



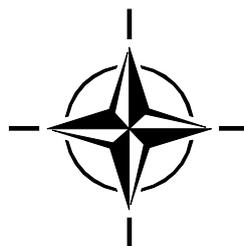
**RTO TECHNICAL REPORT**

**TR-SAS-066-Phase-II**

# **Joint Operations 2030 – Phase II Report: February 2009**

(Opérations interarmées 2030 – Rapport Phase II :  
Février 2009)

This Report documents the results of the Thematic Analysis approach that  
was developed and applied during Phase II of the SAS-066,  
Joint Operations 2030 Long-Term Scientific Study.



Published April 2011





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# The Research and Technology Organisation (RTO) of NATO

RTO is the single focus in NATO for Defence Research and Technology activities. Its mission is to conduct and promote co-operative research and information exchange. The objective is to support the development and effective use of national defence research and technology and to meet the military needs of the Alliance, to maintain a technological lead, and to provide advice to NATO and national decision makers. The RTO performs its mission with the support of an extensive network of national experts. It also ensures effective co-ordination with other NATO bodies involved in R&T activities.

RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also co-ordinates RTO's co-operation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of co-operation.

The total spectrum of R&T activities is covered by the following 7 bodies:

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier co-operation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

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## List of Abbreviations

ACT	Allied Command Transformation
CNN	Cable News Network
JO 2030	Joint Operations 2030
LTSS	Long-Term Scientific Study
NATO	North Atlantic Treaty Organisation
NGO	Non-Government Organisation
SAS	System Analysis and Studies Panel
WMD	Weapons of Mass Destruction

# Joint Operations 2030 – Phase II Report: February 2009

(RTO-TR-SAS-066-Phase-II)

## Executive Summary

In Phase II of the NATO SAS-066 Joint Operations 2030 Long-Term Scientific Study, the Study Group embarked on a Thematic Analytical effort where a Theme was considered to be a description of developments that could lead to or provoke manifest changes in the ‘why’ (role and embedding), ‘what’ (missions and tasks) and ‘how’ (structures, processes, and concepts of operation) of future NATO military operations and organisations. This report documents the reasons for adopting this approach, and includes brief descriptions of each of the 18 Themes. Each of the 18 Themes generated from this effort are listed below:

- Theme 1 – Blurred Distinction between Peace and Conflict
- Theme 2 – Standing Arrangements
- Theme 3 – Planning Under Deep Uncertainty
- Theme 4 – Different Paradigms in Decision-Making
- Theme 5 – Evolving Relationships between Man, Robotics and Machine Intelligence
- Theme 6 – Staying Power
- Theme 7 – Small Team Operations
- Theme 8 – Strategic Compression
- Theme 9 – Dual-Use Technologies
- Theme 10 – Non-Military/Non-Violent Threats
- Theme 11 – Regeneration
- Theme 12 – Three Domains of War: Physical, Mental and Moral
- Theme 13 – Coalition Operations
- Theme 14 – Space is Opening Up
- Theme 15 – Cost Escalation
- Theme 16 – Political Transformation
- Theme 17 – The Role of Information and the Media
- Theme 18 – Super-Empowered Individuals

These 18 Themes were used in Phase III of the study in an effort to generate a JO 2030 Capability Set.

# Opérations interarmées 2030 – Rapport Phase II : Février 2009

(RTO-TR-SAS-066-Phase-II)

## Synthèse

Dans la phase II de l'étude scientifique à long terme JO 2030 du SAS-066, le groupe d'étude s'est lancé dans un travail d'Analyse Thématique, dans lequel un thème était considéré comme étant une description de développements qui pourraient conduire à ou provoquer des changements manifestes des < pourquoi > (rôle et fixation), < quoi > (missions et tâches) et < comment > (structures, processus, et concepts d'opérations) des futures organisations et opérations militaires de l'OTAN. Ce rapport documente les raisons d'adopter cette approche, et inclut une brève description de chaque thème. Au nombre des 18, les thèmes issus de ce travail sont listés ci-dessous :

- Thème 1 – Distinction floue entre paix et conflit
- Thème 2 – Arrangements permanents
- Thème 3 – Planification sous profonde incertitude
- Thème 4 – Différents paradigmes de prise de décision
- Thème 5 – Évolution des relations entre homme, robotique et intelligence des machines
- Thème 6 – Pouvoir pérenne
- Thème 7 – Opérations en petite équipe
- Thème 8 – Compression stratégique
- Thème 9 – Technologies duales
- Thème 10 – Menaces non-militaires / non-violentes
- Thème 11 – Régénération
- Thème 12 – Les trois domaines de la guerre: physique, mental et moral
- Thème 13 – Opérations en coalition
- Thème 14 – L'espace s'ouvre
- Thème 15 – Escalade des coûts
- Thème 16 – Transformation politique
- Thème 17 – Rôle de l'information et des médias
- Thème 18 – Individus aux supers pleins pouvoirs

Ces 18 thèmes ont été utilisés en phase III de l'étude pour générer un ensemble JO 2030 de capacités.

