

Applications and Implications on Future Security Operations arising from the NATO Joint Operations 2030 Long Term Scientific Study

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INTRODUCTION

On an irregular and infrequent basis NATO's Research and Technology Organization and its predecessors have conducted a series of Long Term Scientific Studies. These were last undertaken in the mid-90s after the conclusion of the Cold War, and more recently a similar study, the NATO Joint Operations 2030 Study has been completed. Drawing upon the inputs and insights from a wide range of participating NATO nations the Joint Operations 2030 Study produced three main outputs: a novel Thematic Analysis methodology; a Joint Operations 2030 Capability Set that is a combination of traditional and non-traditional strategic and operational level capabilities that could form the response of a future NATO operation; and a list of Technology Focus Areas that could enable and advance a sub set of the more challenging capabilities extracted from the Joint Operations 2030 Capability Set.

Based on the results obtained from the JO 2030 Study, it will be the objective of this paper to offer insights into the future needs of the national and international security environment as well as the advancing challenges that will impact the upon the Security domain. Time and space prevent a comprehensive presentation of the Joint Operations 2030 Capability Set of which there are over 350 different capabilities. Rather this paper will focus on the Thematic Analytical methodology, describing how and why it was developed, and offering a brief presentation of the 18 Themes that were defined and used for further work by the Joint Operations 2030 Study Group.

THE THEMATIC ANALYSIS METHODOLOGY

The approach taken by the JO 2030 Study 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), Ref [1]. 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 second is that in an era of deep uncertainty, trying to strive for completeness or certitude is bound to fail. This is not just a matter of the practicality of dealing with a lot of possible futures that would soon outstrip the resources available to the study. More importantly was the acceptance that deep uncertainty prevents the definition

of ‘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.

Early in the JO 2030 study the study group wrestled with different approaches of discussing or addressing a capability needs definition effort for a conceptual time period 20-25 years into the future. Given that the future is inherently unknowable, this study was faced with the significant challenge of anticipating the Alliance’s long term future capability needs. In the present day fluid and uncertain strategic environment the study gave some consideration to employing a number of avenues of exploration including trends analysis and extrapolation, alternate worlds analysis, and scenario based analysis before settling upon a brainstorming supported approach which came to be called the Thematic Analysis Methodology. Each of these approaches is briefly discussed below.

Trends Analysis and Extrapolation

To find ways to deal with the challenge of defining future needs, the study group reviewed the “Global Trends”, presented by representatives from NATO’s Allied Command Transformation (ACT), Ref [2]. After some discussions, the group concluded that using a trends analysis and extrapolation approach was not the best option to anticipate future capability needs. The study group agreed that the trends analysis and extrapolation approach, although providing useful information tends to be too linear in its construct and too much based on what we know now. Any deviations or as yet undefined trends would lead to a substantially, if not radically, different future, which would make our assessment of future capabilities erroneous. In other words it was agreed that trend analysis and extrapolation, while offering useful insights to future challenges, would not in any way reliably cover the solution space of all future challenges.

Alternate Worlds Approach

The approach of Alternate Worlds was proposed as an alternative for the study group, Ref [3]. Alternate Worlds looks at various macroscopic parameters deemed as having structural impacts. These parameters are themselves constituted into binary axes of metrics (e.g., international system stability – high or low; peer competitor to the Alliance – yes or no; transatlantic link – weak or strong). Finally, logically consistent clusters of metrics are combined together to establish a possible alternate world. Based on ACT’s use of the Alternate Worlds methodology, four future worlds were proposed to the study group. They were given the following descriptive names:

- a. Return to the World Order;
- b. Middle East Resurgence;
- c. China Resurgence; and
- d. Globalization of Terror.

The study group considered proposing capability needs for NATO that would meet the

challenges found in each world, and to search for capabilities that would be relevant to more than one possible future world. It is useful to note, however, that the study group's resource were limited and it had agreed to, as much as possible, apply the work that was already available through the efforts of the ACT representatives. In the end the study agreed to be informed by this approach but not constrained by it.

Scenario Methodology

The study group also gave serious consideration to the use of selected the scenarios to explore how various future capabilities perform in one or more of the future worlds. There was initial interest in working with NATO ACT to develop one scenario for each future world that encompasses as many elements as possible of each future world; however, it evolved that, across the nations involved in the study it would be difficult to agree on such basic assumptions as to whether the scenario was defensive or expeditionary. In the end, the study agreed that scenarios could be used to inform the context of a future world but not limited by them.

