NORTH ATLANTIC TREATY ORGANISATION

RESEARCH AND TECHNOLOGY ORGANISATION

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RTO TECHNICAL REPORT **TR-SAS-066-Phase-III**

Joint Operations 2030 – Phase III Report: The JO 2030 Capability Set

(Opérations interarmées 2030 – Rapport Phase III : L'ensemble capacitaire JO 2030)

This Report describes and documents the Joint Operations 2030 Capability Set that was developed during Phase III of the SAS-066, Joint Operations 2030 Long-Term Scientific Study.

Published April 2011

Distribution and Availability on Back Cover

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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.

Published April 2011

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List of Abbreviations

ACT	Allied Command Transformation
C2	Command and Control
CBRN	Chemical, Biological, Radiological, and Nuclear
CIMIC	Civil Military Cooperation
CNN	Cable News Network
DOTMLPFI	Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, Facilities, and Interoperability
EM	Electro Magnetic
EU	European Union
IA	Information Assurance
ICT	Information and Communication Technology
IED	Improvised Explosive Device
IFF	Identification Friend or Foe
IIS	Information and Integration Services
IO	International Organization
ISR	Intelligence, Surveillance, Reconnaissance
JISR	Joint Intelligence, Surveillance, Reconnaissance
JO 2030	Joint Operations 2030
LTRS	Long-Term Requirements Study
LTSS	Long-Term Scientific Study
NATO	North Atlantic Treaty Organisation
NEC	Network Enabled Capability
NGO	Non Government Organisation
NII	Networking and Information Infrastructure
PVO	Private Voluntary Organization
ROE	Rules Of Engagement
SA	Situational Awareness
SAS	System Analysis and Studies Panel
SMC	Service Management and Control
SMEs	Subject Matter Experts
TIC	Theme-Issue-Capability
UN	United Nations
WMD	Weapons of Mass Destruction

Joint Operations 2030 – Phase III Report: The JO 2030 Capability Set

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

Executive Summary

Phase III of the NATO SAS-066 Joint Operations 2030 Long-Term Scientific Study advanced upon the work initiated in the earlier phases of the study and produced two major outputs: the JO 2030 Capability Set and a subsequent prioritization effort which divided this set into three sub-sets.

Building upon the Thematic Analysis efforts of Phase II of the study and over the course of a number of meetings and workshops the JO 2030 Study Group amplified the 18 Themes with up to 60 Issues and then associated these Theme-Issue combinations with relevant capabilities to create a set of 355 Theme-Issue-Capability (TIC) combinations which in total constitute the JO 2030 Capability Set. During this effort the Study Group integrated the 38 Long-Term Capability Requirements that had been generated from NATO Allied Command Transformation's Long-Term Requirements Study into this Theme-Issue-Capability construct. The end result is a capability set that incorporates both a set of core NATO military capabilities and a set of future capabilities that attempt to anticipate future operational challenges and that would not be easily found in a present day NATO capability set – if such a set actually existed.

Conscious of the size and complexity of the JO 2030 Capability Set, the Study Group then undertook to provide some extra meaning to this large set of capabilities. A prioritization effort was undertaken which assessed each of the 355 TICs against three criteria:

1) Likelihood of a TIC being a gap across many NATO Nations in the 2020 – 2030 time frame (scored low, medium, or high);
2) The potential for a TIC to have an impact on NATO operations in the 2020 – 2030 time frame (scored low, medium, or high); and
3) An assessment as to whether or not efforts to enable, enhance, or address a TIC will be undertaken by Nations or industry (scored unlikely, likely, or very likely).

The results of this prioritization effort were the following three sub-set lists of the JO 2030 Capability Set:

- A-List TICs scored highly for all three criteria;
- C-List TICs scored well or highly for two of the criteria; and
- D-List TICs scored low or well for two or three of the criteria.

Another way of looking at these three groupings is that:

- A-List TICs are important to future NATO operations but not currently an area of active research;
- C-List TICs are important to future NATO operations and are currently supported by an active research effort by more than one or two NATO Nations; and
- D-List TICs are of lower importance to future NATO operations.

Given the diversity and scale of this set of TICs, the limits on the resources of the Study Group, and the opportunity to provide the greatest return on effort, at the end of Phase III the study agreed to focus the next phases of the study on the A-List TICs.

Opérations interarmées 2030 – Rapport Phase III : L'ensemble capacitaire JO 2030

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

Synthèse

La phase III de l'étude scientifique à long terme SAS-066 JO 2030 a progressé à partir des travaux initiés lors des phases précédentes et a produit deux réalisations : l'ensemble capacitaire JO 2030 et un travail consécutif de hiérarchisation qui a divisé cet ensemble en trois sous ensembles.

S'appuyant sur les travaux d'analyse thématique de la phase II, et sur une suite nombreuse de réunions et ateliers, le groupe d'études JO 2030 a élargi les 18 thèmes jusqu'à 60 questions, puis a associé ces combinaisons Thème-Questions aux capacités appropriées, pour créer une panoplie de 355 combinaisons Thème-Question-Capacité (TIC) qui au total constituent l'ensemble capacitaire JO 2030. Dans le cadre de ces travaux, le groupe d'études a intégré les 38 exigences de capacités à long terme qui avaient été issues de l'étude correspondante du Commandement Allié pour la Transformation de l'OTAN lors de l'établissement de ces combinaisons Thème-Question-Capacité. Le résultat final est un ensemble capacitaire qui incorpore à la fois des capacités militaires centrales de l'OTAN, et des capacités futures qui tendent à anticiper les challenges opérationnels à venir et que l'on pourrait difficilement trouver dans l'ensemble capacitaire actuel de l'OTAN – pour autant qu'un tel ensemble existe actuellement.

Conscient de la taille et de la complexité de l'ensemble capacitaire JO 2030, le groupe d'études a entrepris de donner plus de signification à ce large ensemble. Un travail de hiérarchisation a été lancé, afin d'évaluer chacun des 355 TICs en fonction de trois critères :

1) Eventualité qu'un TIC fasse défaut à plusieurs nations de l'OTAN sur la période 2020 – 2030 (notée faible, moyenne ou forte) ;
2) Potentiel d'un TIC à avoir une incidence sur les opérations de l'OTAN sur la période 2020 – 2030 (noté faible, moyen ou élevé) ; et
3) Estimation de la possibilité que des travaux soient entrepris ou non par des Nations ou des industries afin de permettre, améliorer ou traiter un TIC (noté peu probable, probable ou très probable).

Les résultats de cette hiérarchisation constituent les trois listes de sous-ensembles de l'ensemble capacitaire JO 2030 qui suivent :

- Liste-A des TICs ayant eu la note maximum au regard des trois critères ;
- Liste-C des TICs ayant eu la note moyenne ou maximum au regard de deux des critères ; et
- Liste-D des TICs ayant eu la note minimum ou moyenne au regard de deux ou trois des critères.

Il existe une autre façon de considérer ces trois regroupements, à savoir :

- Liste-A des TICs qui sont importants pour les opérations futures de l'OTAN, mais qui ne sont pas actuellement dans le champ des recherches actives ;
- Liste-C des TICs qui sont importants pour les opérations futures et qui sont actuellement soutenus par des travaux actifs de recherche de la part de nations plus ou moins nombreuses de l'OTAN ; et
- Liste-D des TICs qui sont de moindre importance pour les opérations futures de l'OTAN.

Compte tenu de la diversité et de la taille de cet ensemble de TICs, des ressources limitées du groupe d'études et de la possibilité d'obtenir le plus grand retour d'investissement de ces travaux, à la fin de la phase III, il a été convenu de concentrer les phases suivantes à l'étude de la seule liste-A des TICs.

JOINT OPERATIONS 2030 – PHASE III REPORT

1.0 INTRODUCTION

1.1 Background

Three major Long-Term Scientific Studies (LTSS) were conducted in the 1990s under the auspices of the RTO and its predecessors. 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, a new LTSS was commissioned on Joint Operations in the year 2030 (JO 2030).

1.2 JO 2030 Objectives and Aims

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 identify capability gaps that may exist 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 JO 2030 Analysis Approach

The approach taken by Joint Operations 2030 is based on two principles. The first principle is that the study should complement ongoing long-term planning efforts, notably the Allied Command Transformation (ACT) Long-Term Requirements Study (LTRS). The second principle is that in an era of significant uncertainty, striving for 'completeness' is not practicable. Analysing a statistically robust number of possible futures would outstrip the resources available to any study. However, this is not just a matter of practicality; it explicitly acknowledges that uncertainty prevents this study from defining 'completeness' from the outset. As a matter of principle, one may not be able to postulate a set of scenarios that represents with any confidence relevant future environments and potential military endeavours.

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 traditional 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"[1].

[1] Strategic Management Journal, Vol. 6, pp. 257-272, 1985.