# **JOINT OPERATIONS 2030 – PHASE II REPORT**

## **1.0 INTRODUCTION**

### **1.1 SAS-066 JO 2030 Background**

Three major Long-Term Scientific Studies (LTSSs) were conducted in the 1990s under the auspices of the predecessors of the NATO Research and Technology Organization. These studies addressed the potential for emerging technology to have an impact on Land, Air and Maritime operations, and recommended technical solutions to shortfalls in capability predicted to occur in the 2015 to 2020 time period. The results had a significant influence on planning in NATO Strategic Commands and Research and Technology activities in NATO bodies and Nations (e.g., Long-Term Capability Requirements, and Programme of Work of the Main Armament Groups).

Since the completion of these service-specific LTSSs, the missions and role of the Alliance have changed significantly, and while many of the previous findings may still be applicable, a whole range of new operational factors and planning scenarios have appeared. Therefore, in 2006 a new LTSS was commissioned on Joint Operations in the year 2030 (JO 2030).

### **1.2 Study Objectives**

Joint Operations 2030 was intended to:

- 1) Consider the impact that potential future global security environments could have on joint operations across a range of representative operations;
- 2) Determine the types of capabilities and that may be needed in this future environment; and
- 3) Consider how applied technologies might have a potential impact upon future capabilities and identify system concepts that could either close capability gaps or significantly enhance capabilities.

### **1.3 Report on the Phase II Results**

This, the Phase II report, is a summary of activity up to the end of Phase II of the SAS-066 JO 2030 LTSS. In Phase II, the study team further developed and described the Themes that had been articulated in the later stages of Phase I [1]. These Themes were later combined with the NATO capabilities that came from NATO Allied Command Transformations Long-Term Requirements Study and used to generate a list of JO 2030 capabilities but this is the work of Phase III and will be reported upon in a separate document.

## **2.0 JO 2030 THEMATIC ANALYSIS**

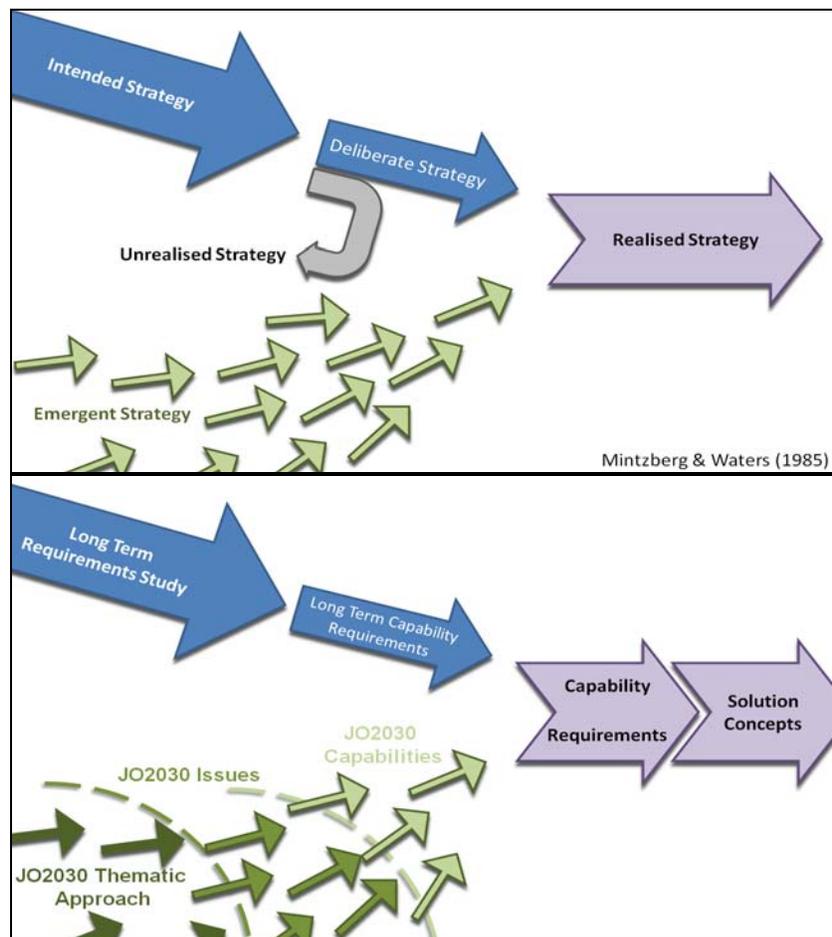
### **2.1 JO 2030 Thematic Analysis Approach**

