the key issue of whether systems and TQM - through synthesis - does facilitate our understanding of institutional behaviour, as opposed to merely yielding knowledge. Section 2 focuses on findings vis-a-vis the institutions, highlighting factors responsible for an institution's inability to deliver a "quality" output all of the time, and analyzing recurring themes from the policy areas examined. In section 3, an assessment is conducted of the winners and losers, analyzing the fluctuations in market-share holdings by the institutions.

1. THE METHODOLOGICAL MERRY-GO-ROUND

1.1 The Systems Input

Whilst the above analysis of institutional behaviour was not systems-driven, an indirect quasi-systems input was achieved via the TQM vehicle. Systems Thinking has thus had a subtle, but not dominant, influence upon the preceding analysis. The utility of systems is discussed briefly below. As highlighted earlier, systems thinkers contend that their approach facilitates deeper "understanding" through the emphasis placed upon the whole rather than the individual parts, and through focusing on behaviour rather than structure. As the discipline has evolved, systems thinkers have by-passed the original behaviouralist's objective of searching for a theory of human behaviour, concerning themselves instead with theories of behaviour applicable at a biological, mechanical and social level.¹ It has been highly relevant to this examination, since the original intention was to focus on behaviour rather than structure.

A system, as highlighted above, is a complex communication and control network, with input and feedback mechanisms. The two concepts which aid our understanding of this network, "hierarchy" and "emergence", have been illustrated throughout. Hierarchy, it will be remembered, means that each system is a sub-system of another and a suprasystem composed of other systems. To illustrate this point, one example - from the preceding examination of institutional behaviour - is provided below: CNAD is a sub-

system of NATO's Defence Support Division - itself a sub-system of NATO - and also a supra-system comprising the Main Groups and NIAG. With regard to the concept of "emergence" - defined as: each new "whole" moving up the hierarchy is greater than the sum of its parts - it is apparent from the above examination that as we move higher up the organizational structure, the senior agency is only able to function effectively if its sub-systems are performing competently and interact well. It is also apparent that excellent communication and control mechanisms are vital for effective operations. Whilst the senior agency has wider decision-making powers - arguably derived from the fact it is the recipient of more communication inputs - it has to be recognized that the power of the containing whole is dependent on the interaction of its parts or sub-systems. In other words, a weak interaction of the parts will reduce the overall ability of the containing whole to perform its functions. It is of course also possible that the interaction could be of a dysfunctional nature.

In political science, or more specifically international relations, if a systems approach is not accepted and implemented, then the international system is no more than a totality of interactions between state actors.² Through adopting a systems approach, we are able to identify facets and principles which explain the particular configuration of relationships. There is an obvious linkage to TQM and the importance of customer-supplier relationships. Within systems thinking it is assumed that despite the complexity and confusion displayed by the amalgam of interactions, there are a set of structures or variables that describe the system, and explain the behaviour of the individual state and non-governmental actors. Systems analysis facilitates our understanding through encouraging us to:

interpret political life as a dynamic system of behaviour, both as an interacting set and as a body of activities which in their totality, are able to work by converting inputs into outputs.³

Whilst it could not be validly claimed that systems thinking explains the functioning of all political systems, it does provide a more useful framework than a reductionist approach, since it is role- and functionally-oriented.

1.2 TQM Revisited

A number of assertions were made earlier concerning the contribution TQM could make to enhancing traditional policy analysis. First, it was claimed that TQM would facilitate a study of the "quality" of institutional decision-making, focusing on the overall service provided and also examining the output of the internal agencies and committees. Second, TQM's emphasis on customer-supplier relationships and the emphasis placed upon understanding the "constituency of interests" was enumerated as a useful methodological tool, most suitable for this type of analysis of institutional behaviour. Third, it was claimed that TQM would play an evaluative role highlighting any deficiencies in organizational/institutional philosophies, procedures and processes. Fourth, it was asserted that TQM would also provide a prescriptive element, offering a useful method for identifying and prioritizing "processes" in need of improvement. Fifth, it was claimed that through employing TQM as an analytical tool it would help us to understand something about the nature of TQM: its strengths, defects and limitations. To execute this analysis, two TQM concepts were employed: the "Customer" and "Cost of Quality" concepts. The validity of the assertions, utility of TQM and importance of the concepts are discussed below as we "Revisit TQM".

Assertion 1

Regarding the first claim that TQM would facilitate a specific study of the "quality" of institutional behaviour, it is apparent from the preceding examination that it has made an important contribution. It has provided direction through focusing on the structural characteristics of the institution - the "design features" - assessing their impact upon the quality of service provided. Additionally, through examining the behaviour and properties of the various internal organs (agencies and committees that constitute the sub-systems) in terms of their role and function within the institution (the containing whole), we have moved further along the road towards achieving a better understanding of why the institution acts in a particular way. TQM has allowed us to conduct a study which is more concerned with function - the "Why?" question, rather than the "How?" question. This represents a shift forwards, since traditional analysis, as commented earlier, tends to yield knowledge and not understanding. TQM has suggested that the quality of the institution's output is not necessarily the sum of the parts: it could in fact be less. TQM has highlighted that within these institutions it is the quality of the interaction between the various agencies which is the critical determinant of the institution's capacity to deliver a "quality" output. The above examination has also indicated the extent to which

superior communication is essential inside and outside of the organization if it is to function decisively.

Assertion 2

The second assertion concerned the contribution TQM could make to our understanding of defence/aerospace relationships. It was claimed that its focus on the customer-supplier network and examination of customer interfaces was crucial for understanding institutional behaviour. Specifically through employing the "Customer" concept, as the above examination clearly demonstrates, we have gained an understanding of the constituency of defence/aerospace. TQM has illustrated how important an effective customer-supplier network is to any organization if it wishes to maintain its market-share.

From the preceding examination of institutional behaviour, TQM has also highlighted five significant problems concerning the role of the customer and capability of the supplier to provide the service:

- a) the customer may not know what his requirements are;
- b) the customer may have identified his requirements, but for some reason be unable to express them;
- c) the customer's requirements could in fact be detrimental to his interests and/or those of fellow customers or the supplier;
- d) the supplier has received the customer's requirements, but the supplier is unable or unwilling to satisfy those requirements;
- e) even if the institution in question is capable of producing a service - not necessarily of the highest standards - how do you mitigate the possibilities of self-defeating and/or contradictory policies (output) as a result of institutional competition ?

It is arguable that without TQM some of the above issues would not have been raised. TQM has helped generate a new agenda for discussion and examination. With regard to the first two factors, the supplier is in a weak position in terms of providing a service, but can convert this weakness to a more positive position by educating" the customer. The supplier may also have to work very closely with the customer. In the security domain, TQM has highlighted the problems facing suppliers in providing a service in a rapidly-changing environment, since the customers are unsure of what it is they want defending from. The supplier institution - which incidentally comprises the

member-states - has to communicate with internal and external customers, often seeking expert advice and policy-guidance from "specialist customers".

The third factor pertaining to the detrimental nature of a customer's request is of critical importance in the security business since lives are at stake. In strict TQM terms, any organization should satisfy customer requirements every time. However, in instances where the requirements would clearly be detrimental to the customer's own position and/or those of fellow customers or damage the supplier-organization, then institutions must deliver what they believe is in the customer's interests.

The fourth factor highlights the structural constraints and technical incapacity of institutions to deliver a particular service. Whilst this is discussed below, it is important to recognize at this juncture that not all the institutions are able to offer all services. Some are better placed than others. Those who are unwilling to offer services - provided that it is not because of the above factor - are liable to eventually lose their share of the market in that particular service area. Given the proliferation of institutions in the area examined above, such inaction could result in that institution ceasing to exist in a rationalization exercise by national governmental members. However, since customers demand a high quality service, losing a poor supplier is not a loss, but a gain.

The proliferation of institutions discussed earlier is the fifth major customer-supplier problem-area. Whilst there are advantages in healthy competition, it is important to recognize that the "quality" of output of any of the institutions will be diminished by contradictory policies of competitors. The whole issue of rivalry has been discussed above, and is addressed in more depth in section 2.1.

Assertion 3

It was claimed earlier that TQM would have an evaluative role, highlighting deficiencies in philosophies, procedures and processes. In addition to identifying structural inadequacies of the institutions as the above examination has illustrated, TQM has also focused our attention on the shared values and common goals of the members of the institutions. Following the ending of the Cold War there is undoubtedly a greater potential for national differences to emerge, and for the traditional philosophy behind the establishment of some institutions to be questioned. TQM has also indicated deficiencies in processes such as the EC's regulatory mechanisms, which are applied across all

defence industrial sectors, but which fail to take into account the specific needs and attributes of certain industries such as aerospace.