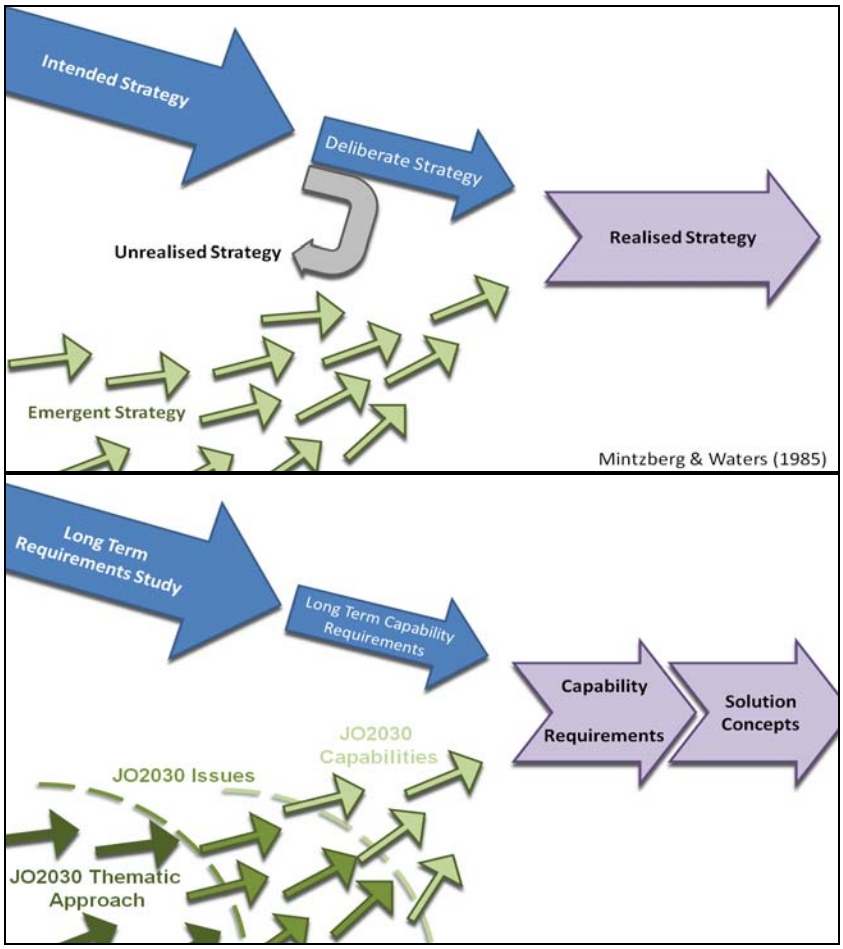


Figure 1: Mintzberg and Waters Realised Strategy and the JO 2030 Realised Approach.

The development of the Thematic Approach that has been applied in the JO 2030 study formed a part of the early phases of the study itself. This approach evolved from the initiative of the JO 2030 Study Group and side stepped some of the methodological steps as detailed in the study's initial Terms of Reference. All deviations were discussed and accepted by the study team and, in turn, were presented and accepted by the NATO 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, and key areas for future research and development. The five phases indicated are briefly described below.

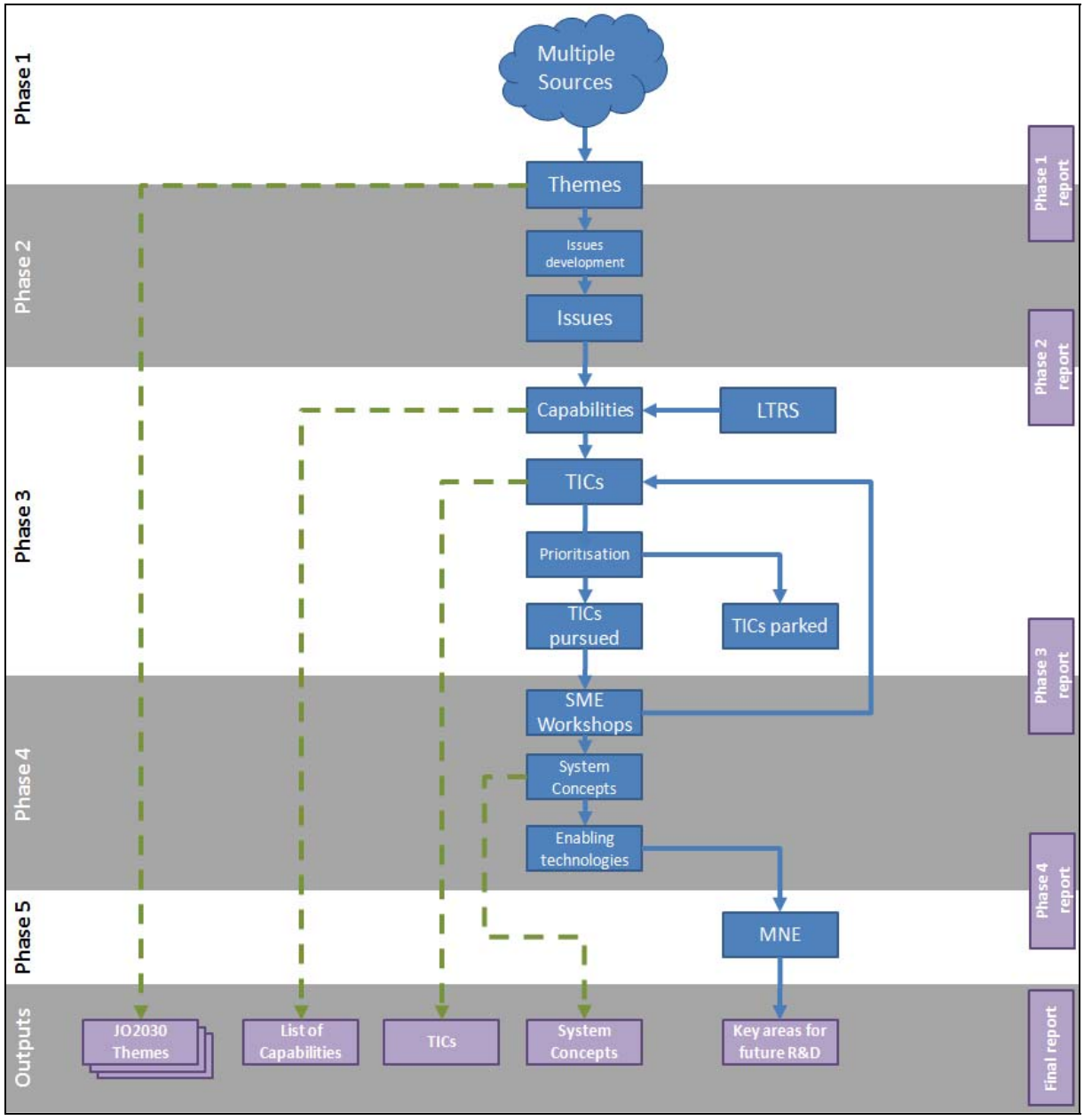


Figure 2: JO 2030 Study Flow Diagram with Phases and Activities.

1.3.1 Phase I – Identification of Themes

In Phase I fundamental, longer-term developments in the environment in which NATO will exist and operate were looked at. Potential 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 domains. This was completed using a range of sources, including ACT's Multiple Futures Project. From this, a number of Themes were derived – where a Theme is a description of developments may not yet be

well defined but that could provoke manifest changes in the 'why' (role and embedding), 'what' (missions and tasks) and 'how' (structure, means and concepts of operation) of military organisations and operations.

The 'complementary' nature of the JO 2030 study places emphasis on developments and possible consequences that are not typically covered by traditional long-term planning methods. The 'completeness is impossible' principle underlines the fact that Theme generation was a creative process, rather than a well-established derivation and selection method.

A set of eighteen Themes was agreed upon by the JO 2030 Study Team. These Themes do not define the future and are not intended to be comprehensive in their scope or coverage. It is therefore recognized that the study should allow for additional Themes to be added during the process.

1.3.2 Phase II – Identification of Issues within Each Theme

In Phase II the Themes identified were elaborated and enriched. For each Theme a number of distinct Issues were developed. Issues were the first order security-related consequences and challenges that resulted directly from the Theme and were articulated as problem statements. In general, for each Theme, two to five Issues were developed resulting in a total of 60 Issues for the 18 Themes.

1.3.3 Phase III – Identification of Capabilities for 2030

Using the Theme-Issue nomenclature, in Phase III Capabilities for each of the Issue-related problem statements were identified or developed. These Capabilities span the domains of doctrine, organisation, training, materiel, personnel, leadership, and facilities. This effort resulted in the JO 2030 Capability Set, which is a set of 355 Theme-Issue-Capability (TIC) triplets that were taken forward for solution work.

From this set of 355 capabilities a prioritization further sub-divided them into a three groups and a smaller list of some 40 TICs were selected to be pursued for focussed efforts at indentifying research or technology solutions.

1.3.4 Phase IV – Search for Research and Technology Development Opportunities

This phase is intended to seek out technology development and emerging System Concepts that could address the TICs generated in the previous phase. Both 'technology' and 'systems' should be understood in a broad sense, in parallel with the 'DOTMLPFI'-nature of the identified Capabilities.

The first activity in this phase will be the conduct of Solution Solicitation Sessions ("triple Ss"). These sessions should bring together Subject Matter Experts (SMEs) to identify potential systems concepts or solution approaches that might satisfy the TICs. A systems concept illustrates how the system works and what it does in order to satisfy or alleviate the problem. Ideally, it includes a roadmap to achieving the system, identifies key components, critical points, and any parallels or precedents. Finally, the systems concept should identify leaders in the field and any existing work. Where systems concepts cannot be developed for a TIC, a solution approach should be aimed for. A solution approach describes potential avenues that might lead to a viable system. In both cases, the underlying ('hard' and 'soft') technology development should be highlighted.