The approach taken by Joint Operations 2030 was based on two principles. One is complementary – the study should add to, rather than duplicate, ongoing long-term planning efforts, notably the Allied Command Transformation (ACT) Long-Term Requirements Study (LTRS). Indeed the Study deliberately tried to create the space to explore problems and realities resident within the NATO military organisations and operations and not to be constrained by current NATO constructs and policies. The other is that in an era of ‘deep’ uncertainty,

## JOINT OPERATIONS 2030 – PHASE II REPORT

trying to strive for ‘completeness’ is bound to fail. This is not just a matter of practicality – having to deal with a lot of ‘possible futures’ would soon outstrip the resources available to the study. More importantly was the acceptance that deep uncertainty prevents from defining ‘completeness’ in the first place. As a matter of principle, for the given time horizon of some 20-plus years, one cannot postulate a set of scenarios – and associated military missions and tasks – that represents with a high degree of confidence all relevant future environments and possible military endeavours within.

Inspired by the strategic planning theories of Mintzberg and Waters, the Joint Operations 2030 team therefore postulated a less ‘purposive’ and more ‘impressionistic’ approach as compared to the more trend extrapolation approach of other long-term planning efforts. Mintzberg and Waters suggested that realised strategy was the outcome of an intended strategy – deliberately planned and organised – and emergent strategy – which is an outcome of interpretation of the intended strategy and an organisation’s adaptation to external circumstances. The Mintzberg and Waters concept of the ‘Realised Strategy’ is set-out in “Of Strategies, Deliberate and Emergent” [2].



**Figure 1: Mintzberg and Waters Realised Strategy and the JO 2030 Realised Approach.**

The development of the JO 2030 Thematic Approach began in the latter stages of Phase I of the study and was more fully developed during a series of meetings in Phase II. At some points, the newly adopted approach

deviates from the methodological steps as proposed in the initial Terms of Reference. All changes were discussed and agreed to by the study group as a whole and, subsequently, reported and agreed to by the RTO SAS Panel.

Figure 2 gives a schematic overview of the Thematic Approach. It relates JO 2030 phases with activities and outputs. Study deliverables will be the phase reports and supporting outputs will include detailed point papers for each Theme, a list of the identified Capability Requirements for each Theme-Issue combination, developed system concepts, and key areas for future RTD. The five phases indicated are briefly described below.