Assertion 4

Specifically through using the CoQ vehicle TQM has provided a prescriptive role, offering a useful method for identifying priority areas in need of improvement. It has highlighted that certain initiatives pursued by the institutions are contributing towards a high CoQ: they are affecting the organization's ability to deliver a "quality" output. Thus in the R&D area, as discussed earlier, the EC's recognition of the need for greater consistency between national and institutional policies will only lead to provision of a "quality" output, if the institution's *modus operandi* is altered to facilitate these changes.

Assertion 5

The fifth claim made earlier pertains to the extent to which the employment of TQM in this examination of institutional behaviour has succeeded in giving us a greater insight into TQM itself. From the preceding discussion three major areas require comment:

- a) a potential deficiency within the "Customer" concept;
- b) the role of "continuous improvement" in relation to organizational efforts to deliver a "quality" output;
- c) intra-organizational efforts to achieve a "quality" output.

Regarding the "customer" concept, it should be acknowledged, as the above section clearly highlights, that it has made a substantial contribution to this research, in terms of benefitting our understanding of the constituency under scrutiny and also providing direction and focus to the study. However, an over-enthusiastic application of the concept can be detrimental to an organization. A major limitation appears to be a pre-occupation with "internal customerization": over-emphasis on the internal customer at the expense of other stake-holders, specifically the end-users. In these instances, the internal customer-orientation is so intense that the organization loses sight of its external focus. This could result in a very high CoQ, if through neglect of the external customer's requirements, business is lost and the market-share reduced.

With regard to "continuous improvements", it has already been noted that TQM's

origins are in systems - specifically Statistical Process Control - and that therefore the emphasis is placed upon an endless drive to improve. However, there is an inherent problem with this concept. The assumption is made that if you remove what is defective (wrong) you automatically have something which is perfect (right). This is a fallacy, since it is quite possible that you will in fact have something which is much worse - the two are not strictly correlated. It should also be noted that there is a potential danger of spending too much time focusing on trying to do things better, rather than focusing on whether it is right to do them in the first place. In addition, it should be recognized that "continuous improvement" is not beneficial to you if you are not the market-leader, since you will always be behind the lead organization, who will also be working to retain the competitive edge.⁴ The solution appears to be "discontinuous improvements", as coined by Russell Ackoff⁵, which involves organizational discontinuous jumps or creative leaps.

Closely linked to the above is the third issue which concerns the various efforts made within organizations to achieve a "quality" output. The assumption is made that if improvements are carried out in sections of the institution separately, then the overall performance of the organization - and "quality" of its output - will be increased. The fact is, the performance of the system is not the sum of the parts: instead, it is the interaction of those parts which contributes towards improving the "quality" of output.

The above sections have highlighted some of the deficiencies or weaknesses of TQM itself, but do not in any way detract from the utility of TQM as a methodological tool. Provided that the above comments are recognized when applying TQM, it will provide a valuable insight into institutional behaviour and efforts to satisfy customer requirements.

2. THE INSTITUTIONAL ENDGAME

2.1 Background

In each of the policy sections, the post-1989 initiatives and policies of NATO, the EC and WEU-(IEPG) have been discussed and analyzed in the context of British aircraft procurement. From the examination of the institutional behaviour, four recurring themes emerged as major impediments to an institution's capacity to deliver a quality output:

- a) Structural Constraints;
- b) Institutional Proliferation and Inter-Institutional Rivalry
- c) Intra-Institutional Infighting;
- d) Regulatory Tendencies

The extent to which individually or collectively they have affected institutions, specifically in the security field, is discussed below.

2.2 Structural Constraints

From the preceding analysis of post-1989 institutional behaviour, it is apparent that explanations for an institution's inability to deliver a "quality" output may not necessarily be due to a failure to acknowledge the importance of establishing an effective external customer-focus. In fact, as illustrated throughout the period examined, the reasons for non-quality initiatives can often be attributed to inherent structural constraints and deficient procedural mechanisms, impeding the organization's capacity to act.

The above examination of the EC indicated that both structural deficiencies and inappropriate procedural or regulatory mechanisms were affecting the organization's performance. Regarding structural limitations, it is important to recognize, as suggested in Chapter Three, that the sectoral nature of the institution means that it is inappropriately equipped to execute defence industrial matters. It cannot deal with defence as a consolidated entity or handle aerospace as a consolidated group. However, notwithstanding Article 223 (itself a procedural obstacle), EC initiatives have affected aircraft companies since the civil/military distinction is blurred: EC excursions in the civil aeronautics area, mainly through the transport directorate, continue to have ramifications for military business operations.

On the procedural side, in addition to the problems and ambiguities caused by Article 223's continued existence, there are also examples of procedural mechanisms which are proving self-defeating and detrimental. In the broad research, development and technology domain - an area where investment is needed but funds are lacking - initiatives should be facilitating projects, not stifling them. Chapter Three highlighted the existence of Community handicaps which are reducing the effectiveness of research programmes, such as the fact that over two years is required for their adoption.

Furthermore, the EC's voting system could also represent a potential area for discord - and affect the "quality" of output - since different voting methods are used for different issues. Those issues which are borderline between sector areas could be problematic.

Regarding the WEU, it is apparent that prior to 1993, its organizational structure was not the most satisfactory arrangement, given that the executive arm operated in London, whilst most of the policy and research functions were carried out in Paris. Recognition of this fact and of the benefits accruing from a central location close to NATO and the EC led to the re-location of WEU to Brussels, in January 1993. To a certain extent, parts of the IEPG have also been isolated from Brussels' decision-making, since the IEPG's secretariat is Lisbon-based. The above examination has also highlighted that the IEPG was deficient in one major respect: it could not adopt any binding measures because it was not recognized officially by any treaty. The decision to transfer IEPG functions to WEU has of course necessitated a complete reconsideration of Euro-institutional structures and procedures in relation to juridical structure, competency and political will. It is important to acknowledge that the benefits of any system cannot be obtained if the necessary machinery is not in place to facilitate its implementation and development, and that its success will largely be determined by the political will to see it succeed.

2.3 Institutional Proliferation and Inter-Institutional Rivalry

Whilst acknowledging that a degree of institutional rationalization has taken place post-1989 - resulting in IEPG functions being transferred to the WEU, followed closely by those of Eurogroup - it is important to recognize that this institutional "cannibalism" has only occurred in the defence industrial domain, not in the core security area.

As the preceding examination highlighted there has been a proliferation of institutional actors in the broad security field: NATO and the WEU more recently, are the established security players, but rival actors have sought a larger share of the action. These include the EC (EU post-1993) - viewed by many Euro-realists as the interloper in the security field - and also the CSCE and UN, particularly because of burgeoning peacekeeping missions. Whilst the involvement of additional players is not necessarily detrimental in itself, it should be acknowledged that particularly in the area of security provision - where the stakes are much higher and the risks greater - amateurs cannot survive for long playing the professional game. As argued earlier in Chapter Five and

also in the section above, it would be illogical to hand over the job of European security provider to the European Community, since: a) it lacks the appropriate internal mechanisms, and thus is attempting to execute a function for which it was not designed (see above); b) its origin lies in economics treaties, not in defence and security, and thus its primary orientation is economic; and c) other organizations exist which were designed to perform security functions, and which have the relevant expertise and experience. However, if one adopts a strict TQM stance, and solely considers the wishes of the EC's customer-base - the national governments - then if they want it, it has to be viewed as a quality output. This of course raises the issues discussed above about customers making demands upon institutions which are detrimental to their interests or seeking a service which the institution cannot realistically provide.

Whilst it is arguable the extent to which the West European states have managed successfully to cobble together a framework for defence co-operation, it is blatantly apparent that the military machine born out of Maastricht and the Petersberg Declaration is weak (lacking "teeth"), is driven by little power and is at the mercy of fluctuating national political will. The practical reality is that the existence of competing players puts a strain on resources: the WEU may have established a military planning cell, but it has not yet organized exercises in the field, since these need to be fitted in with NATO and national scheduled exercises at a time when defence budgets are under fire and duplication must be avoided.⁶ This highlights the problems plaguing the institutions as they plan for future contingencies.