Thematic Analysis Methodology

Finally, beyond using scenario based geo-political and technological axes to identify future capability needs, within the study group there emerged an interest in developing a novel avenue of exploration that attempted to characterise deep trends or as yet barely understood conditions that could influence future outcomes. This exploration came to be called a Thematic Analysis Methodology and refers to those lateral issues, whose impact is often hard to discern or is underestimated.

To summarise, in the early phases of the study 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 effort drew upon a wide range of sources, including ACT's Multiple Futures Project, various nations' internal strategic assessments, and other related future security analysis, Refs [2-5].

Applying this methodology, the JO 2030 Study Group derived a number of Themes where a Theme was considered to be a description of developments that could lead to or provoke manifest changes in the Why – the role and embedded working dynamics within a system, the What – the missions and tasks, and the How – the structures, processes, and concepts of operation of future NATO military operations and organisations, Refs [2&6]. The complementary principle¹ places particular emphasis on developments and possible consequences that are typically not covered by more trend 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.

THE EIGHTEEN JO 2030 THEMES

¹ Any two descriptions of a complex system are likely to be complementary, Ref[7]

Employing a series of creative spirals, iterations and lively discussions the JO 2030 Study agreed upon a set of underlying assumptions and, subsequently, eighteen Themes. The assumptions that help set the context for the development of the Themes are as follows:

- Objective or Goal Oriented - The Study sought to address current challenges for which there is no ready solution; and to be unconstrained by the present thus allowing the group to consider how things might be. This was less of an effort of projecting today's challenges and trends on to what tomorrow would be like and more of an attempt to overcome these challenges by asking what could tomorrow be like and what changes would enable that vision.
- Future Security Environment and Trend Analysis – The Study agreed that it would be informed by, but not constrained to, the many well known trends and foresight studies of the future. These include such things as trends and forecast advances in computer processing, global warming, nanotechnology, robotics, shifting demographics, and bio-technology, to name but a few.
- The Use of Scenarios – the Study accepted that forecasting future changes and conditions is very difficult and was concerned that the adoption of any one scenario or set of scenarios too quickly traps people in preconceptions and undisclosed assumptions. The Study also recognised that developing consensus on any one or a set of scenarios would be difficult. Finally, it agreed to not adopt any one scenario but rather to encourage and leave as much room as possible for free and open minded thinking.
- NATO in 2030 – while the Study tried to remain open to many possibilities and eventualities, it did agree that, given JO 2030 was a NATO Research and Technology Organization directed study and that it was sponsored by the NATO Conference of National Armaments Directors, per force, NATO itself would remain a viable alliance in 2030.
- NATO Policy and Doctrine – the JO 2030 Study agreed to be informed by NATO's current policy and doctrine, but not to be constrained by it. In other words, it was assumed that if it needed or wanted to, NATO could or would change. This ranged from continued change in its membership; to organizational changes in how the Alliance is structured, managed and administered; and to various policy, governance and doctrinal debates.
- NATO has a Kinetic Competitive Advantage – which is to say that NATO has and is expected to retain a well demonstrated ability to win on and even dominate a traditional military battlefield. On the other hand, many of the challenges in future Joint Operations will be at the edges of this battlefield; at the pre and post conflict points of the battlefield; be of a non-kinetic nature; and will characteristically be concerned with human problems that will need human solutions.

As to the eighteen Themes, the JO 2030 Study saw them as attempts to understand some of the

future challenges that NATO would face. Also, it was agreed that they were not necessarily comprehensive in their scope or coverage and, indeed, could surely be added to again in the future. The eighteen Themes were meant to be initial efforts to articulate emerging or hidden problems and challenges that could impact future NATO operations – however that operation might be defined. These Themes also were meant to be understood as challenges for NATO as a whole and not for one or few lead NATO nations who are, arguably, at different levels of ability across some or many of these Themes then are the majority of the NATO nations. The eighteen Themes are listed below followed by a brief description of each.

- 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 Teams 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

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, trans-national 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.

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 International Organizations, 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.

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.

Theme 4 – Different Paradigms in Decision Making

The interconnected strategic environment of the 21st 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’.

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.

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.

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 to 'sense and respond' independent of the larger force and adapt accordingly. This will drive modularity and networked requirements.

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.

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 is 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.

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 threat are nonconventional 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 transnational coordination and interagency cooperation to resolve. Examples of these types of threats include: computer network attack, pandemics, mass migration and natural disasters.

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 and producing the capability.

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 success campaign plan. The war of ideas, hearts and minds, fourth generation, 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.

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.

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 have built to 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.

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 are discussed, 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.

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 sometimes ambivalence to those about 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.

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.