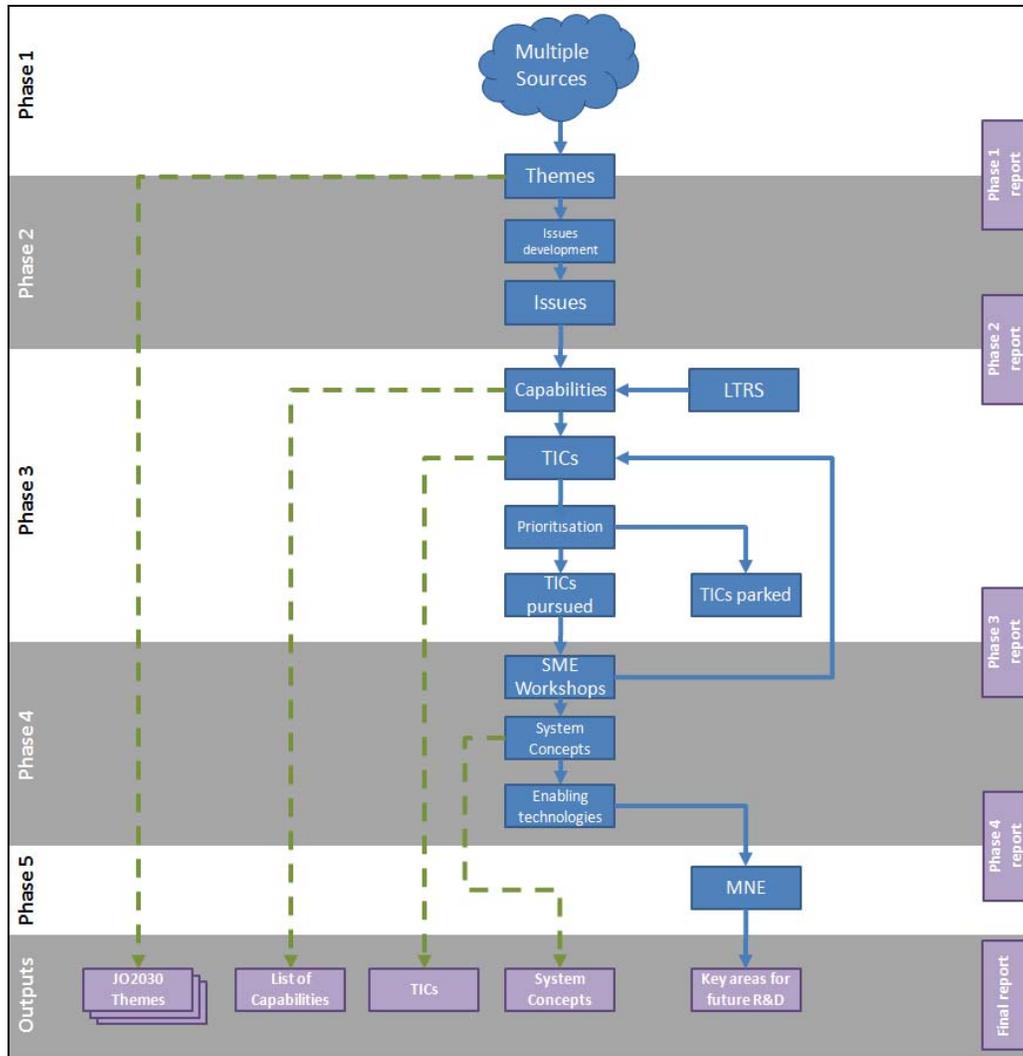


Figure 2: JO 2030 Study Flow Diagram with Phases and Activities.

## 2.2 Phase I – Identification of Themes

In Phase I fundamental, longer-term developments in the environment in which NATO will exist and operate were considered. These possible developments could be trends, breakthroughs or shocks in the geopolitical

security environment, in the institutional context, in technology development or in underlying social/economical/moral/legal structures. This drew upon a wide range of sources, including ACT's Multiple Futures Project, various Nations internal strategic assessments, and other related future security analysis. From this, a number of Themes were derived and here the JO 2030 Study agreed that a Theme was considered to be a description of developments that could lead to or provoke manifest changes in the 'why' (role and embedding), 'what' (missions and tasks) and 'how' (structures, processes, and concepts of operation) of future NATO military operations and organisations.

The 'complementary' principle places particular emphasis on developments and possible consequences that are typically not covered by more extrapolation-based long-term planning methods. The 'completeness is impossible' principle signifies that Theme generation is a creative process, rather than a well-established derivation and selection methodology.

Employing a series of creative spirals and iterations the JO 2030 Study agreed upon a set of eighteen Themes. These Themes do not define the future and are not intended to be comprehensive in their scope or coverage and indeed could even be added to again in the future.

### 2.3 JO 2030 Themes

The titles of the 18 agreed upon JO 2030 Themes are as follows. A brief description of each of the 18 Themes follows in the next section:

- Theme 1 – Blurred Distinction between Peace and Conflict
- Theme 2 – Standing Arrangements
- Theme 3 – Planning Under Deep Uncertainty
- Theme 4 – Different Paradigms in Decision-Making
- Theme 5 – Evolving Relationships between Man, Robotics and Machine Intelligence
- Theme 6 – Staying Power
- Theme 7 – Small Team Operations
- Theme 8 – Strategic Compression
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- Theme 11 – Regeneration
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- Theme 17 – The Role of Information and the Media
- Theme 18 – Super-Empowered Individuals