Once all of the Solution Solicitation Sessions are completed it is intended that the systems concepts and solution approaches that have been developed will be analysed for coherence within each TIC, then across the TICs. This analysis should identify the common underpinning and enabling technologies for NATO in 2030.

1.3.5 Phase V – Conduct of the Multi-National Exercise and Final Report

The emphasis in this phase will be to refine the system concepts and to further identify and describe the list of underpinning and enabling technologies. This will be the basis for recognizing key topics and areas for future Research and Development (R&D) activities within the NATO R&D community. This effort will be achieved through the conduct of a Multi-National Exercise which will take the form of a Symposium for presenting, validating and expending upon the work of the study to date.

1.4 Phase III Report Aim

This report is a summary of activity of Phase III of the JO 2030 Study. In Phase III, the study team developed the JO 2030 Capability Set and identified a sub-set of capability requirements that would in the end form the focus of the work in Phase IV.

2.0 DEVELOPING THE JO 2030 CAPABILITY SET

2.1 Work Done in Phase III – The JO 2030 Capability Set

Using the Theme-Issue nomenclature, in Phase III Capabilities for each of the Issue-related problem statements were derived. As a first basis for formulating these Capabilities, the JO 2030 Study Team looked at the thirty eight (38) Long-Term Capability Requirements (LTCRs) from ACT's LTRS as a set of potential ready-made requirements. Each LTCR was examined to see if it was suitable for any of the Theme-Issue combinations. After the LTCRs had been explored, the Study Group over the course of a series of meetings then developed and internally validated desirable outcomes for all of the remaining Issues which in turn identified a number of Capabilities that would address the Themes and Issues. In many instances, for each Issue multiple Capabilities were identified.

Across the sixty Issues a total of 355 Theme-Issue-Capability (TIC) triplets were generated. A complete list of these 355 TICs in tabular form is presented in Annex D to this report. As a conscience decision the language used to describe the Capabilities was kept generic, which resulted in many of the same Capability descriptions being repeated in different Theme-Issue combinations. In all, there are 114 unique Capabilities. Using generic descriptions for the Capabilities allowed for the team to identify common needs across TICs. However, in doing so, it should be clearly noted that, for the purposes of the JO 2030 Capability Set, only a combination of a Theme, an Issue and a Capability accurately describes the requirement, which is to say that the context provided by the particular Theme and Issue informs and works to define a given Capability description.

2.1.1 Prioritizing the Themes-Issues-Capabilities

Given the limitations on the resources available to the JO 2030 Study Group it was determined that 355 TICs was a large number to deal with. Therefore, an exercise was conducted to identify a sub-set with a more manageable number that could be concentrated upon.

JO 2030 identified three criteria that could be used in this prioritization effort:

1) Likelihood of a TIC being a gap across many NATO Nations in the 2020 – 2030 time frame (scored low, medium, or high);
2) The potential for a TIC to have an impact on NATO operations in the 2020 – 2030 time frame (scored low, medium, or high); and

3) An assessment as to whether or not efforts to enable, enhance, or address a TIC will be undertaken by Nations or industry (scored unlikely, likely, or very likely).

A total of twelve members of the JO 2030 Study Group scored all of the TICs against these three criteria. An analysis of the scores received was undertaken and led to the TICs being separated into three groupings – an A, C and D List such that:

- A-List TICs scored highly under all three criteria;
- C-List TICs scored medium or highly for two of the criteria; and
- D-List TICs scored low or medium for two or three of the criteria.

There was also a B list but it was actually an artificial combination of the A-List TICs and TICs that shared the same Capability descriptor as an A-List TIC. This proved to be an interesting but not very useful grouping and it was not retained for the purposes of the remainder of the study.

Another way of looking at these three groupings is that:

- A-List TICs are important to future NATO operations but not currently an area of active research;
- C-List TICs are important to future NATO operations and are currently supported by an active research effort by more than one or two NATO Nations; and
- D-List TICs are of lower importance to future NATO operations.

The resulting sub-sets consisted of 40 A-List TICs; 122 C-List TICs; and 193 D-List TICs. A list of the A-List TICs can be found as Annex C. Figure 3 shows the distribution of the A-List TICs across the Themes. Theme 16 – Political Transformation had the most TICs within the sub-set selected, whereas Theme 15 – Cost Escalation and Theme 18 – Super Empowered Individuals had no TICs in the sub-set.

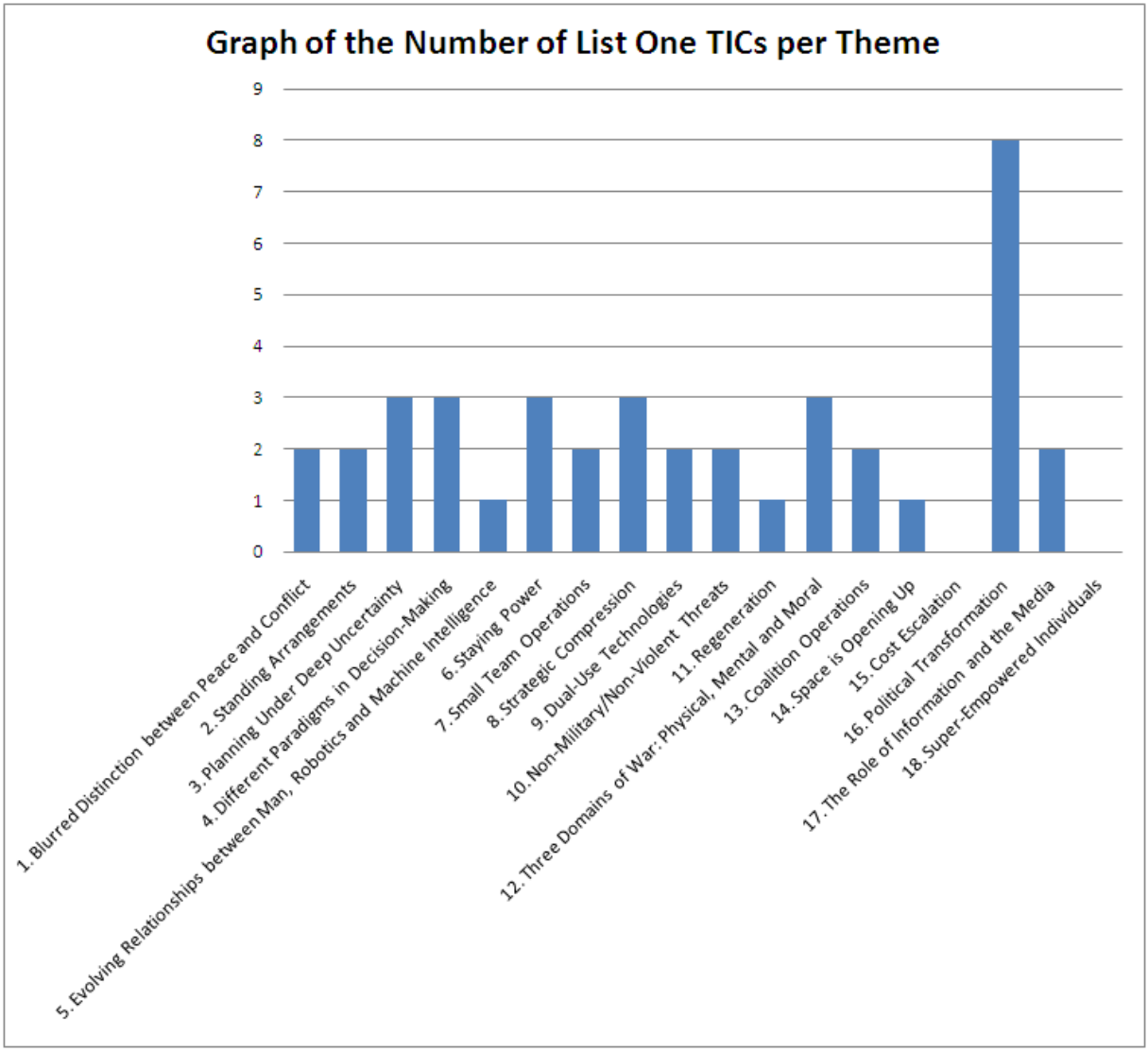


Figure 3: Graph of the Frequency of Selected TICs Appearing in Each Theme.

JO 2030 Study Group considers that all the TICs are eligible for further exploration and as such are called the JO 2030 Capability Set and are considered to be an important output of the study. The complete JO 2030 Capability Set of 355 TICs is included as Annex D.

2.1.2 An Analysis of All of the TICs

Finally, given the large number of TICs generated, it is worth undertaking a cursory assessment of the breadth of the subjects covered. This was completed by mining all of the text of the Themes, Issues, and the Capability requirements. The Wordle website allows users to upload text that is data mined and output in the format of a picture. The size of the word relates to its frequency of the occurrence, the colour and orientation of the words is purely aesthetic. Some of the more interesting frequently occurring words were “information” (most frequent at 197 occurrences), “environment” (142), and “risk” (104).

Figure 4: Wordle Output of the Most Frequently Occurring Words in the TICs.

3.0 CONCLUSION

In Phase III of the Joint Operations 2030 Long-Term Scientific Study the Study Group extended the Thematic Analytical effort that had been initiated in Phase II of the study. The Themes and Issues that had been generated in Phase II were associated with Capability statements and each Theme-Issue-Capability became known as a TIC. These TICs were augmented with NATO Capabilities that were generated by NATO ACT's Long-Term Requirements Study and resulted in the Joint Operations 2030 Capability Set, a set of 355 TIC combinations.