Instances of inter-institutional rivalry, or competency battles, can also be found in the R&D and technology domains: at its height, the EC, NATO, WEU, IEPG and Eurogroup were all active players, accompanied at various intervals by others such as EDIG and EUREKA. The defence (aerospace) trade area provides another example of institutional proliferation. The various competing regulatory mechanisms are discussed in section 2.5.

2.4 Intra-Institutional In-fighting

In addition to the inter-institutional difficulties discussed above, the preceding examination of institutional behaviour has also revealed the existence of a number of marked national differences of opinion within respective institutional memberships. Whilst it is arguable the extent to which tensions within the organizations have heightened post-

Cold War, the evidence examined earlier suggests that not all problems can be attributed to structural design flaws within the organizations. In fact, many of the problems would appear to be caused by nations "championing" their own cause via institutional agencies, rather than pursuing initiatives in the collective interest. The fact that national interests still impinge upon international agencies and inter-governmental organizations is, of course, not a new phenomenon. However, what is new is the surge in national interests first. Whereas within NATO, the ethos of united against the common enemy militated against fragmentation of internal support, the disappearance of the monolithic Soviet threat has weakened the institutional base, and consequently the post-1989 era has been characterized by instances of French "independence" or "symbolic gestures" - particularly with the creation of Eurocorps - undermining the institution as a whole.

The intra-institutional in-fighting appears to have been driven by six major factors:

- a) the end of the Cold War and disappearance of the common enemy in the East which weakened the bond between members of the security institutions, allowing for a greater expression of "national" differences and tensions;
- b) the absence of a natural "leader" amongst the European nations;
- c) an increasing number of states 'championing' "national interests" first, often at the expense of overall institutional objectives;
- d) European fears, particularly French, of a resurgent Germany;
- e) a more frequent manifestation of Atlanticist versus solo-European differences of opinion;
- f) the Balkans crisis, which has raised important military and political questions in the post-Cold War environment.

There are a number of instances of the above factors at work, and selected examples are enumerated below.

NATO

First, on the organizational front, the in-fighting problems have manifested themselves in internal debates on NATO's future development. The British and Dutch particularly, as Chapter Five highlighted, have been strongly committed to preserving the Atlanticist link with Europe in an evolving NATO, ensuring that US-European security is still intertwined. The French, in contrast, have not been so constructive in efforts to

adapt the Alliance, since their allegiance lies with organizations where the American component is absent: the EU and WEU are their preferred agents. In fact, within the context of Alliance development, as Simon Lunn, Deputy-Secretary-General of the North Atlantic Assembly (NAA) has commented:

The French have been *continually obstructive* [emphasis added], because they wanted to promote the Western European Union.⁷

France's pre-occupation with promoting agencies which are non-American and opposing those which it perceives to be, is illustrated by its unenthusiasm for extending the hand of friendship to the former WTO states. As Boris Johnson⁸ contends, France was the first nation to recoil at the idea of membership for Eastern Europe, "spying a plot to extend the USA's influence."

The second area where intra-NATO differences have emerged is in the military-operational domain, where France's continued quest to minimize the effects of what it perceives as "Americanization" - strengthening the "Europeanization" process, particularly if it happens to be of the French variety - manifested itself in the establishment of the Franco-German Eurocorps discussed in Chapter Five. France's love of symbol, as opposed to reality, is demonstrated by Eurocorps' creation. As Boris Johnson⁹ highlights, when the French speak of the corps as the "mailed fist" of the WEU, they omit to mention two major problems:

- a) the corps is still impeded from action by Germany's constitutional prohibition of military excursions abroad;
- b) the absence of interoperability - for if the Eurocorps ever ventured beyond its Strasbourg watering-holes, the French Army tanks could not make use of German Leopard tank shells and vice versa.

Furthermore, it should also be recognized that which ever banner the corps operates under, it will lack a heavy-lift transport capability, unless it utilizes American equipment.

Examples of in-fighting, particularly US-European animosity, can also be found in the defence trade domain, an area explored in Chapter Four. There is a strong case for arguing that within the fora of CNAD, the Americans only pressed for a NATO-GATT "code of conduct" because they perceived potential gains at the expense of the

Europeans, and as soon as they realized they could lose out through opening up their market they back-pedalled. The fact that America has been able to call the shots within most of the agencies has caused friction within the Alliance. However, as argued earlier, it should not be forgotten that there will be instances where what is deemed to be in America's interest also happens to be in the institution's interest, or certainly not to its detriment. Furthermore, given the fact that the USA is the strongest player within NATO, it is inevitable that it will have a more dominant role - as the lead nation - and that therefore many Alliance initiatives may have the appearance of being more "American" than NATO-European.

The fourth area illustrating the ability of certain countries to "hijack" institutional vehicles to achieve national ends is to be found in the R&D and technological sectors: as Chapter Three suggested, there is a strong argument supporting the view that USA's "Critical Technologies Plan" is an example of a nation championing national interests.

EC

Since 1989 there have been numerous examples of in-fighting within the European Community. Perhaps the most obvious area which has highlighted the marked national differences of the membership is the Maastricht ratification saga. As Chapter Five identified, security issues continue to divide member-states.

Within the EC, a number of differences have arisen between in the R&D domain, specifically in the field of dual-use technologies. As Chapter Three indicated, the British, French, Italians and Greeks have all expressed reservations on the EC's proposed initiatives, bringing them into conflict with fellow members. It should also be recognized that procurement and regulatory mechanisms have also been divisive since the defence industrial heavy-weights of France and Britain will be affected more by trans-national merger and competition regulations than the smaller players within the Community. Differences of opinion over institutional relations with the former Eastern Bloc have also manifested themselves, to a certain extent mirroring the debate within NATO.

2.5 Regulatory Tendencies

The policy areas examined above and case-study analysis all illustrate the post-1989 institutional tendency to establish regulatory mechanisms across all sectors. A number of points can be made concerning the institutional regulations in general, some

of which were discussed in the preceding chapter.

First, all of the institutional initiatives (with the exception of the EC's aeronautical policies) are targeting defence industries in general, thus ignoring the specific characteristics and needs of defence industrial sectors.

Second, many appear to be driven more by the short-term considerations of the moment, rather than constituting part of a coherent, coordinated policy agenda.

Third, it is arguable that, particularly in the context of provision of a "defence and security" service, some organizations are providing the service because it fulfils their institutional aspirations rather than because they are best-equipped to supply it.

Fourth, regulation or "over-regulation" appears to be a panacea for all ills, since it is a useful method of being seen to be addressing an issue, whilst actually avoiding the inherent structural problems which afflict the area.

Fifth, many of the initiatives reflect the "reactive" nature of the institutions to the changing political-military environment, and the absence of pro-active interventions. However, it is arguable that this is a somewhat harsh criticism given the fact that the institutions are operating within established parameters and are organizationally-structured to promote the *status quo* and to address a number of identified contingencies.

Sixth, the existence of multiple institutional actors pursuing policies in the same area can result in contradictory, self-defeating and duplicatory regulations. Apart from contributing towards a higher CoQ, as highlighted throughout, it should also be recognized that this greatly minimizes the effectiveness of such initiatives.

Instances of the above are provided below, drawing on the evidence from the preceding examination.

In the defence aerospace trade sector, a number of regulatory mechanisms were set up post-Gulf War, but the majority could prove to be ineffectual. EC defence trade regulations can be criticized on the following grounds:

- a) they make the flawed assumption that defence companies can survive by confining their sales to fellow institutional players;
- b) the EC comprises only two of the world's leading arms exporters - France and Britain - thus minimizing the global impact upon suppliers. EC measures also run the risk of the Third World allegation of "imperialists" pushing their weight around;
- c) in their current form - and certainly if extended further in the same direction - they arguably hamper the legitimate trade in defence equipment. An increased bureaucratization could jeopardize the effectiveness of the industry to satisfy customer requirements of a self-defence capability.

However, whilst much can be said on the debit side, it has to be recognized that since the EC already has competency in the competition sector, there is a certain logic to the argument that extending its purview to defence industrial trade regulation is not such an anathema.

Regarding NATO's code of conduct, the preceding discussion in Chapter Four supports the assertion made earlier that certain institutional vehicles can be hijacked for promoting national ends, such as protecting precious home defence markets. As highlighted in Chapter Four, and reiterated in Chapter Six, the code in its present form does not benefit companies in Europe, since it indirectly affords "protection" to American firms. Whilst a proper assessment of the "quality" of the code can only be made after the three year transitional period expires, the criteria on which the output will be judged should include: a qualitative analysis of changes in the way governments award contracts, and a quantitative assessment of instances of neutral and preferential treatment. However, in view of the non-binding nature of the code, and the number of exclusion clauses contained within, it is arguable that the code's effectiveness will be somewhat reduced.