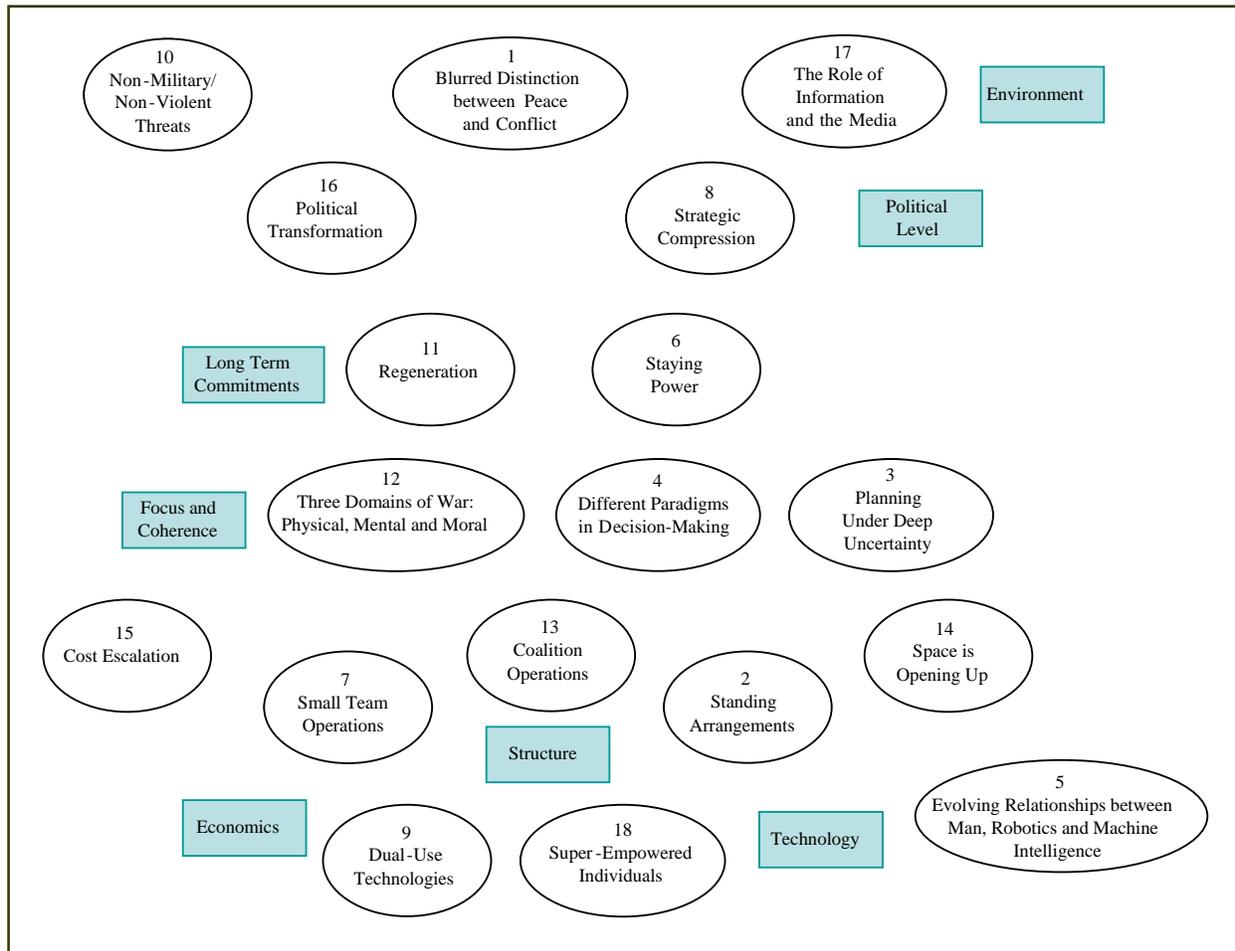


Figure 3: JO 2030 Themes – A Visual Representation.

### 3.0 JO 2030 BRIEF THEME DESCRIPTIONS

#### 3.1 Introduction and Brief Description of Each of the Themes

In addition to defining and agreeing to each Theme, during Phase II efforts were made to elaborate, enrich and identify each Theme. A brief summary of this effort is presented below in the form of a brief description for each Theme.

##### 3.1.1 Theme 1 – Blurred Distinction between Peace and Conflict

The distinction between peace and conflict will become more blurred over the next decades as forces are used to accomplish traditional and non-traditional military missions in areas where a sustained threat will be present. This will be brought about by the globalization of the threat from terrorists, extreme fundamentalists, transnational criminals and weapons proliferation. There will be a shift from the sequential, phased, contiguous operations of the past to more continuous, simultaneous, parallel and distributed operations bringing military forces in contact with civilians, NGOs and indigenous security forces as well as a variety of opposing forces with diverse motives for conducting violent and non-violent actions.

### **3.1.2 Theme 2 – Standing Arrangements**

Increasingly, in order to achieve its political and military objectives, the Alliance will operate within a comprehensive approach that will include a host of non-military supporting/supported organizations. The complementary capabilities of these partners will increase the overall capability of the Alliance to achieve its goals and, thus, must be included in the early planning and execution phases of operations to ensure their coherent application. These organizations will include NGOs, international and regional IOs, and private contractors, which are increasingly being used in outsourced non-core military capabilities. In order to successfully coordinate lines of development and to integrate these organizations into operations, it will be necessary to consider them within the operational planning process and to develop standing arrangements.

### **3.1.3 Theme 3 – Planning Under Deep Uncertainty**

In the past, where conditions were relatively certain, Alliance defence and operational planning processes were deliberate and reflected ‘strategy as design’. The fluidity and pace of change within the emerging globalised environment will increasingly demand that planning for Alliance operations will be done under conditions of deep uncertainty. Deep uncertainty is present when decision-makers do not know or cannot agree on – the current system model of how things fit together, prior probabilities, timing and cost. This will require a new suite of methods and analytical tools to support decision-makers in a ‘strategy as process’ manner to develop capabilities that are flexible, adaptable and robust.