Efforts to bring some meaning and clarification to the JO 2030 Capability Set resulted in a prioritized list which divided the Capability Set into three lists:

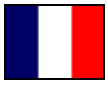
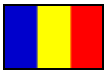
- The A-List which were TICs that are considered important to future NATO operations but are not currently the subject of active R&T efforts;
- The C-List which were TICs that are considered important to future NATO operations and are currently the subject of active R&T efforts; and
- The D-List which were TICs that are considered to be of lower importance to future NATO operations.

This Phase III Report documents the effort to generate the Joint Operations 2030 Capability Set and the prioritization effort that generated the A, C and D List of TICs.

Annex A – PHASE III STUDY PARTICIPANTS

Name	Country/Organization
Babcock, Sandy	CAN
Beedie, Alistair	NATO DPP
Bekkers, Frank	NLD
Berdila, Iulian	ROU
Bretherton, Peter	NATO ACT
de Spiegeleire, Stephan	NLD
Gervasio, Angelo	NATO ACT
Glarum, Sigurd	NOR
Hartmann, Jens	NATO ACT
Kinneer, Bradley	USA
Kurtis, Raimonds	NATO ACO
Leeman, Geert	BEL
Lemche, Viggo	DNK
Massel, Paul	CAN
Meier, Andreas	DEU
Micha, Christian	BEL
Pikner, Ivo	CZE
Pinto, Marc	NATO NURC
Purton, Simon	NATO ACT
Simpson, Richard	NATO ACT
Svejda, Mioslav	CZE
Tocher, Mark	NATO ACT
Toevank, Freek-Jan	NLD
Verhoeff, Eric	NATO ACT
Walker, Bruce	NATO ACT
Wright, Colin	NATO ACT

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
BEL					
CAN					
CZE					
DNK					
FRA					
DEU					
HUN					
ITA					
NLD					
NOR					
ROU					
SVK					
SVN					
USA					
NATO					

Annex C – THE FORTY A-LIST TICs

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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 the 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.	1.1	**Peace and conflict coexist**	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict. Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily.	1.1.6	**Capable of shaping the 'home front' in the grey zone between peace and conflict**
			1.3	**Establish a workable division of labour / collaboration structure with other agencies**	Both with other governmental agencies, with NGOs and with private parties (see Theme 2). In various forms of partnerships or customer-contractor relationships. Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders).	1.3.3	**Capable of generating coherent and integrated policy options**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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 to outsource 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.	2.1	**Understanding different business models**	The real cost/benefit balance between contracting out a service vs. retaining in-house capability is difficult to measure and assess. It is also a dynamic balance, to a large extent driven by actual developments difficult to predict in advance.	2.1.2	**Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities**
			2.3	**Establish a workable division of labour / collaboration structure with external service providers**	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties. In various forms customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	2.3.8	**Capable of establishing and maintaining communication channels and liaison relationships with potential service providers/partners prior to the commencement of operations**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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	**Dealing with intrinsic uncertainty**	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	3.1.6	**Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour**
			3.2	**Financial planning in Government**	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. Need for better ways of cash managing defence budgets? Might include strategies to deal with price fluctuations of required assets, such as commodities, e.g., through hedging strategies.	3.2.5	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	3.4	**Future structures**	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world may be examined for applicability. Outsourcing of services and rely on market adaptation mechanisms must be considered.	3.4.4	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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'.	4.1	**Achieving common objectives**	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities reside in each of the organizations on achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	4.1.6	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**
						4.1.8	**Capable to assess and implement the structures and processes for planning / decision-making / activity coordination / feedback across the various actors in a comprehensive approach**
			4.2	**Information management**	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so.	4.1.10	**Capable of acting in dynamic 'value chains' with a variety of potential partners**

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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'.	4.2	**Information management**	In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour. (cont'd)	4.1.10	**Capable of acting in dynamic 'value chains' with a variety of potential partners**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	5.1	**Moral, ethical and legal considerations of "human-out-of-the-loop"**	With the human out of the loop or not "at risk", the parameters for deciding on whether, where, when and how to wage war shift, at the political, strategically and operational/tactical level. What are the bounds/benefits of "automation" of military tasks? Winning the hearts and minds vs. safety of troops. Unmanned systems are typically used in dull, dirty or dangerous environments/ tasks. Psychological/moral aspect – is escalation potential higher if technology substitutes personnel?	5.1.3	**Capable of defining unambiguous Rules Of Engagement (ROEs)**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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 successful 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.	6.2	**Facilitate political stamina**	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	6.2.6	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**
			6.3	**Establish a workable division of labour / collaboration structure with other agencies**	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	6.3.5	**Capable of developing flexible and adaptive leaders**
						6.3.7	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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 operations 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.	7.3	**Quick organisational learning cycle**	Quickly promulgate locally learned lessons to other relevant parts of the organisation. Both to dampen out tried-out but proven ineffective strategies and to amplify effective emergent strategies. Sharing of 'situational understanding' to achieve coherent effects that are realistic in the given situation.	7.3.2	**Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour**
						7.3.4	**Capable of adapting organizational structures to reflect changing circumstances and evolving objectives**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
8	**Strategic Compression**	Strategic compression can be defined as the forming of unexpected casual 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.	8.1	**Different causal relationships across the levels of conflict/ organisations/ endeavours**	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage / pressure affect the Issue?	8.1.2	**Capable of gathering, analysing and disseminating lessons learned in a timely fashion**
						8.1.6	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**
			8.3	**Morality and culture in coalition/ inter-agency endeavours**	If typical operations become more international and inter-agency (and even with external service providers), with (the need for) cooperation and collaboration pushing down to the tactical level (see, e.g., small team operations), several issues arise. The most fundamental issue might be the need to make an endeavour succeed with parties that act from quite diverse moral and cultural views.	8.3.1	**Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	9.1	**Spin-in of high quality, high pace innovation**	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	9.1.3	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**

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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.	9.2	**Pace of technology development**	The pace of technology development is accelerating with a big jump ahead through the combination of advances in ICT, nano and bio technology and cognitive sciences. The variety of ways to wage war may drastically increase – faster than society can keep up in terms of legal and moral embedding of the phenomenon of war.	9.2.2	**Capable of empowering society / local communities to deal with the risks associated with the proliferation of dual-use technology**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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 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.	10.1	**Expansion of the mission set**	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	10.1.3	**Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment**
			10.2	**Risk prioritisation, balance of investments and scaling problem**	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences). The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc.	10.2.2	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	11.1	**Quantitative regeneration**	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor civil "look-alike" products and production lines to military applications.	11.1.1	**Capable of researching and executing strategies that mitigate the need for large numbers of forces**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	12.1	**Need to develop capabilities that act in the information and moral domain**	The character of war is expanding from just traditional force-on-force engagements to more asymmetric engagements/endeavours where the focus is on the mental and moral domains. The need to 'win the peace' must be incorporated into the force structure / capability development process as well as in the operational planning process and operations. As an example, it might become of prime importance for NATO to craft the message that is transmitted across multiple media to the numerous audiences that could impact operations. This will include friendly, adversary and neutral audiences. Also, effects in the physical domain may be instrumental to achieving effects in the information and the moral domain.	12.1.5	**Capable of forward operational planning for complex endeavours across the different stages and in a multi-agency environment**
			12.2	**Cyber security**	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	12.2.6	**Capable of acting without access to cyberspace**

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Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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 sharing of technology.	13.1	**Burden sharing**	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	13.1.2	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**
			13.2	**Legal issues and caveats**	Legal issues that deal with coalition operations. Application of laws of armed conflict. Geneva Convention and International Court of Justice. Applies a sense of coalition in a broad sense, not NATO led but with NATO Nation participation.	13.2.3	**Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	14.1	**Critical dependence upon space assets**	The dependence on space assets, for example, communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	14.1.2	**Capable of acting without access to space assets**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	16.1	**Achieving campaign level surprise**	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	16.1.5	**Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour**
						16.1.7	**Capable of establishing how military activities contribute to achieving political objectives and end-states, and vice versa**
			16.2	**Burden sharing**	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	16.2.2	**Capable of measuring, analysing, predicting and anticipating risk within a complex environment**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	16.3	**Comprehensive approach**	Embedding military capability/efforts in inter-agency endeavours.	16.3.1	**Capable of conducting civil-military cooperation in an inter-agency environment**
						16.3.3	**Capable of formulating and executing shared and realistic actions**
						16.3.4	**Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements**
						16.3.7	**Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour**
						16.3.8	**Capable of undertaking in-depth foresight analysis to develop models of the future security environment**

Theme No	Theme	Theme Summary	Issue No	Issue	Issue Description	Cap Req No	Capability Requirement
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.	17.1	**24-hour media cycle**	The Alliance will work in an environment where the news media will be pervasive and will have access to (near) real-time transmission capabilities to a global audience. This could harm military operations. Or is this something that the military can try to influence or take advantage of? The speed with which media can report on incidents during operations far exceeds ability of Commanders to present a comprehensive insight into the NATO 'side of the story'. This can most certainly result in incorrect, possibly volatile, information being spread through a theatre of operations bring about serious consequences.	17.1.3	**Capable of designing effective media strategies**
			17.3	**Media as an intelligence source for the enemy**	The proliferation of media and mediums through which information related to operations can be accessed has significantly increased the use of media reports as sources for intelligence. Adversaries have used traditional media reports, as well as more non-traditional sources such as YouTube and Google, to access geographic data and receive results of attacks and assessments of the quality of tactics. Ambient intelligence?	17.3.2	**Capable of exploiting information space for disinforming opponents**

Annex D – THE JOINT OPERATIONS 2030 CAPABILITY SET

The following table contains the 355 Theme-Issue-Capability combinations that were generated in Phase III of the SAS-066 JO 2030 Study and constitute the Joint Operations 2030 Capability Set.