Regarding the IEPG's defence market initiatives - notwithstanding the fact IEPG functions now have to be viewed in the context of the WEU - a number of problems arise with its "fair return" objective, an objective based upon the principle of *juste retour* as enshrined in the Vredeling Report and Action Plan. First, this policy initiative, as originally proposed, was in direct conflict with the European Commission's open-market scheme, thus illustrating the problem of having too many institutions regulating the same sector. Second, such a regulatory mechanism could only be effective to the extent that there is common agreement on what constitutes "fair competition", but this issue has been

subject to differing national interpretations. Third, the principle of *juste retour* makes it very difficult to preserve an element of competition in collaborative projects and certainly tends to increase costs.¹⁰ Fourth, "regulation" and "enforcement" can be poles apart: as highlighted in Chapter Four, the absence of a military equivalent of the European Commission to investigate complaints and the non-existence of a "defence" division of the European Court to rule on such complaints, is a major weakness.

As a general comment on the "regulatory syndrome", it has to be recognized that regulatory mechanisms and procedures cannot compensate for structural deficiencies or inadequacies within the institutions. The above examination has highlighted that the more detailed and complex the regulations the more likely they are to: a) defeat the intention of serving the customer, and b) be more open and vulnerable to abuse. Through their agencies, the institutions should be regulating because necessity, practicality and logic, dictate such a course, not regulating for regulations' sake.

3. FINAL SCORE

3.1 Winners and Losers

The above analysis examined developments at the institutional level post-1989: a period which has seen nations fragment, new countries form, institutions disappear and organizational rivalry increase. The uncertainty has increased too, but defence spending has not risen. In fact, it has been under threat of further cuts as a fundamental reconsideration of European security is undertaken, and governments are under pressure from electorates to allocate monies to non-defence sectors. This places additional strains upon defence contractors and the armed forces who are all having to do more with less. Given the proliferation of new missions for the institutions to perform, juxtaposed with the distinct possibility that institutional memberships will also increase, placing additional burdens on the organizations, there is a real need to curtail this trend of spending less on defence. As Trevor Taylor argues:

Not to put too fine a point on it, there has already been a substantial peace dividend, which was rarely noticed because the recession hid any benefits from the lower defence spending which has been occurring since the mid-1980s.¹¹

This is not the time to be reducing defence expenditure when there is currently so little

usable defence capability.¹²

Whilst Chapter Six focused on the impact of institutional initiatives on the British aircraft industry, this final section proposes to assess the overall winners and losers in the institutional arena, on the basis of market-share fluctuations vis-a-vis areas of competency. Institutional players that are deemed "winners" are those which have:

a) maintained or increased their share of a particular supply function or b) entered a new supply area, in terms of providing a new service. Those institutions classified as "losers" are those which have a) witnessed a reduction (in real terms) of the supply of a specific function/service or b) totally exited from a sector or ceased to exist.

Regarding military winners, NATO has remained as the only credible political-military organization capable of protecting the interests of its membership. The prophets of doom were ringing its death-knell once the ex-USSR dissolved and the Cold War ended, but the Alliance has survived because it is an organization that has become indispensable. Whilst it is arguable the extent to which NATO has lost a portion of its military market-share to the WEU (and possibly to a EU-WEU in the future), it is still regarded as a winner because those organizations will have to make use of NATO's integrated military structure (IMS) and other Alliance assets. Despite what committed Europeanists would have us believe, Europe is not self-sufficient in the "security" sphere and could not perform the most likely spectrum of missions without North American manpower and hardware. The WEU has also gained in standing following solid performances in the Persian Gulf and action in the Adriatic, but as discussed above, Gulf minesweeper operations could just have easily taken place by European contributors working ad hoc within a NATO framework. However, the combined momentum from Maastricht and Petersberg will doubtlessly drive the inevitable process of "Europeanization" which is taking place, resulting in Europeans attempting to do more for themselves. It thus seems likely that the Euro-oriented institutions will increasingly become more assertive.

With regard to the procurement regime, it is the former EC - that champion of regulatory mechanisms - which will probably emerge as the winner. The advent of the Single Market and increased criticism of Article 223 would seem to suggest that it will be sooner rather than later when the organization will have all of defence under its jurisdiction. Whilst there is undoubtedly a certain logic to this scenario, given that

defence industries are part of industry, it has to be recognized that defence industries are rather unique in terms of the service they provide. It would therefore be a most unwise move to regard it as just another industry subject to the "blanket" effect of burgeoning European Union directives. From applying the criteria enumerated above, a superficial interpretation of the IEPG's status would be that its exit from the market place indicates it is a loser. This would be an inappropriate and fallacious conclusion to draw since the IEPG is in fact a winner: its unique role and the validity of the service provided have been recognized by its absorption into the WEU and by the creation of the Western European Armaments Group (WEAG). Only the name has changed; committee structures and remit remain unaltered essentially. Britain will continue to work through WEAG to develop an open European defence equipment market.

In the research, development and technology domain, the position of winners and losers is not quite so clear. Since NATO's purview is infrastructure rather than research, it would be extremely unfair to conduct a straight comparison with the other institutions, criticizing it for sponsoring less programmes than the EC or ex-IEPG. It is the contention of this analysis that NATO can be viewed as a winner - on the basis of maintaining its market-share - through the excellent work of the DRG and AGARD. The EC has also maintained its market-share, primarily through the vehicle of the Framework programmes. However, there is still much to be done at the institutional level: in fact, on the basis of the above examination, it is arguable that most of the institutions have failed to supply the goods quickly enough, creating a vacuum, which national governments have not filled (because of budgetary constraints), thus forcing "industry" to seize the initiative. In view of the fact that institutions have perhaps lost their momentum, it is industrial consortia such as Airbus Industrie, and industrial trade groupings such as EDIG, which have been forced to increase their stake in their market, and thus have to be classified as winners. EDIG's value can be gauged by the fact that it is still the only recognized focal point for the IEPG with industry on the EUCLID programme. Whilst it would be incorrect to view the IEPG/WEU as losers, it should be noted that in terms of market influence many activities have been eclipsed by those of the EC(EU).

Within the defence (aerospace) trade sector, the EC managed to maintain its share of the market through its continued drive for arms export regulation and dual-use technologies' regulation. However, the institution was unable to increase its market-share

due to the continued existence of Article 223: only when this Article is deleted or amended will the EC be able to implement a defence export control policy. It should also be acknowledged, as emphasized earlier, that this institution is not the most appropriate forum for regulating defence exports, and thus it would not be a popular winner - on the above criteria - amongst the leading arms exporters within the organization. NATO can be viewed as a winner in this sector, since it increased its market-share through the emergence of the "Code of Conduct", and also through its support for the United Nations Register. To a certain extent, all the institutional initiatives have been overshadowed by the United Nations Register. Despite the deficiencies discussed above, it represents a significant step forward and also marks an increase in the UN's market-share of trade sector issues.