### **3.1.4 Theme 4 – Different Paradigms in Decision-Making**

The interconnected strategic environment of the 21<sup>st</sup> century has given rise to increased uncertainty and complexity. These emerging threads have been grasped by increasingly adaptive opponents. For the Alliance to be successful in the coming decades, it will have to undertake politically and militarily complex missions requiring a comprehensive approach. The interaction of changing circumstances in the strategic and operational environments will require different paradigms for decision-making. The complexity of future Alliance operations implies both quantitative and qualitative changes in the information and analytical support needed to make good and timely decisions. This could mean a move from the current paradigm of ‘command and control’ to one of ‘focus and convergence’.

### **3.1.5 Theme 5 – Evolving Relationships between Man, Robotics and Machine Intelligence**

The exponential increase in computing power over the coming decades will lead to advances in artificial intelligence and the increasing use of robotics in military operations. The removal of the ‘man from the loop’ has beneficial effects, but also leads to questions on how to incorporate these advances into military operations. In operations where concerns over fratricide, defective targeting and collateral damage may override effectiveness, reluctance to deploy autonomous weapons system may persist. These advances demand changes in other aspects of military planning and execution brought about by the increasing speed of action available to autonomous systems.

### **3.1.6 Theme 6 – Staying Power**

It seems probable in the coming decades that Alliance military forces will be engaged on a more or less continuous basis in operations requiring significant numbers of the troops and weapons systems. To successfully undertake such operations over time will require ‘staying power’ from Alliance Nations to remain engaged. There is a perception that Alliance forces currently do not possess sufficient staying power to engage a

tenacious, adaptive enemy that seeks to keep Alliance forces engaged for a long period. Staying power must be developed at several conceptual levels:

- Political – political priorities and messages must be aligned to keep forces engaged;
- Operational – clever campaign design, use of technology, avoidance of too ambitious operations and increased forces; and
- Tactical – operations are typically undertaken by small units demanding improved equipment, protection and tactics.

### **3.1.7 Theme 7 – Small Team Operations**

In the future, military operations will increasingly be the domain of small units and teams. This will include variants of small fighting units and multi-disciplinary teams designed to address specific multi-faceted problems where security only forms part of the puzzle. These teams must generally work autonomous, independent missions for considerable periods of time. These teams must be able to shape the ‘command intent’ to develop solutions based on local conditions. They must be able to ‘sense and respond’ independent of the larger force and adapt accordingly. This will drive modularity and networked requirements.

### **3.1.8 Theme 8 – Strategic Compression**

Strategic compression can be defined as the forming of unexpected causal relationships and breaking of expected causal relationships among the tactical, operational and strategic levels of conflict in the political, information, military and economic domains. This is a combination of the ‘strategic corporal’ and the ‘tactical politician’. This is brought about by the interconnectedness of the globalised environment and the pervasiveness of the 24-hour media cycle supported by almost instantaneous information systems and networks allowing more people access to more information. The coalition nature of most future operations will increase the importance of controlling strategic compression to maintain the coherence/viability of the coalition.

### **3.1.9 Theme 9 – Dual-Use Technologies**

The concept of dual-use technology has most recently been used to describe the use of commercial technology for military purposes. With the bulk of research and development funds being expended on commercial development of technology, it very likely such developments will produce systems that will have a collateral military use. As scientific advances increase exponentially over the coming decades, there will be a requirement to monitor commercial technology for those developments that could give possible adversaries a mechanism to produce weapons systems.

### **3.1.10 Theme 10 – Non-Military/Non-Violent Threats**

The Alliance will face a variety of hybrid threats in the future. These include non-military threats where the source of the threats are non-conventional military forces and non-violent threats wherein, though it may be an enabler or an intended consequence of the action, violence is not an inherent element. These threats could come about through deliberate action, accidental occurrences or natural disasters. The cause and effect of these events is not limited by borders and are characterized by difficulty in prediction, detecting, localizing and typically involve little or no warning. They require trans-national coordination and inter-agency cooperation to resolve. Examples of these types of threats include:

- Computer network attack;

- Pandemics;
- Mass migration and
- Natural disasters.

### **3.1.11 Theme 11 – Regeneration**

Most NATO Nations have moved away from large forces toward smaller, more professional and more technologically intense forces as the threat from a peer competitor has receded over the last decades. The focus has moved to fighting short, intense battles against a medium sized force or conducting, what had been termed ‘lesser included’, missions such as counter-insurgency or stabilization/reconstruction. Regeneration refers to the ability of the Alliance to restore operational capabilities that formerly had been in its inventory or to develop a capability that is technically feasible but is not available for immediate use. Regeneration includes recognizing the need for taking action, conceptualizing the capabilities, deriving DOTMLPFI (Doctrine, Organisation, Training, Material, Leadership and education, Personnel, Facilities, and Interoperability) and producing the capability.