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.1.1	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict. Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily.	Capable of 'Sense and Respond'
1.1.2	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict. Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily.	Capable of generating coherent and integrated policy options
1.1.3	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.1.3	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily. (cont'd)	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
1.1.4	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict. Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
1.1.5	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict. Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
1.1.6	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict.	Capable of shaping the 'home front' in the grey zone between peace and conflict

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.1.6	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily. (cont'd)	Capable of shaping the 'home front' in the grey zone between peace and conflict
1.1.7	Blurred Distinction between Peace and Conflict	Peace and conflict coexist	In some areas of the world the situation is one where small sporadic conflict is so interwoven with normal life that people continue with their lives in spite of daily danger and regular episodes of conflict. Furthermore, expeditionary operations create the situation where a Nation is at peace at home, but at war (at least in practice if not de jure) abroad. The public needs to be aware of the (supposed) role of the military in the grey area between peace and conflict. Support of (possibly protracted, risky, costly) military activities without 'a war going on' might otherwise be withdrawn easily.	Capable of finding other actors and contracting/influencing/persuading them to shape the environment
1.2.1	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States. However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required.	Capable of 'Sense and Respond'

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.2.2	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States. However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
1.2.3	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States. However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
1.2.4	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.2.4	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required. (cont'd)	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
1.2.5	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States. However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
1.2.6	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States. However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required.	Capable of advanced distributed learning, training/exercises in a multi-level security environment through a single, comprehensive network architecture

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.2.7	Blurred Distinction between Peace and Conflict	Geopolitical security environment as a "complex system"	Countries (and the public) have a difficult time understanding world situations that are critical in nature (high risk) vs. situations that are not or less critical (low risk). There can be a peaceful situation that is on the path to major confrontation and war if action is not taken. Some (potential) conflicts have limited impact on the vital interests of NATO and Member States. However, the geopolitical security environment is a "complex system" with (unpredictable) risks of escalation from small causes to catastrophic consequences. Agile sense, communicating (getting the message out to politicians and public), pro-action and response functions at the strategic level are required.	Capable of rapid strategic reaction to (potentially) major and/or catastrophic crises
1.3.1	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties (see Theme 2, Standing Arrangements). In various forms of partnerships or customer-contractor relationships. Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders).	Capable of 'Sense and Respond'
1.3.2	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties (see Theme 2, Standing Arrangements). In various forms of partnerships or customer-contractor relationships.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.3.2	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders). (cont'd)	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
1.3.3	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties (see Theme 2, Standing Arrangements). In various forms of partnerships or customer-contractor relationships. Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders).	Capable of generating coherent and integrated policy options
1.3.4	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties (see Theme 2, Standing Arrangements). In various forms of partnerships or customer-contractor relationships.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.3.4	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders). (cont'd)	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
1.3.5	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties (see Theme 2, Standing Arrangements). In various forms of partnerships or customer-contractor relationships. Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders).	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
1.3.6	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties (see Theme 2, Standing Arrangements). In various forms of partnerships or customer-contractor relationships.	Capable of inter agency generic training as well as specific mission rehearsal

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.3.6	Blurred Distinction between Peace and Conflict	Establish a workable division of labour / collaboration structure with other agencies	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. Includes issues concerning the role of private contractors vs. the core responsibilities of Armed Forces (as a power instrument of a State). Same for the role of the Armed Forces in national crisis and disaster management vis-à-vis the role of civil authorities and operational services (e.g., first responders). (cont'd)	Capable of inter agency generic training as well as specific mission rehearsal
1.4.1	Blurred Distinction between Peace and Conflict	Refection of the broad(ened) spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
1.4.2	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.4.3	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
1.4.4	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of conducting civil-military cooperation in an inter-agency environment
1.4.5	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of enhancing the Situational Awareness (SA) of individual soldiers and increasing shared knowledge
1.4.6	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities.	Capable of subduing, dispersing, or controlling individuals or groups of individuals and engaging vehicles/ assets/platforms/systems with a significantly reduced risk of death or permanent injury/damage

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
1.4.6	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc. (cont'd)	Capable of subduing, dispersing, or controlling individuals or groups of individuals and engaging vehicles/ assets/platforms/systems with a significantly reduced risk of death or permanent injury/damage
1.4.7	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of providing identification, location, status and movement of friendly and neutral force elements
1.4.8	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of advanced distributed learning, training/exercises in a multi-level security environment through a single, comprehensive network architecture
1.4.9	Blurred Distinction between Peace and Conflict	Refection of the broad spectrum in Armed Forces concepts, organisation, processes	There is a distinct difference between the core capabilities needed for war fighting (direct action) and (military) tasks in non-violent situations. There is a never ending discussion as to whether the same personnel (and, to a lesser extent, other means and ways) can be used in both capacities. The broadening of the spectrum calls for a review and possibly a redesign of concepts, organisation and processes. Issues that arise include growing urbanization, military vs. police, public vs. private, international vs. internal, etc.	Capable of assessing one's own organisational strengths and weaknesses vis-à-vis those of other parties

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
2.1.1	Standing Arrangements	Understanding different business models	The real cost/benefit balance between contracting out a service vs. retaining in-house capability is difficult to measure and assess. It is a dynamic balance, to a large extent, driven by actual developments that are difficult to predict in advance.	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
2.1.2	Standing Arrangements	Understanding different business models	The real cost/benefit balance between contracting out a service vs. retaining in-house capability is difficult to measure and assess. It is a dynamic balance, to a large extent, driven by actual developments that are difficult to predict in advance.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
2.1.3	Standing Arrangements	Understanding different business models	The real cost/benefit balance between contracting out a service vs. retaining in-house capability is difficult to measure and assess. It is a dynamic balance, to a large extent, driven by actual developments that are difficult to predict in advance.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
2.1.4	Standing Arrangements	Understanding different business models	The real cost/benefit balance between contracting out a service vs. retaining in-house capability is difficult to measure and assess. It is a dynamic balance, to a large extent, driven by actual developments that are difficult to predict in advance.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
2.2.1	Standing Arrangements	Legal status of service providers	The legal status of contractors that provide a function within an operational theatre must be addressed within international law as they apply to Laws of Armed Conflict and within Status of Forces Agreements with host Nation / local governments. This is particularly the case for combat support (intelligence, communications, etc.) and actual combat functions: both in defence (e.g., guarding facilities, VIPs and convoys) and offence and is driven by both outsourcing and non-contiguous battlefields with no real rear areas.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
2.3.1	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
2.3.2	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of generating coherent and integrated policy options
2.3.3	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
2.3.4	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of ‘Sense and Respond’

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
2.3.5	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
2.3.6	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
2.3.7	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of advanced distributed learning, training/exercises in a multi-level security environment through a single, comprehensive network architecture
2.3.8	Standing Arrangements	Establish a workable division of labour / collaboration structure with external service providers	Both with other force providers (e.g., regional security organisations such as the African Union) and with private parties and reflecting a variety of different customer-contractor relationships. The interaction between Armed Forces and external service providers within an operational theatre must be integrated and coordinated. Tactical and operational C2, ISR and SA to work with and track those that are linked and not linked to the endeavour.	Capable of establishing and maintaining communication channels and liaison relationships with potential service providers/partners prior to the commencement of operations

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.1.1	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
3.1.2	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of advanced distributed learning, training/exercises in a multi-level security environment through a single, comprehensive network architecture
3.1.3	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
3.1.4	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
3.1.5	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.1.6	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
3.1.7	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of providing a Networking and Information Infrastructure (NII) to enable NATO to conduct future operations
3.1.8	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of developing flexible and adaptive leaders
3.1.9	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of preserving space as a sanctuary for NATO assets
3.1.10	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed. Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm.	Capable of assessing in near real-time open sources of information for relevant data
3.1.11	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Concerns the mindset of people making decisions. Real options approach, buy a stake in a solution and then opt for that solution when needed.	Capable of stimulating, absorbing, exploiting and rewarding diversity in the military, including appropriate training