3.2 Epilogue

The post-1989 era has been characterized by a flurry of Euro-institutional metamorphoses and defence industrial re-structuring. As the above examination has demonstrated, the ever-changing security environment has presented risks and challenges to the institutions and defence industrial contractors, but it has also presented immense opportunities. Given the plethora of institutions which still exist today, the strengths and qualities to be derived from a functionally interlocking framework are vast. Each institution has a unique service to supply, based upon its original design configuration and its capacity to change. Whilst a degree of institutional rationalization and "cannibalization" was inevitable following the Cold War's conclusion, this process is "playing itself out", as a new equilibrium is established. The end of the Cold War does not mark the end of the need for institutions and alliances. On the contrary, in the era of uncertainty ahead, now is the time when we most need them. In the words of NATO's Secretary-General, Manfred Wornier:

We have to realise that the end of the Cold War has spelled the end neither of history, nor of forward looking security policy. Security still comes at a price, and we must pay it.¹³

CONCLUSION ENDNOTES

1. See Richard Little, "*A systems approach*", in Trevor Taylor (ed), **APPROACHES AND THEORY IN INTERNATIONAL RELATIONS**, (New York: Longman Group Limited, 1978), p.200.
2. *ibid.*p.189.
3. David Easton, **A SYSTEMS ANALYSIS OF POLITICAL LIFE**, (New York: John Wiley & Sons, Inc., 1965), p.479.
4. As highlighted by Michael Jackson, "*Beyond the Fads: Systems Thinking for Managers*", **Inaugural Lecture**, University of Hull, Hull, 25 October 1993.
5. As highlighted by Russell Ackoff, "*Beyond TQM*", **High Profile Lecture**, University of Hull, Hull, 18 September 1992.
6. Trevor Taylor, "*West European security and defence cooperation: Maastricht and beyond*", **INTERNATIONAL AFFAIRS**, Vol.70, No.1, January 1994, p.5.
7. Simon Lunn; as quoted in Boris Johnson, "*With Friends Like These...*", **THE SPECTATOR**, 8 January 1994, p.11.
8. Boris Johnson, *op.cit.*p.11.
9. *ibid.*p.10.
10. See Trevor Taylor, *op.cit.*p.14.
11. *ibid.*p.10.
12. *ibid.*p.11.
13. Manfred Worner, scheduled address to the Inaugural Conference of The Atlantic Council of the United Kingdom, Queen Elizabeth II Conference Centre, London, 26 November 1993, (Text read by Sir John Weston in Manfred Worner's absence), (London: Text published by The Atlantic Council of the United Kingdom, Text 140), p.1.

Future Research

In this final section some areas are identified for future research, drawing on the experience of the utility of TQM as employed in this research. It is important to recognize, as highlighted above, that this analysis has identified some deficiencies within TQM itself. However, as with all models and approaches, there are strengths and weaknesses, and there are of course instances where one approach/theory is more appropriate than another. Whilst it is probably true that the benefits of TQM (whether in its theoretical form or implementation phase) can in fact be reduced if the model is applied too rigidly or incorrectly, this in no way detracts from the potential contribution it can make.

Taking into account the limitations of TQM, as discussed in the Conclusion, it is still apparent that TQM has the potential to provide us with an insight (and hopefully understanding) of the following: the system ("constituency of interest") under examination and how it came to exist; the elements needed to sustain its existence; the importance of organizational culture and diversity; the importance of customers and customer relationships; and the valuable benchmarks/indicators - which embody the "quality" philosophy - that are relevant to any evaluation of institutional performance.

There are of course a number of future areas for investigation in the institutional/defence procurement regime. Two are provided below, illustrating exciting areas to be addressed. They are not an exhaustive list.

i) Institutions and International Standards

Of growing importance to the "modern manager", when implementing TQM, is to seek "accreditation" and to be awarded the seal of an international standard ISO 9000 (or its equivalent). Should organizations such as NATO and the EU eventually travel down the same road? Is that the only means of demonstrating "performance excellence" and a "quality" commitment in a particular field? Is that what the member-states want? Is it in fact relevant to diplomatic, political and military organizations? Should institutions also implement "Quality" programmes? We have already seen a trend in Britain of governmental agencies exploring quality programmes and various public sector agencies (including individual higher education establishments and police forces) seeking

accreditation.

ii) Defence Industries and "Quality Management"

Another area requiring evaluation concerns the effectiveness of quality Programmes and initiatives (such as TQM/QFD) in terms of improving a defence contractor's performance. It would be interesting to conduct an analysis of various companies' performances since they boarded the "quality bandwagon" and implemented in-house quality programmes, using standard indicators such as output, revenue per employee, increased likelihood of winning contracts and reduction in failure/re-work costs over a given timeframe.

APPENDIX 1.

SELECTED U.K. MILITARY HELICOPTER SALES/TRANSFERS TO THIRD WORLD COUNTRIES, 1971-1985.

RECIPIENT COUNTRY	WEAPON TYPE	NUMBER ORDERED	YEAR OF ORDER	YEAR(S) OF DELIVERY	TOTAL NO. DELIVERED
Argentina	Lynx	9	1977	1978	2
Bangladesh	Wessex	2	1973	1973	2
Brazil	Wasp	2	1973	1973	2
Brazil	Lynx	9	1975	1977-78	9
Brazil	Wasp	7	1977	1977-79	7
Brazil	Wasp	4	(1979)	1980	4
Egypt	SH-3D	6	(1973)	1975-76	6
India	SH-3D	6	(1970)	1971	6
India	SH-3D	6	(1972)	1973-74	6
India	SH-3D	5	1977	1978	5
India	HAS-5	12	1983	1984-86	(12)
India	HAS-5	20	1985	-	-
Nigeria	Lynx	3	1981	1984	3
Pakistan	SH-3D	6	(1973)	1975	6
Qatar	Lynx	3	1976	1977	3
S.Africa	Wasp	6	1971	1973	(6)

NOTES :

a) Conventions :

- () = uncertain data
- = data not available

b) Comments :

- i) Argentina, Lynx, 1977 order - On 2 Type-42 Destroyers; First ordered 1973; Final contract 1977.
- ii) Bangladesh, Wessex, 1973 order - Gift.
- iii) Brazil, Wasp, 1973 order - Arming 2 Gearing Class Destroyers.
- iv) Brazil, Lynx, 1975 order - Arming Niteroi Class Frigates.
- v) Brazil, Wasp, 1977 order - Arming Gearing and Sumner Class Destroyers.
- vi) Brazil, Wasp, (1979) order - From Royal Navy surplus stocks.
- vii) Egypt, Sea King, (1973) order - Ordered via Saudi Arabia.
- viii) India, HAS-5 Sea King, 1983 order - Contract signed June.
- ix) Pakistan, Sea King, (1973) order - For Navy.
- x) South Africa, Wasp, 1971 order - 7th ordered embargoed March 1974.

c) Sources :

Based upon: Appendices 1 & 3 in Michael Brzoska and Thomas Ohlson, **ARMS TRANSFERS TO THE THIRD WORLD, 1971-85.**, (Oxford: Oxford University Press/SIPRI, 1987); **SIPRI YEARBOOKS; JANE'S ALL THE WORLD'S AIRCRAFT**, (London : Macdonald).

APPENDIX 2.

SELECTED U.K. MILITARY AIRCRAFT SALES/TRANSFERS TO THIRD WORLD COUNTRIES, 1971-1985.

RECIPIENT COUNTRY	WEAPON TYPE	NUMBER ORDERED	YEAR OF ORDER	YEAR(S) OF DELIVERY	TOTAL NO. DELIVERED
A to L					
Algeria	Hawk	(16)	(1985)	-	-
Chile	Canberra	3	(1981)	1982	3
Chile	Hunter	9	(1971)	1971	9
Chile	Hunter	8	(1973)	1973	8
Chile	Hunter	12	1982	1982	12
Ecuador	BAC-167	4	1971	1973	4
Ecuador	BAC-167	8	1972	1972	8
Ecuador	BAC-167	4	1974	1974	4
Ecuador	BAC-167	6	(1985)	-	-
Ecuador	Jaguar	12	1974	1977-78	12
India	Canberra	12	(1968)	1970-71	12
India	Canberra	10	(1968)	1970-71	10
India	Hunter	5	(1970)	1972	5
India	Jaguar	40	(1979)	1981-82	(40)
India	Jaguar	8	(1982)	1982	8
India	Sea Harrier	6	1979	1983-84	6
India	Sea Harrier	10	1985	-	-
India	Sea Harrier	2	1979	1984	2
India	Sea Harrier	1	1985	-	-
Indonesia	Hawk	8	1978	1980-81	8
Indonesia	Hawk	4	1980	1981	4
Indonesia	Hawk	5	1982	1983	5
Indonesia	Hawk	3	1983	1984	(3)
Kenya	BAC-167	6	(1970)	1971	6
Kenya	BAC-167	6	1977	1978	6
Kenya	Hawk	12	1979	1980	(12)
Kenya	Hunter FGA-9	3	1973	1974	3
Kenya	Hunter	3	1973	1973	3
Kuwait	BAC-167	6	(1970)	1971	6
Kuwait	Hawk	12	1983	1985-86	(12)
Lebanon	Hunter	6	1975	1975-77	6

Appendix 2. Cont..