### **3.1.12 Theme 12 – Three Domains of War: Physical, Mental and Moral**

Kinetic activity associated with traditional military operations has been joined by actions in the moral and mental (information) domains as equal components of a successful campaign plan. The war of ideas, for hearts and minds, or Fourth Generation Warfare, amongst the people has stressed the relevance of the moral and mental domains. As asymmetric adversaries avoid exposing themselves to the superior conventional force of the Alliance, the importance of actions outside the physical domain become more obvious. Within irregular warfare the importance of the moral domain becomes dominant as the security of the people becomes an overarching goal. In the future, physical actions will be used to enable the achievement of objectives in the mental and moral domains.

### **3.1.13 Theme 13 – Coalition Operations**

In the future, no single instrument of power will be able to solve complex crises. Coalitions will be used extensively to conduct all manner of military operations. Members of the coalition will provide various capabilities to the force while accepting differing levels of risk. Coalition operations will highlight areas such as interoperability and common doctrine. The ability to develop a common strategy within a common legal framework will be crucial to the achievement of coalition objectives. This Theme raises issue of interoperability, role specialization, training and equitable sharing of costs and risks.

### **3.1.14 Theme 14 – Space is Opening Up**

By 2030 the amount of traffic in space will have increased markedly requiring coordination and regulation. The Alliance will remain dominant in this area with capabilities for ISR, navigation and weather observation based in space. The commercial sector of particularly western economies also relies heavily on space communications. The reliance of the Alliance on space could develop into a focus area for possible adversaries that could seek to exploit this potential ‘Achilles heel’. Space junk and anti-satellite systems are threats to the usage of space during operations. Commercial enterprises allow even small groups to have access to space imagery that could be used for intelligence purposes. Space Situational Awareness becomes an important component for future Alliance operations.

### **3.1.15 Theme 15 – Cost Escalation**

It will be critically important to have a full understanding of the growing costs of developing and operating military weapons systems. With constant defence budgets in real terms, the increasing unit and operating/maintenance costs of systems and personnel will bring about reductions in force structures over time. Long-term planners will require knowledge of Operating Cost Escalation (OCE) and Investment Cost Escalation (ICE). The effects of technological progress that improves a product's quality or performance as opposed to those that make the production process more effective pertain, and it is highlighted that the former more readily affects military systems as Nations attempt to acquire smaller numbers of 'state of the art' systems. Combined with acquisition in the early stages of product development (limiting cost reductions from learning), the inability to allocate research and development across a high number of systems, and the likelihood that these systems are manufactured in high labour cost Nations results in cost escalation.

### **3.1.16 Theme 16 – Political Transformation**

Political transformation may be needed if the Alliance is to achieve a fundamental military transformation. The future 'mission space' is expected to require quicker and more decisive action at all levels of command. The capability to achieve strategic surprise calls for political acceleration and dominance. Projection of trends into the future shows that individual Nations will exhibit support for those issues that truly matter to all but will sometimes exhibit ambivalence to those issues with which they have reservations. This manifests itself as political agreement to an operation, but failure to then take a fair share of the burden. Political transformation will require:

- The capability to arrive at political decisions in a timely manner;
- The need to share equitably the burden of risk and cost;
- The incorporation of the 'whole-of-government' or 'comprehensive' approach; and
- The need to garner public support for ongoing operations.

### **3.1.17 Theme 17 – The Role of Information and the Media**

The media has become instrumental in developing the context for the public audiences that affect the Alliance. The pervasive 24/7 media cycle will continue to create the 'CNN effect' where strong emotional content can engender public reaction which may affect political and military decision-making at all levels of command. There is a symbiotic relationship between the military and the media in that the media requires access and information and the military needs the media to communicate with the public. The increased instantaneous access to information available to the public will be a serious consideration in the future as public perception can drive constraints on both the political and military levels.

### **3.1.18 Theme 18 – Super-Empowered Individuals**

In the coming decades, access to, development, deployment and usage of powerful conventional and unconventional weapons, including WMDs, will have spread to not only small countries, but will come within the reach of non-state actors such as terrorist networks and trans-national criminals. The exponentially accelerating convergence of nanotechnology, biology, information systems and cognitive sciences – all of which have major dual-use potential – will enable groups as small as single individuals to develop highly dangerous weapons. Lower barriers to access to the required knowledge and technology will enable the low cost – low signature production of weapons with destructive power up to those of WMD. The combined effect

of these trends has been termed ‘toxic knowledge’ or the ‘holocide intercept’ where individuals could conceivably endanger large parts of society.