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.1.11	Planning Under Deep Uncertainty	Dealing with intrinsic uncertainty	Additional Theme-Issues: change the OPP; adaptive leadership Symposium; learning adaptivity; invest in training; lessons learned; and breaking of the control paradigm. (cont'd)	Capable of stimulating, absorbing, exploiting and rewarding diversity in the military, including appropriate training
3.2.1	Planning Under Deep Uncertainty	Financial planning in Government	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. There is a need for better ways of cash managing defence budgets that include hedging strategies to deal with price fluctuations of assets and commodities.	Capable of 'Sense and Respond'
3.2.2	Planning Under Deep Uncertainty	Financial planning in Government	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. There is a need for better ways of cash managing defence budgets that include hedging strategies to deal with price fluctuations of assets and commodities.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
3.2.3	Planning Under Deep Uncertainty	Financial planning in Government	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. There is a need for better ways of cash managing defence budgets that include hedging strategies to deal with price fluctuations of assets and commodities.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
3.2.4	Planning Under Deep Uncertainty	Financial planning in Government	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. There is a need for better ways of cash managing defence budgets that include hedging strategies to deal with price fluctuations of assets and commodities.	Capable of dynamically managing budgets within a complex environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.2.5	Planning Under Deep Uncertainty	Financial planning in Government	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. There is a need for better ways of cash managing defence budgets that include hedging strategies to deal with price fluctuations of assets and commodities.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
3.2.6	Planning Under Deep Uncertainty	Financial planning in Government	Current financial planning processes and the public accountability within Western governments do not support dynamic/responsive military planning for capability procurement. There is a need for better ways of cash managing defence budgets that include hedging strategies to deal with price fluctuations of assets and commodities.	Capable of modelling cost of various force structure options
3.3.1	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of 'Sense and Respond'
3.3.2	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
3.3.3	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.3.4	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of dynamically managing budgets within a complex environment
3.3.5	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
3.3.6	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of modelling cost of various force structure options
3.3.7	Planning Under Deep Uncertainty	Capability assessment toolsets and processes	Existing capability assessment toolsets determine requirements very specifically and very early in the capability development process. But the future environment in which the capability is deployed is intrinsically unknowable and risks situating the estimate, or limiting operational flexibility and agility. Includes, e.g., 'smart' and "fast track' procurement.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
3.4.1	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.4.2	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
3.4.3	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of dynamically managing budgets within a complex environment
3.4.4	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
3.4.5	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of modelling cost of various force structure options
3.4.6	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of ‘Sense and Respond’

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
3.4.7	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
3.4.8	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
3.4.9	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
3.4.10	Planning Under Deep Uncertainty	Future structures	The need for agile, flexible and adaptive answers to (intrinsically unpredictable) changes in the security environment warrants a radical rethink of how Armed Forces are structured and maintained. Models from the business world could be examined for applicability: outsourcing of services and the use of market adaptation mechanisms could be considered.	Capable of acting in dynamic ‘value chains’ with a variety of potential partners
4.1.1	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.1.1	Different Paradigms in Decision-Making	Achieving common objectives	There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation). (cont'd)	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
4.1.2	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
4.1.3	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.1.4	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
4.1.5	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
4.1.6	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable of measuring, analysing, predicting and anticipating risk within a complex environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.1.7	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable to construct a hierarchy or possibly a network of objectives for the various actors from the overarching objective(s) of the comprehensive approach
4.1.8	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable to assess and implement the structures and processes for planning / decision-making / activity coordination / feedback across the various actors in a comprehensive approach
4.1.9	Different Paradigms in Decision-Making	Achieving common objectives	The increasing number of entities such as military forces, NGOs, IOs and others operating within the theatre during complex endeavours makes the definition of common objectives and focus extremely difficult. There is a requirement to elicit and define the objectives of the numerous players and come to some level of consensus on a way forward that will converge and focus the capabilities that reside in each of the organizations upon achievement of an overall objective. For the military this implies, e.g., the ability to integrate non-military actions in military planning as part of a comprehensive approach (see also Theme 16 – Political Transformation).	Capable of inter agency generic training as well as specific mission rehearsal

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.2.1	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of controlling/influencing the cyberspace environment
4.2.2	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of providing disruption resistant communications services for the implementation of a Networking and Information Infrastructure (NII)
4.2.3	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of providing Information and Integration Services (IIS) for the implementation of a Networking and Information Infrastructure (NII)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.2.4	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of providing Information Assurance (IA) services for the implementation of a Networking and Information Infrastructure (NII)
4.2.5	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of providing identification, location, status and movement of friendly and neutral force elements
4.2.6	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of providing Service Management and Control (SMC) services for the implementation of a Networking and Information Infrastructure (NII)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.2.7	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of developing information/ weapons systems with open architectures and common standards that will incorporate legacy systems
4.2.8	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of incorporating artificial intelligence into systems to speed fusion of information and decision-making
4.2.9	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of digesting lessons identified into lessons learned and anchoring this in the organisation (organisation learning)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.2.10	Different Paradigms in Decision-Making	Information management	The exponentially increasing amount of potential data, information and knowledge available to decision-makers is resulting in overload and decisions based upon sometimes faulty information. This leads to the necessity to devolve decision-making down to lower levels where the quality of available information is higher rather than retain authority at higher levels based upon the technological capability to do so. In general, in a NEC environment, the traditional 'top-down' stream of information is augmented by a structural 'bottom-up' stream as well as a 'sideways' stream to Allies and 'other' agencies involved in the endeavour.	Capable of acting in dynamic 'value chains' with a variety of potential partners
4.3.1	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of developing flexible and adaptive leaders
4.3.2	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
4.3.3	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.3.4	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
4.3.5	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of employing lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
4.3.6	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of employing non or less lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
4.3.7	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of rapidly deploying significant military forces into and within a theatre of operations to enable swift crisis resolution
4.3.8	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of providing real-time audio and textual language translation to overcome language and communication barriers

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
4.3.9	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of increased self-sustainment for units deployed in theatre by effectively exploiting available resources
4.3.10	Different Paradigms in Decision-Making	Complex adaptive adversaries	In NATO operations, adversaries will continue to use highly complex adaptive systems that react and learn from encounters with Alliance forces and use decentralized structures that are difficult to discern to pass information and tactics, techniques and procedures throughout the network (linear vs. non-linear decision-making).	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
5.1.1	Evolving Relationships between Man, Robotics and Machine Intelligence	Moral, ethical and legal considerations of "human-out-of-the-loop"	With the human out of the loop or not "at risk", the parameters for deciding on whether, where, when and how to wage war shift, at the political, strategically and operational/tactical level. What are the bounds/benefits of "automation" of military tasks? Winning the hearts and minds vs. safety of troops. Unmanned systems are typically used in dull, dirty or dangerous environments/ tasks. Psychological/moral aspect – is the potential for escalation higher if technology substitutes personnel?	Capable of analysing vast amount of code to ensure that 'bugs' are truly limited so as to allow great machine automation of process that require extremely fast decision-making
5.1.2	Evolving Relationships between Man, Robotics and Machine Intelligence	Moral, ethical and legal considerations of "human-out-of-the-loop"	With the human out of the loop or not "at risk", the parameters for deciding on whether, where, when and how to wage war shift, at the political, strategically and operational/tactical level. What are the bounds/benefits of "automation" of military tasks? Winning the hearts and minds vs. safety of troops. Unmanned systems are typically used in dull, dirty or dangerous environments/ tasks. Psychological/moral aspect – is the potential for escalation higher if technology substitutes personnel?	Capable of tracing / back tracking all fires
5.1.3	Evolving Relationships between Man, Robotics and Machine Intelligence	Moral, ethical and legal considerations of "human-out-of-the-loop"	With the human out of the loop or not "at risk", the parameters for deciding on whether, where, when and how to wage war shift, at the political, strategically and operational/tactical level.	Capable of defining unambiguous Rules Of Engagement (ROEs)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
5.1.3	Evolving Relationships between Man, Robotics and Machine Intelligence	Moral, ethical and legal considerations of "human-out-of-the-loop"	What are the bounds/benefits of "automation" of military tasks? Winning the hearts and minds vs. safety of troops. Unmanned systems are typically used in dull, dirty or dangerous environments/tasks. Psychological/moral aspect – is the potential for escalation higher if technology substitutes personnel? (cont'd)	Capable of defining unambiguous Rules Of Engagement (ROEs)
5.1.4	Evolving Relationships between Man, Robotics and Machine Intelligence	Moral, ethical and legal considerations of "human-out-of-the-loop"	With the human out of the loop or not "at risk", the parameters for deciding on whether, where, when and how to wage war shift, at the political, strategically and operational/tactical level. What are the bounds/benefits of "automation" of military tasks? Winning the hearts and minds vs. safety of troops. Unmanned systems are typically used in dull, dirty or dangerous environments/ tasks. Psychological/moral aspect – is the potential for escalation higher if technology substitutes personnel?	Capable of flawless IFF and flawless autonomous targeting
5.2.1	Evolving Relationships between Man, Robotics and Machine Intelligence	Speed of action and reaction (trans-human capacity)	With an increasing operational tempo because of technological advance, is the human-in-the-loop more and more the bottleneck for timely action and situation-specific adaptation? What does this mean for the role of humans in military operations?	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
5.2.2	Evolving Relationships between Man, Robotics and Machine Intelligence	Speed of action and reaction (trans-human capacity)	With an increasing operational tempo because of technological advance, is the human-in-the-loop more and more the bottleneck for timely action and situation-specific adaptation? What does this mean for the role of humans in military operations?	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
5.2.3	Evolving Relationships between Man, Robotics and Machine Intelligence	Speed of action and reaction (trans-human capacity)	With an increasing operational tempo because of technological advance, is the human-in-the-loop more and more the bottleneck for timely action and situation-specific adaptation? What does this mean for the role of humans in military operations?	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
5.2.4	Evolving Relationships between Man, Robotics and Machine Intelligence	Speed of action and reaction (trans-human capacity)	With an increasing operational tempo because of technological advance, is the human-in-the-loop more and more the bottleneck for timely action and situation-specific adaptation? What does this mean for the role of humans in military operations?	Capable of incorporating artificial intelligence into systems to speed fusion of information and decision-making
5.3.1	Evolving Relationships between Man, Robotics and Machine Intelligence	Other system life cycles	If system performance is largely determined by software, system upgrade/adaptation becomes largely a matter of changing software modules – distributed, online and real-time. This applies also to decision algorithms, codifying doctrine and rules of engagements.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
5.4.1	Evolving Relationships between Man, Robotics and Machine Intelligence	Bio-mechanical enhancements to humans that increase capabilities and capacity	Increased human performance by (literally) integrating technology into humans (as opposed to replacing humans by technology). Think of, brain-machine interfaces, bionics, brain stimulating drugs, etc.	Capable of increasing the performance and endurance of personnel on deployed operations
5.4.2	Evolving Relationships between Man, Robotics and Machine Intelligence	Bio-mechanical enhancements to humans that increase capabilities and capacity	Increased human performance by (literally) integrating technology into humans (as opposed to replacing humans by technology). Think of, brain-machine interfaces, bionics, brain stimulating drugs, etc.	Capable of dealing with the ethical/ judicial issues
6.1.1	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of countering mobile underwater threats, including sub-surface vehicles, swimmers and torpedoes
6.1.2	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of detecting and successfully engaging low signature airborne targets
6.1.3	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of effectively countering threats to low speed / low altitude air vehicles