RECIPIENT COUNTRY	WEAPON TYPE	NUMBER ORDERED	YEAR OF ORDER	YEAR(S) OF DELIVERY	TOTAL NO. DELIVERED
N to Z					
Nigeria	Jaguar	18	1983	1984-85	(18)
Oman	BAC-167	8	(1971)	1973	8
Oman	BAC-167	4	1974	1976	4
Oman	BAC-167	1	(1985)	1985	1
Oman	Jaguar	12	1974	1977-78	(12)
Oman	Jaguar	12	1980	1983	12
Oman	Jaguar	1	1982	1982	1
Oman	Jaguar	1	(1985)	1985	1
Oman	Tornado ADV	8	1985	-	-
Oman	VC-2 Viscount	6	(1971)	1971-73	6
Qatar	Hunter	3	(1969)	1971-72	3
Qatar	Hunter T-7	1	(1969)	1971	1
Saudi Arabia	BAC-167	10	(1971)	1973	10
Saudi Arabia	BAC-167	21	1976	1977	21
Saudi Arabia	Hawk	30	(1986)	-	-
Saudi Arabia	Jetstream	2	(1986)	-	-
Saudi Arabia	Tornado ADV	24	1986	1986	(2)
Saudi Arabia	Tornado IDS	48	1986	1986	(4)
Singapore	Hunter	12	(1969)	1970-71	12
Singapore	Hunter	22	1971	1972-73	22
Singapore	Hunter FR-11	4	(1969)	1970-71	(4)
Singapore	Hunter T-75	5	(1971)	1973	5
Sudan	BAC-167	10	(1983)	1984	3
UAE	Hawk	24	1983	1984-86	(24)
UAE	Hunter	12	(1968)	1970-71	12
Zimbabwe	Canberra	1	1981	1981	1
Zimbabwe	Canberra	1	1981	1981	1
Zimbabwe	Hawk	8	1980	1982	8
Zimbabwe	Hunter	4	1981	1981	4
Zimbabwe	Hunter	5	1983	1984	5
Zimbabwe	Hunter T-7	1	1981	1981	1

Appendix 2. Cont..

NOTES:

a) Conventions:

- () = uncertain data
- = data not available

b) Comments:

- i) Algeria, Hawk, 1985 order - reportedly ordered.
- ii) Ecuador, BAC-167, 1985 order - aircraft originally destined for Sudan. May have been cancelled in favour of more T-33s.
- iii) India, Jaguar, 1982 order - 18 delivered on loan from the RAF in 1980; 8 returned 1982; 1 to Oman; 1 crashed; Rest offered to Indian Air Force.
- iv) India, Sea Harrier, 1979 order - for use on the Aircraft Carrier "Vikrant".
- v) Kenya, BAC-167, 1977 order - unconfirmed.
- vi) Nigeria, Jaguar, 1983 order - option on 18 more.
- vii) Oman, Jaguar, 1985 order - replacing lost aircraft.
- viii) Oman, Tornado ADV, 1985 order - deliveries postponed due to lack of funding.
- ix) Oman, VC-2 Viscount, 1971 order - some bought in Australia and Ireland for refurbishment in the U.K.
- x) Saudi Arabia, BAC-167, 1976 order - replacing losses, unconfirmed.
- xi) Sudan, BAC-167, 1983 order - delivery halted for financial reasons.
- xii) UAE, Hunter, 1968 order - for Abu Dhabi.
- xiii) Zimbabwe, Hawk, 1980 order - 1 destroyed and 3 damaged in terrorist attack.
- xiv) Zimbabwe, Hunter, 1983 order - replacing aircraft destroyed in sabotage attack in 1982.

c) Sources:

Based upon: Appendices 1 & 3 in Michael Brzoska and Thomas Ohlson, **ARMS TRANSFERS TO THE THIRD WORLD, 1971-85.**, (Oxford: Oxford University Press/SIPRI, 1987); **SIPRI YEARBOOKS**; **JANE'S ALL THE WORLD'S AIRCRAFT**, (London : Macdonald).

APPENDIX 3.

SELECTED U.K. MILITARY AIRCRAFT AND HELICOPTER SALES/TRANSFERS, 1992.

RECIPIENT COUNTRY	WEAPON TYPE	NUMBER ORDERED	YEAR OF ORDER	YEAR/S OF DELIVERY	TOTAL NO. DELIVERED
A to P					
Austria	BAe-146	2	1991	-	-
Brazil	Super Lynx Helicopter	(7)	1992	1992	(5)
Brunei	Hawk-100	16	1989	-	-
Canada	EH101 Helicopter SAR	15	1992	-	-
Ecuador	Jaguar	3	1991	1992	3
Finland	Hawk	7	1990	-	-
Greece	F-4	32	1992	-	-
Indonesia (L)	Hawk-100	(14)	1992	-	-
	Hawk-200	(10)	1992	-	-
Japan	BAe-125-800	3	1989	1992	3
	BAe-125-800	3	1991	-	-
Korea,S.	Hawk	20	1990	-	-
Malaysia	Hawk-100	10	1990	-	-
	Hawk-200	18	1990	-	-
Norway	SH-3D Sea King helicopter	1	1989	1992	1
Oman	Hawk-100	4	1989	-	-
	Hawk-200	12	1990	-	-
Portugal	Super Lynx	5	1990	-	-

RECIPIENT COUNTRY	WEAPON TYPE	NUMBER ORDERED	YEAR OF ORDER	YEAR/S OF DELIVERY	TOTAL NO. DELIVERED
R to Z					
Romania (L)	BN-2A Islander	-	1968	1968-69	(450)
Saudi Arabia	BAe-125-800	12	1988	1988-92	(12)
	Hawk-100	20	1988	-	-
	Hawk-200	40	1988	-	-
	Tornado IDS	48	1988	-	-
	WS-70 Helo	(50)	1988	-	-
Sri Lanka	HS-748-2 Transport Aircraft	2	(1991)	1992	2
UAE	Hawk-100	18	1989	1992	2
Uruguay	Wessex Helicopter	2	1992	1992	2
Zimbabwe	Hawk	5	1990	1991-92	(5)

Notes:**a) Conventions:**

() = uncertain data - = data not available (L) = Licence

b) Comments:

- i) Austria, BAe-146, Transport aircraft, Austrian UN relief activities.
- ii) Brazil, Super Lynx, deal estimated at \$25 million.
- iii) Brunei, Hawk-100, deal worth \$260 million.
- iv) Canada, EH101, part of deal including 35 ASW helicopters from Italy.
- v) Ecuador, Jāguar, Fighter/Ground Attack aircraft, ex-RAF; order may be for 6 aircraft.
- vi) Greece, F-4 Phantom, equipment is ex-RAF.
- vii) Japan, BAe-125-800, 1991, follow-on order for up to 24 expected.
- viii) Korea,S.,Hawk, deal worth \$140 million.
- ix) Malaysia, Hawk-100, 1990, part of deal worth \$740 million, including 18 Hawk-200s, weapons, training and services.
- x) Norway, Sea King helicopter, deal worth \$18 million including upgrade of 8 delivered earlier.
- xi) Oman, Hawk-100, 1989, deal worth \$225 million, including 12 Hawk-200s.
- xii) Portugal, Super Lynx helicopter, for 3 MEKO-200 Frigates; deal worth \$81 million/offsets 25%.
- xiii) Saudi Arabia, 1988 order, part of Tornado package.
- xiv) UAE, Hawk-100, for Abu Dhabi; part of deal worth \$340 million.
- xv) Uruguay, Wessex, ex-Royal Navy equipment.

c) Sources:

British Aerospace PLC Annual Report And Accounts 1991, p.14.; and SIPRI, SIPRI YEARBOOK 1993: WORLD ARMAMENTS AND DISARMAMENT, (Oxford: Oxford University Press, 1993), Appendix 10C, pp.483-518.

APPENDIX 4.

NATO CODE OF CONDUCT IN DEFENCE TRADE

INTRODUCTION

1. The North Atlantic Treaty calls upon the members of the Alliance to seek to eliminate conflict in their international economic policies and encourages economic collaboration between any or all of them. Efficient trade in the field of armaments is regarded by the members of the Alliance as an important aspect of such collaboration and one essential means to achieve better use of today's limited defence resources and to meet the requirements of collective Alliance security together with harmonization of military requirements and the promotion of the maximum extent of equipment standardization and interoperability.

2. The current trends towards arms reductions, declining resources for defence equipment procurement, the rising cost of weapons system development, and the current fragmentation of NATO defence markets require changes to improve the conditions of defence trade and achieve more effective cooperation among the members of the Alliance at the earliest possible stages in research, development and production of military equipment.

3. Members of the Alliance, while remaining responsible for equipping their armed forces and for the protection of essential national security interests related to armaments procurement, will follow the principles, policies and operating guidelines set out in the following Code of Conduct.