### **3.2 Themes to Issues to Capabilities**

Phase II also saw the start of the derivation of Issues and Capabilities from these Themes but since the generation of the JO 2030 Capability Set is the subject of the Phase III Report the full description of that effort will be left to that report.

## **4.0 CONCLUSION**

The SAS-066 Joint Operations 2030 Phase II Report documents the Thematic Analytical effort that was conducted by the Study. The Study considered a Theme to be a description of developments that could lead to or provoke manifest changes in the ‘why’ (role and embedding), ‘what’ (missions and tasks) and ‘how’ (structures, processes, and concepts of operation) of future NATO military operations and organisations. This analytical effort allowed for a greater exploration of the problem and capability needs of NATO future Joint Operations then would have resulted from a standard trend extrapolation or reliance on current capability sets developed from within current NATO policy and doctrine guidelines.

In the end, Phase II generated 18 Themes which were subsequently applied to a capability definition effort in the next phase of the study. The 18 Themes have been elaborated and expanded to add additional context and meaning and the brief descriptions of each of these 18 Themes is contained in this report.

## **5.0 REFERENCES**

- [1] Joint Operations 2030 – Phase I Report: June 2007, RTO-TR-SAS-066-Phase-I, April 2011, 28 pgs.
- [2] Mintzberg and Waters, “Of Strategies, Deliberate and Emergent, Strategic Management Journal, Vol. 6, pp. 257-272, 1985.

## **Annex A – LIST OF CONTRIBUTORS TO THE JO 2030 THEMATIC GENERATION EFFORT**

<b>Name</b>	<b>Country/Organization</b>
Barbu, Cornel	ROU
Bekkers, Frank	NLD
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Leeman, Geert	BEL
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Lemche, Viggo	DNK
Massel, Paul	CAN
Meier, Andreas	DEU
Ouellet, Eric	CAN
Pikner, Ivo	CZE
Purton, Simon	NATO ACT
Schlichting, Heinz-Fredrick	DEU
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## Annex B – VISUAL ATTENDEES LIST BY COUNTRY/ORGANIZATION

Country	Exploratory Team Meeting 22-23 March 2006	Phase I Meeting 6-10 November 2006	Phase II Meeting 25-29 June 2007	Phase III Meeting 1 6-9 November 2007	Phase III Meeting 2 4-9 February 2008
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CAN					
CZE					
DNK					
FRA					
DEU					
HUN					
ITA					
NLD					
NOR					
ROU					
SVK					
SVN					
USA					
NATO					

## ANNEX B – VISUAL ATTENDEES LIST BY COUNTRY/ORGANIZATION

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<b>REPORT DOCUMENTATION PAGE</b>															
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<b>7. Presented at/Sponsored by</b> This Report documents the results of the Thematic Analysis approach that was developed and applied during Phase II of the SAS-066, Joint Operations 2030 Long-Term Scientific Study.															
<b>8. Author(s)/Editor(s)</b> Multiple			<b>9. Date</b> April 2011												
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<b>13. Keywords/Descriptors</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">JO 2030</td> <td>Long-Term Scientific Study</td> </tr> <tr> <td>JO 2030 Capability Set</td> <td>NATO Long-Term Capability Requirements</td> </tr> <tr> <td>JO 2030 Themes</td> <td>Thematic analysis</td> </tr> <tr> <td>Joint Operations 2030</td> <td>Theme-Issue-Capability</td> </tr> <tr> <td>LTCRs</td> <td>TICs</td> </tr> <tr> <td>LTSS</td> <td></td> </tr> </table>				JO 2030	Long-Term Scientific Study	JO 2030 Capability Set	NATO Long-Term Capability Requirements	JO 2030 Themes	Thematic analysis	Joint Operations 2030	Theme-Issue-Capability	LTCRs	TICs	LTSS	
JO 2030	Long-Term Scientific Study														
JO 2030 Capability Set	NATO Long-Term Capability Requirements														
JO 2030 Themes	Thematic analysis														
Joint Operations 2030	Theme-Issue-Capability														
LTCRs	TICs														
LTSS															
<b>14. Abstract</b> In Phase II of the NATO SAS-066 Joint Operations 2030 Long-Term Scientific Study, the Study Group adopted a Thematic Analytical approach where a Theme was considered to be a description of developments that could lead to or provoke manifest changes in the 'why' (role and embedding), 'what' (missions and tasks) and 'how' (structures, processes, and concepts of operation) of future NATO military operations and organisations. This report documents the reasons for adopting this approach, and includes brief descriptions of each of the 18 Themes.															





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