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
6.1.4	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of detection, warning and neutralization of full spectrum of CBRN agents or contaminants and identifying the type of agent or contaminant and the area affected
6.1.5	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of intercepting and destroying in-flight ballistic missiles
6.1.6	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of selectively denying the use of the EM spectrum to opponents without impacting its use by NATO
6.1.7	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
6.1.8	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of providing integrated personal protection from the range of threats faced in operational theatres (ballistics, Chemical, Biological, Radiological and Nuclear (CBRN), environmental, etc.)
6.1.9	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of increasing the performance and endurance of personnel on deployed operations
6.1.10	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of enhancing the mobility and survivability of (predominantly but not exclusively land) vehicles on deployed operations

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
6.1.11	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
6.1.12	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of establishing forward air and seaports of disembarkation
6.1.13	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of detecting and neutralising 'internal' threats (within/under the security umbrella)
6.1.14	Staying Power	Provide a sustained security umbrella at relatively low, manageable costs	Typically in prolonged stabilisation and reconstruction endeavours. Includes practical solutions such as leaving equipment behind, and shared use of resources and capabilities from cycle to cycle of an operation.	Capable of automatic/self repair
6.2.1	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of controlling/influencing the cyberspace environment
6.2.2	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of defeating incoming rocket, artillery and mortar rounds
6.2.3	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of countering IED threats at any point in the life cycle
6.2.4	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of remote/immediate medical assessment and first aid to ensure that battlefield casualties receive appropriate medical treatment within appropriate medical timelines

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
6.2.5	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of controlling access to designated unattended areas and borders using lethal/non-lethal means, denying or allowing access to those appropriate personnel and equipment
6.2.6	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
6.2.7	Staying Power	Facilitate political stamina	Cost and risk sharing, retain the ability to react to emerging security challenges while holding true to long-term commitments in reconstruction endeavours.	Capable of modelling cost of various force structure options
6.3.1	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
6.3.2	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of developing and assessing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
6.3.3	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of conducting civil-military cooperation in an inter-agency environment
6.3.4	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of providing identification, location, status and movement of friendly and neutral force elements
6.3.5	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of developing flexible and adaptive leaders

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
6.3.6	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of dynamically managing budgets within a complex environment
6.3.7	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
6.3.8	Staying Power	Establish a workable division of labour / collaboration structure with other agencies	Both with other governmental agencies, with NGOs and with private parties. In various forms of partnerships or customer-contractor relationships. Typically in prolonged stabilisation and reconstruction endeavours. It should be noted that the 'civ-mil loop' implied here goes beyond what is currently understood under the term 'CIMIC' (Civil-Military Cooperation). CIMIC is an instrument for the military Commander, basically aimed at force protection and accomplishment of the military mission. The civ-mil interaction here is aimed at achieving a higher order objective and is not 'owned' by the military.	Capable of modelling cost of various force structure options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
7.1.1	Small Team Operations	Self awareness	Know your own strength and weaknesses in response to external circumstances, both in a general sense (for planning purposes) as well as in a particular situation (for measured action).	Capable of enhancing the Situational Awareness (SA) of individual soldiers and increasing shared knowledge
7.1.2	Small Team Operations	Self awareness	Know your own strength and weaknesses in response to external circumstances, both in a general sense (for planning purposes) as well as in a particular situation (for measured action).	Capable of providing identification, location, status and movement of friendly and neutral force elements
7.1.3	Small Team Operations	Self awareness	Know your own strength and weaknesses in response to external circumstances, both in a general sense (for planning purposes) as well as in a particular situation (for measured action).	Capable of providing a Networking and Information Infrastructure (NII) to enable NATO to conduct future operations
7.1.4	Small Team Operations	Self awareness	Know your own strength and weaknesses in response to external circumstances, both in a general sense (for planning purposes) as well as in a particular situation (for measured action).	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
7.1.5	Small Team Operations	Self awareness	Know your own strength and weaknesses in response to external circumstances, both in a general sense (for planning purposes) as well as in a particular situation (for measured action).	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
7.2.1	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an “effects-based” feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
7.2.2	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
7.2.3	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of enhanced, effective, and flexible beyond line-of-sight communication
7.2.4	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of providing integrated personal protection from the range of threats faced in operational theatres (ballistics, Chemical, Biological, Radiological and Nuclear (CBRN), environmental, etc.)
7.2.5	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of increased self-sustainment for units deployed in theatre by effectively exploiting available resources
7.2.6	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of the covert deployment, extraction and resupply of forces (company size and larger, i.e., not only Special Forces) into areas of the operational theatre not controlled by own forces and located a significant distance away from the normal supply chain, whether on land or sea
7.2.7	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of tagging and tracking individuals or vehicles

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
7.2.8	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of controlling access to designated unattended areas and borders using lethal/non-lethal means, denying or allowing access to those appropriate personnel and equipment
7.2.9	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of employing lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
7.2.10	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of employing non or less lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
7.2.11	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of countering IED threats at any point in the life cycle
7.2.12	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of defeating incoming rocket, artillery and mortar rounds
7.2.13	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of countering static underwater threats, including detecting and disposing of all types of naval mines in all water bodies and at all water depths
7.2.14	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of 'seeing through walls' to facilitate urban operations

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
7.2.15	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of subduing, dispersing, or controlling individuals or groups of individuals and engaging vehicles/ assets/platforms/systems with a significantly reduced risk of death or permanent injury/damage
7.2.16	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of employing scalable weapons that can be designated depended on the circumstances
7.2.17	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of developing power systems appropriate for the energy requirements of personnel systems
7.2.18	Small Team Operations	Local sense and respond	Situation specific actions, possibly in a smart trial-and-error mode with an "effects-based" feedback loop. Flexible doctrine and emergent strategies based on experienced successes and failures.	Capable of developing innovative camouflage, concealment and deception
7.3.1	Small Team Operations	Quick organisational learning cycle	Quickly promulgate locally learned lessons to other relevant parts of the organisation. Both to dampen emergent strategies that have been tested and proven ineffective and to amplify those emergent strategies that have been shown to be effective. Sharing of 'situational understanding' to achieve coherent effects that are realistic in the given situation.	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
7.3.2	Small Team Operations	Quick organisational learning cycle	Quickly promulgate locally learned lessons to other relevant parts of the organisation. Both to dampen emergent strategies that have been tested and proven ineffective and to amplify those emergent strategies that have been shown to be effective. Sharing of 'situational understanding' to achieve coherent effects that are realistic in the given situation.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
7.3.3	Small Team Operations	Quick organisational learning cycle	Quickly promulgate locally learned lessons to other relevant parts of the organisation. Both to dampen emergent strategies that have been tested and proven ineffective and to amplify those emergent strategies that have been shown to be effective. Sharing of 'situational understanding' to achieve coherent effects that are realistic in the given situation.	Capable of gathering, analysing and disseminating lessons learned in a timely fashion
7.3.4	Small Team Operations	Quick organisational learning cycle	Quickly promulgate locally learned lessons to other relevant parts of the organisation. Both to dampen emergent strategies that have been tested and proven ineffective and to amplify those emergent strategies that have been shown to be effective. Sharing of 'situational understanding' to achieve coherent effects that are realistic in the given situation.	Capable of adapting organizational structures to reflect changing circumstances and evolving objectives
7.4.1	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of increasing the performance and endurance of personnel on deployed operations
7.4.2	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of providing integrated personal protection from the range of threats faced in operational theatres (ballistics, Chemical, Biological, Radiological and Nuclear (CBRN), environmental, etc.)
7.4.3	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of ready deployment, high mobility, high-tempo manoeuvre dominance operations, and survivable land engagement
7.4.4	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of providing real-time audio and textual language translation to overcome language and communication barriers