4. The NATO Code of Conduct in Defence Trade sets out a moral and political and not a legally binding commitment by members of the Alliance to fundamentally improve the conditions of defence trade. Nothing in this Code of Conduct will, therefore, affect the obligations of the member nations under international agreements, including for example GATT, the Treaty of Rome, and the Canada - U.S. Free Trade Agreement.

I. SCOPE AND COVERAGE

5. In satisfying their requirements for equipment intended for specifically military purposes, members of the Alliance commit themselves to apply this Code of Conduct in all phases of the equipment procurement cycle - from feasibility and project definition through design and development to production and in-service support - for both national and collaborative programmes.

6. Recognizing the current level of obstacles to be overcome and the various factors and sensitivities associated with each procurement phase, members of the Alliance have decided on a pragmatic, progressive approach to the achievement of an open and competitive defence equipment market NATO-wide, and have decided on the following specific arrangements:

- 6.1 Defence research activities not related to the development of specific military equipment will not be covered by this Code.
- 6.2 Contracting related to project feasibility, project definition and design and development activities will be covered by the Code of Conduct. For an appropriate period, however, governments will have discretion to limit the application of the cross-border competitive purchasing provisions of the Code - on a case-by-case basis - in respect of contracts for major development programmes that they are financing directly, either nationally or in cooperation. Any such limitations will be notified and explained to other members of the Alliance promptly, normally before the issue of tender documentation.
- 6.3 Production and in-service support contracting, including off-the-shelf purchasing, will be covered by the Code of Conduct. A government that has limited the application of the Code in respect of a specific development programme will have discretion, however, to do likewise in subsequent production and in-service support contracts under the conditions set out in para. 6.2 above.

7. Additional national exemptions of specific procurements from the application of this Code of Conduct will be kept to the minimum and will be confined strictly to operational emergencies in wartime or in international crisis, and for an appropriate period, to other essential national imperatives. Consistent with national requirements to safeguard highly sensitive classified information, any such exemptions will be notified and explained to other members of the Alliance promptly, normally before the issue of tender documentation.

8. Where a government has exempted a specific procurement from the cross-border competitive purchasing provisions of the Code according to the limitations or exemptions described in paragraphs 6 and 7 above, other governments will have discretion to likewise limit the application of similar provisions of the Code in relation to prospective contracts for the purchase of the equipment concerned.

9. Commonly agreed product areas to be excluded from the application of the Code of Conduct are nuclear weapons and nuclear propulsion systems, anti-toxic and radioactive agents, and cryptographic equipment.

10. Subject to the above qualifications, the NATO Code of Conduct will apply to all contracts awarded by governments valued above a threshold of the equivalent of 300,000 IAU in national currencies. None of the arrangements described above precludes a member of the Alliance from applying the principles of the Code of Conduct to contracts valued below that threshold or for which an exemption would otherwise be available.

II. PRINCIPLES FOR IMPROVING DEFENCE TRADE AMONG THE ALLIES

11. Respecting the fundamental condition of reciprocity, members of the Alliance will progressively eliminate their own barriers to defence trade - be they legal, legislative, political, technical, cultural, procedural, or attitudinal - on an Alliance-wide basis, and will oppose with all means authorized by their national constitutions the introduction in their country of any measures which would reinforce or maintain protectionism in defence trade.

12. Open market operations and the sharing of technology can only proceed on the basis of mutual benefit and reciprocity. Against that underlying principle, members of the Alliance recognize that actual overall achievements will largely depend on the success that individual member nations will have in removing the obstacles and barriers referred to above. In harmonizing their competition policies they will further:

- 12.1 follow cross-border competitive purchasing principles and the non-discriminatory application by each member nation of procurement practices and procedures to industry sources throughout the Alliance;
- 12.2 take into account the need to avoid trade distorting effects such as the creation of monopolies or the introduction or re-introduction of any barriers to market access;
- 12.3 extend to the suppliers of other members of the Alliance fully transparent procedures and treatment no less favorable than that extended to national industries throughout all stages of the procurement process;
- 12.4 take measures to establish mutual benefit and reciprocity in the systematic improvement of market conditions for defence procurement NATO-wide;

- 12.5 eliminate obstacles to the transfer of defence technology among members of the Alliance; and
- 12.6 take fully into account the special position of member nations with developing defence industries.

13. In order to facilitate a move towards an Alliance-wide defence industrial base and to ensure security of supply among them, the members of the Alliance will endeavour not to prevent any defence suppliers from providing continued supply of goods and services to the Ministries of Defence of other member nations' governments for their own national use. [When authorizing the sale or transfer of military equipment to a government of a member of the Alliance, for use by its own armed forces, the selling nation will not impose restrictions other than limitation on re-sale or transfer to a third party.]

III. GOVERNMENT DEFENCE PROCUREMENT PRACTICES AND PROCEDURES

14. Non-discriminatory treatment of suppliers within the market

14.1 Members of the Alliance will ensure the non-discriminatory application of procurement practices and procedures to industry sources throughout the Alliance by extending to the industries of other members treatment no less favorable than that extended to its own industries. Equally, the degree of foreign affiliation or ownership will not be used to discriminate among locally-established suppliers.

14.2 The principle of non-discrimination will be consistently applied throughout all stages of the procurement process.

15. Qualification of suppliers

15.1 Any conditions on qualification of suppliers will be established in a non-discriminatory manner and limited to those essential to ensure the company's capability to fulfill the contract in question, and will be made available to all suppliers in a timely manner. The process of, and the time required for, qualifying suppliers will not be used either to keep foreign suppliers off a suppliers list or from being considered for a particular proposed procurement, or to delay unduly any proposed contract award.

- 15.2 Members of the Alliance will seek mutual recognition of potential suppliers on a NATO-wide basis. Where needed, in order to achieve reciprocal recognition of a nationally qualified supplier, appropriate arrangements will be made. A network of "focal points" will be established to assist in the exchange between member nations of data concerning potential suppliers and in the provision to potential suppliers of general information on national contracting practices.
16. Publication of and non-discriminatory access to bidding opportunities
- 16.1 In order to inform potential suppliers in all member nations of opportunities to bid for defence contracts in fair and open competition, each member of the Alliance will publish in a timely and effective manner specific notices of proposed procurements of defence equipment and contracts placed. Such notices shall constitute either an invitation to participate in the bidding process or to qualify to bid.
17. Bid solicitation
- 17.1 Tender documentation will be available in good time to potential tenderers and contain all specific information necessary to permit them to submit responsive bids.
- 17.2 Members of the Alliance will make available information concerning laws, regulations, procedures, practices and requirements regarding national procurement.
18. Solicitation/tender evaluation criteria
- 18.1 The fundamental criteria on which contracting authorities should base the award of each contract will be cost (both acquisition and life-cycle as appropriate), schedule, technical merit of offers, or other specific criteria set out in the solicitation/invitation. The purchasing government will retain full responsibility for selection of the winning tender.

19. Contractor debrief and dispute settlement procedures

19.1 It will be a basic principle in handling contractor representations within the Alliance that parity of treatment as between national and non-national tenderers be afforded.

19.2 Any tenderer who considers himself to have been disadvantaged in any particular respect in the tendering or selection procedures relating to a defence procurement contract undertaken by the government of a member nation will have the right to make formal representations in that specific respect to that government.

19.3 Competing suppliers will be notified promptly as to the successful offerer. On request, suppliers will be debriefed promptly concerning the reasons why they were not allowed to participate in a procurement or were not awarded a contract.

20. Contract auditing procedures

20.1 Members of the Alliance recognize the authority of the national audit services/authorities of the supplier's government to conduct contract cost verification and/or price investigations if requested by and on behalf of the purchasing government. In so doing, they will follow their own laws, regulations and practices. Where needed in order to achieve reciprocal recognition of all such investigations, arrangements to this end will be effected.

21. Quality control and quality assurance practices and procedures

21.1 Members of the Alliance recognize the responsibility of the national authorities of the supplier's government to perform quality control/assurance verifications and/or investigations if requested by and on behalf of the purchasing government. In so doing, they will apply existing NATO agreements concerning government quality control and quality assurance practices and procedures. Where such agreements do not exist or are not sufficient, additional agreements will be effected.

22. Protection of classified information and data

22.1 Members of the Alliance will ensure that the security classification of material held or used, or information exchanged in connection with the work covered by this Code of Conduct be safeguarded in accordance with agreed NATO and other multilateral security provisions.