Theme 18 – Super-Empowered Individuals

In the coming decades, access to, development, deployment and usage of powerful conventional and unconventional weapons, including weapons of mass destruction (WMDs), will have spread to not only small countries, but will come within the reach of non-state actors such as terrorist networks and transnational 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 to 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.

APPLICATIONS FOR FUTURE SECURITY OPERATIONS

As part of the JO 2030 Study these eighteen Themes were elaborated upon and associated with 60 Issues and further linked with 114 Capabilities: the end result is a set of 355 Theme-Issue-Capability triplets that constitute the JO 2030 Capability Set. This set of capabilities incorporated the 38 Long Term Capability Requirements from Allied Command Transformation’s Long Term Requirement Study, Ref [1], and contain a range of traditional, war-fighting capabilities through to some challenging capabilities which would not be found in current day Capability Based Planning capability sets. A discussion of the details of the JO 2030 Capability Set including the elaboration of these 18 Themes into 355 Theme-Issue-Capability triplets is beyond the scope of this paper and the interested reader is referred to Ref [8].

For the purposes of the JO 2030 Study, the JO 2030 Capability Set provided a novel, robust, and challenging set of capabilities which offered an articulation of the demand or requirements of potential future NATO operations at the strategic and operational levels. The JO 2030 Capability Set, or more precisely, a sub set of the Capability Set, was used by the study to try to identify research and technology investment opportunities which could lead to improvements in these Capability areas for future operations.

As these Themes receive broader exposure, they may engender other potential applications. One such application of these 18 Themes and the resultant JO 2030 Capability Set is that they could offer thought provoking challenges to NATO defence planners and practitioners in the years to come. They could well serve as the impetus for improvement or change in a wide range of strategic and operational defence related systems, organizational structures, processes and

procedures.

A second possible application is that they will aid in a more expansive and comprehensive understanding of the complexities of a given NATO operation. Success in such operations is clearly much more than the number of air sorties, tanks destroyed, ground captured or even IEDs that have been detected on a day to day basis. The use and study of the 18 Themes could potentially improve upon the understanding of the many obvious and hidden factors that contribute towards or impede the attainment of success in a given operation.

Finally, given that the Study's Final Report is in the final stages of editing and publication, there may well be other as yet undiscovered uses and applications that will only come to light with wider exposure and consideration of the results of the Thematic Analysis Methodology and of the wider JO 2030 Study as a whole.

IMPLICATIONS FOR FUTURE SECURITY OPERATIONS

The implications that the results of the JO 2030 Study could have on future security operations include but are not restricted to the following:

- The Thematic Analysis Methodology and the resultant 18 Themes and the JO 2030 Capability Set offer novel and innovative ways of looking at the complex military alliance that NATO and at conflict in a post modern, networked, globalized, connected and informed age;
- The Thematic Analysis Methodology is one attempt to anticipate and address many, as yet, poorly understood problems and challenges before they become pressing realities;
- The results of the JO 2030 Study offer many insights that could initiate or inform the coming changes and evolutions in practises, procedures, processes, organizations and networks that all are engaged in a multi national and multi agency future security operation.
- Careful consideration of the results of the study could aid in the understanding of an operation not as an isolated, linearly, cause and effect controlled event, but rather as a complicated, complex, chaotic, multi-dimensional event that is loosely and strongly connected across many different societal and organizational networks

CONCLUSION

Over the course of the NATO Joint Operations 2030 Long Term Scientific Study a deliberate effort was made to avoid the study becoming a simple projection of the present day situation. Rather, serious attempts were made to frame the problem in terms of what a distant tomorrow might look like and what NATO would need to do today to achieve success in such a tomorrow. This led to a set of Themes, which allowed for a creative and open-ended conceptualization of some of the less well understood, and more challenging dynamics and realities of future NATO Joint Operation. As such, the Thematic Analysis Methodology and the 18 Themes are one of the main results of the JO 2030 Study. It was accepted that some of the challenges that are part of some or many of the Themes may never be solvable, but that did not prevent the study from attempting to frame them, trying to define them, and making an effort at addressing them in some way in terms of possible future research and technology support.

Based upon the work that was conducted by the JO 2030 Study, this paper has attempted to offer insights into the future needs of the national and international security environment and the advancing challenges that will impact the upon the Security domain. It focussed on describing the Thematic Analysis Methodology and the resulting 18 Themes that the JO 2030 Study generated using this methodology. The 18 Themes allowed for broad and hopefully insightful articulation of many of the well and not so well defined capability requirements or challenges that NATO may need to improve upon or to develop in its attempts to successfully plan and conduct near and far future Joint Operations.

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