IV. INTRA-ALLIANCE TECHNOLOGY TRANSFER

23. Measures to enhance technology sharing within NATO

23.1 Members of the Alliance, subject to national security considerations, will remove barriers to sharing of technology across national boundaries between Allied industries, including barriers stemming from divergent national export licensing requirements, and will avoid any discrimination among suppliers within the Alliance.

23.2 Regarding technology sharing as vital to the effort to improve the conditions of defence trade, governments of member nations, when possessing proprietary rights, will make technical information and data available on fair and reasonable terms. Where governments are not the owners of such rights, they will encourage the owners to transfer the information on the same terms.

23.3 [When authorizing the sale or other transfer of military technology to a government of a member of the Alliance for use by its own armed forces, the selling nation will not impose restrictions other than limitation on re-sale or transfer to a third party.]

23.4 Member nations should be prepared to support the efforts of their respective national industries in intra-Alliance negotiations of licenses, royalties and technical information exchanges.

24. Safeguards against re-export of critical military technology

24.1 Respecting national security and foreign policy considerations, member nations agree to the need for effective and efficient controls vis-a-vis third countries on the transfer within the Alliance of technical information and data which is classified or subject to export restrictions by the country of origin.



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V. TRANSITIONAL MEASURES

25. Objectives

25.1 In order to establish confidence in the progressive elimination of existing barriers to trade and the transfer of technology, and to ensure systematic improvement of market conditions for defence procurement NATO-wide, the members of the Alliance will consider an adequate period of transition. Specific transitional measures to remove barriers to defence trade will take into account the various legal, administrative and political structures of member nations, as well as their differing levels of industrial and technical capability.

25.2 The adoption of a progressive approach to the implementation of measures agreed in the Code of Conduct is regarded as a key means of establishing mutual benefit and reciprocity among members of the Alliance.

26. Removal of barriers to defence trade

26.1 During a period of transition, and starting from its outset, members of the Alliance will progressively reduce and eliminate existing barriers to defence trade which have the effect of restricting entry into procurement markets, discriminating among potential suppliers, limiting collaboration or preventing the transfer of technology.

26.2 The removal of barriers to defence trade and the transition to a more open market for defence procurement within the Alliance are expected to achieve over time economic, technological and industrial benefits for all member nations.

26.3 A transitional period will be required to allow the defence industries of some member nations to prepare themselves for the impact of open competition across borders and for their participation, whether as prime or sub-contractors, in an Alliance-wide industrial and technological base.

26.4 During the period of transition, some members of the Alliance require the maintenance of existing specific measures, e.g. juste retour and offsets, to secure an equitable economic return for national spending abroad for defence procurement. As barriers to defence trade - legal, legislative, political, technical, cultural, procedural, or attitudinal - are eliminated, these specific transitional measures will also be eliminated. This process of elimination will be reciprocal.

and actions will begin and end simultaneously. In its progressive implementation, this process will take into account the differences in existing barriers to defence trade among the members of the Alliance.

27. Specific transitional measures for DDI nations

27.1 During the transitional period, members of the Alliance will give favourable consideration to exclusions of the DDI nations from the principle of non-discrimination and from the elimination of economic return measures with respect to certain procurements. These exclusions are necessary to improve their contribution to the Alliance industrial and technological base, and will be defined for each DDI nation.

27.2 Other members of the Alliance will, upon request, provide additional assistance to potential suppliers in DDI nations in submitting tenders for proposed procurements.

27.3 Other members of the Alliance will give favorable consideration to facilitating the participation of DDI nations in collaborative research, development and production programmes.

VI. IMPLEMENTATION

28. Members of the Alliance will ensure that the principles and operating guidelines in this Code of Conduct are applied on the broadest possible basis to their procurement activities from the date of its endorsement.

29. Within the framework of the Conference of National Armaments Directors (CNAD), members of the Alliance will jointly develop and put into practice NATO-wide arrangements required to operate the provisions of this Code of Conduct and will review the operation, effectiveness and implementation of the Code on a regular basis. They will attempt to resolve, expeditiously and equitably, any practical difficulties of a general nature which may be encountered concerning the interpretation or application of the Code of Conduct.

30. Members of the Alliance will initiate further consultations on the intra-Alliance transfer of technology and transitional measures as described in Chapters IV and V above.

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31. The Conference of National Armaments Directors shall annually inform the Council on progress in implementing this Code of Conduct and in improving the conditions of defence trade within the Alliance.

APPENDIX 5.

PARTNER COUNTRIES WHICH HAVE SIGNED THE PARTNERSHIP FOR PEACE FRAMEWORK DOCUMENT, AS AT 30 MARCH 1994.

DATELINE	COUNTRY	POSITION OF SIGNATORY
26/01/94	Romania	Minister for Foreign Affairs
27/01/94	Lithuania	President
02/02/94	Poland	Prime Minister
03/02/94	Estonia	Minister for Foreign Affairs
08/02/94	Hungary	Minister for Foreign Affairs
	Ukraine	Minister for Foreign Affairs
09/02/94	Slovakia	Prime Minister
14/02/94	Bulgaria	President
	Latvia	Prime Minister
23/02/94	Albania	President
10/03/94	Czech Republic	Prime Minister
16/03/94	Moldova	President
23/03/94	Georgia	Foreign Minister
30/03/94	Slovenia	Prime Minister

Source: "Focus On NATO", NATO REVIEW, Vol.42, No.2, April 1994, p.32.

APPENDIX 6.

CORRELATION MATRIX
(TECHNICAL INTERACTIONS)

CUSTOMER REQUIREMENTS		POLITICAL WILL/COMMITMENT	PROCEDURAL MECHANISMS	MANPOWER: REGULAR TROOPS, RESERVES AND SPECIAL UNITS	REGULAR MANOEUVRES AND TRAINING EXERCISES	AIRCRAFT: COMBAT, TRANSPORT AND SUPPORT	HELICOPTERS: ATTACK, TRANSPORT AND SUPPORT	SEA POWER	LAND POWER	LOGISTICS AND SUPPLY	INTEGRATED MILITARY STRUCTURE	SOPHISTICATED C3I	TECHNOLOGICAL CAPABILITY	VISION, STRATEGY AND TACTICS	CUSTOMER RATING OF PERFORMANCE
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> SELECTED DETAILS OF SERVICE (NOT IN ORDER OF PREFERENCE) </div>	IMPORTANCE RATING 1-5 (MAX)													1 (worse)-5 (better)	
HIGH DETERRENT VALUE	5	●	▲	○	●	●	●	●	●	□	□	●	●	●	Customer Perception of Institution's Performance versus Competitors' Service Performance
MILITARILY SUCCESSFUL	5	●	△	●	○	●	●	●	●	○	○	●	●	●	
AVAILABILITY	5	●	□	●	○	●	●	●	●	●	●	●	●	●	
SUSTAINABILITY	5	●	□	○	○	□	□	□	□	●	●	●	○	●	
RELIABILITY	5	●	□	●	○	□	□	□	□	●	●	●	○	●	
SURVIVABILITY	5	○	□	●	□	□	□	□	□	●	●	●	●	●	
FLEXIBILITY	4	○	●	●	□	○	○	○	○	●	●	●	●	●	
RAPID-RESPONSE	4	○	○	●	○	●	●	○	○	●	●	●	●	●	
RESOURCE-EFFICIENCY	3	□	□	○	○	□	□	□	□	○	○	○	○	●	
ENVIRONMENTALLY-FRIENDLY	2	□	△	▲	□	△	△	△	△	▲	▲	▲	□	□	
DEFENCE INDUSTRIAL BENEFITS	3	○	△	▲	▲	□	□	□	□	○	○	○	○	○	
LOW FATALITY/CASUALTY RATE	3	△	▲	○	○	□	□	□	□	○	○	○	○	○	
TECHNICAL/COST RANKINGS															
OPERATIONAL TIME RESOURCE CONSTRAINTS POLITICAL AND SOCIAL COSTS															
TECHNICAL RATINGS															
TARGET VALUES OF TECHNICAL CHARACTERISTICS															

KEY TO CENTRAL MATRIX SYMBOLS

●	○	□	△	▲
STRONG POSITIVE	POSITIVE	NEUTRAL	NEGATIVE	STRONG NEGATIVE

The above diagram is a partially completed HoQ provided here for illustrative purposes only. Total completion would require inputs from specialist customer groups. The HoQ serves both a descriptive and prescriptive function.

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