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
7.4.5	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of subduing, dispersing, or controlling individuals or groups of individuals and engaging vehicles/ assets/platforms/systems with a significantly reduced risk of death or permanent injury/damage
7.4.6	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of providing identification, location, status and movement of friendly and neutral force elements
7.4.7	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of enhancing the Situational Awareness (SA) of individual soldiers and increasing shared knowledge
7.4.8	Small Team Operations	Develop individual skill sets, and combine those skill sets into effective teams	Selection, education and training system geared towards personal professionalization. Training, operational planning and actual operations geared towards effective team composition and performance.	Capable of remote/immediate medical assessment and first aid to ensure that battlefield casualties receive appropriate medical treatment within appropriate medical timelines
7.5.1	Small Team Operations	Endeavour specific training	Situation-specific training to be adaptive, loose and late coupling of individual resources (people, means and ways) to effective, internally coherent teams. Emergent leadership based upon individual skill sets and the endeavour specific tasks and circumstances.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
7.5.2	Small Team Operations	Endeavour specific training	Situation-specific training to be adaptive, loose and late coupling of individual resources (people, means and ways) to effective, internally coherent teams. Emergent leadership based upon individual skill sets and the endeavour specific tasks and circumstances.	Capable of developing flexible and adaptive leaders

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
8.1.1	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of developing flexible and adaptive leaders
8.1.2	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of gathering, analysing and disseminating lessons learned in a timely fashion
8.1.3	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
8.1.4	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
8.1.5	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
8.1.6	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of measuring, analysing, predicting and anticipating risk within a complex environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
8.1.7	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of modelling cost of various force structure options
8.1.8	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of conducting civil-military cooperation in an inter-agency environment
8.1.9	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of undertaking in-depth foresight analysis to develop models of the future security environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
8.1.10	Strategic Compression	Different causal relationships across the levels of conflict/ organisations/endeavours	Strategic compression is the forming of unexpected or breaking of expected causal relationships among the tactical, operational and strategic level of conflict, of organisations and of endeavours (operations). Both the broadening of the types of endeavours where the military have a role and the increased complexity of typical endeavours cause this phenomenon. How to organise tasks, competences, responsibilities and available resources to mirror the reality of strategic compression? How to deal with strategic Corporals and tactical Generals / micro management? How does accountability and media coverage/pressure affect the issue?	Capable of managing and exploiting information flowing top-down, bottom-up and sideways in a multi-agency environment
8.2.1	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of controlling/influencing the cyberspace environment
8.2.2	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of providing a Networking and Information Infrastructure (NII) to enable NATO to conduct future operations
8.2.3	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of providing identification, location, status and movement of friendly and neutral force elements

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
8.2.4	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
8.2.5	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of assessing in near real-time open sources of information for relevant data
8.2.6	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of developing information/ weapons systems with open architectures and common standards that will incorporate legacy systems
8.2.7	Strategic Compression	Information management	Conventional quality reportage, objective coverage, sources of information validation loose their bearings under strategic compression. These information processes and products are partly replaced by raw, unprocessed, unregulated, or even manipulated sources and streams of information, directly available to the actors at the various levels, and to the public.	Capable of swiftly assessing media information and responding with truth data
8.3.1	Strategic Compression	Morality and culture in coalition / inter-agency endeavours	If typical operations become more international and inter-agency (and even with external service providers), with (the need for) cooperation and collaboration pushing down to the tactical level (see, e.g., small team operations), several issues arise. The most fundamental issue might be the need to make an endeavour succeed with parties that act from quite diverse moral and cultural views.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
9.1.1	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
9.1.2	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
9.1.3	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
9.1.3	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge. (cont'd)	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
9.1.4	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of modelling cost of various force structure options
9.1.5	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of controlling/influencing the cyberspace environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
9.1.6	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of the covert deployment, extraction and resupply of forces (company size and larger, i.e., not only Special Forces) into areas of the operational theatre not controlled by own forces and located a significant distance away from the normal supply chain, whether on land or sea
9.1.7	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of detection, warning and neutralization of full spectrum of CBRN agents or contaminants and identifying the type of agent or contaminant and the area affected
9.1.8	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
9.1.8	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge. (cont'd)	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
9.1.9	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
9.1.10	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
9.1.11	Dual-Use Technologies	Spin-in of high quality, high pace innovation	Dual-use technology provides an opportunity to import high quality innovation at reasonable costs – for business processes, products and services. One issue is how to guarantee security of information and security of supply. Another is how to maintain technological dominance. One element is to keep track of how advancement in civil domains can be incorporated effectively in the military domain. Furthermore, there is quite some craftsmanship needed to combine the right dual-use technologies with a few remaining defence specific technologies for efficient and effective (large scale) military applications. This is where the West through the combination of its economic strength, industrial base and high quality military professional skill still has a competitive edge.	Capable of fast technology insertion
9.2.1	Dual-Use Technologies	Pace of technology development	The pace of technology development is accelerating with a big jump ahead through the combination of advances in ICT, nano and bio technology and cognitive sciences. The variety of ways to wage war may drastically increase – faster than society can keep up in terms of legal and moral embedding of the phenomenon of war.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
9.2.2	Dual-Use Technologies	Pace of technology development	The pace of technology development is accelerating with a big jump ahead through the combination of advances in ICT, nano and bio technology and cognitive sciences. The variety of ways to wage war may drastically increase – faster than society can keep up in terms of legal and moral embedding of the phenomenon of war.	Capable of empowering society / local communities to deal with the risks associated with the proliferation of dual-use technology
9.2.3	Dual-Use Technologies	Pace of technology development	The pace of technology development is accelerating with a big jump ahead through the combination of advances in ICT, nano and bio technology and cognitive sciences. The variety of ways to wage war may drastically increase – faster than society can keep up in terms of legal and moral embedding of the phenomenon of war.	Capable of enforcing restrictions on civilian technologies with military applications

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
9.3.1	Dual-Use Technologies	Disruptive technologies	Globalisation and "civilisation" of military technology make proliferation control a rearguard battle. Adversaries might come up with technology applications that suddenly tip the military balance (e.g., between the offensive and the defence), rendering Western military superiority (locally and temporarily) useless.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
9.3.2	Dual-Use Technologies	Disruptive technologies	Globalisation and "civilisation" of military technology make proliferation control a rearguard battle. Adversaries might come up with technology applications that suddenly tip the military balance (e.g., between the offensive and the defence), rendering Western military superiority (locally and temporarily) useless.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
9.3.3	Dual-Use Technologies	Disruptive technologies	Globalisation and "civilisation" of military technology make proliferation control a rearguard battle. Adversaries might come up with technology applications that suddenly tip the military balance (e.g., between the offensive and the defence), rendering Western military superiority (locally and temporarily) useless.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
9.3.4	Dual-Use Technologies	Disruptive technologies	Globalisation and "civilisation" of military technology make proliferation control a rearguard battle. Adversaries might come up with technology applications that suddenly tip the military balance (e.g., between the offensive and the defence), rendering Western military superiority (locally and temporarily) useless.	Capable of fast technology insertion
10.1.1	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.1.1	Non-Military/ Non-Violent Threats	Expansion of the mission set	How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain? (cont'd)	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
10.1.2	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of 'Sense and Respond'
10.1.3	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
10.1.4	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.1.4	Non-Military/ Non-Violent Threats	Expansion of the mission set	How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain? (cont'd)	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
10.1.5	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
10.1.6	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
10.1.7	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.1.7	Non-Military/ Non-Violent Threats	Expansion of the mission set	How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain? (cont'd)	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
10.1.8	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of controlling/influencing the cyberspace environment
10.1.9	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of subduing, dispersing, or controlling individuals or groups of individuals and engaging vehicles/ assets/platforms/systems with a significantly reduced risk of death or permanent injury/damage
10.1.10	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate.	Capable of real-time medical surveillance of populations

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.1.10	Non-Military/ Non-Violent Threats	Expansion of the mission set	How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain? (cont'd)	Capable of real-time medical surveillance of populations
10.1.11	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of gathering meteorological information and providing accurate forecasts of future environmental conditions
10.1.12	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate. How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain?	Capable of controlling access to designated unattended areas and borders using lethal/non-lethal means, denying or allowing access to those appropriate personnel and equipment
10.1.13	Non-Military/ Non-Violent Threats	Expansion of the mission set	Shifting responsibilities in the different phases of the whole security chain allow for an expansion of the potential roles of Armed Forces throughout this security chain: from analysis and early warning; through general prevention and preparation; specific prevention and preparation; protection; pre-emption; response; to recover; and evaluate.	Capable of digesting lessons identified into lessons learned and anchoring this in the organisation (organisation learning)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.1.13	Non-Military/ Non-Violent Threats	Expansion of the mission set	How may the core competences of the military – such as unity of command, unity of effort and disciplined and enduring action under stressful circumstances – be best applied and expanded in the comprehensive security domain? (cont'd)	Capable of digesting lessons identified into lessons learned and anchoring this in the organisation (organisation learning)
10.2.1	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences). The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
10.2.2	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences). The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
10.2.3	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences).	Capable of generating coherent and integrated policy options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.2.3	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc. (cont'd)	Capable of generating coherent and integrated policy options
10.2.4	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences). The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc.	Capable of modelling cost of various force structure options
10.2.5	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences). The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc.	Capable of swiftly assessing and developing antidotes, vaccines, treatments or decontamination against all agents
10.2.6	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	Ability to order all hazards risks across probability and impact. Combining a long-term perspective upon military core responsibilities and competences, while simultaneously answering to emergent risks, threats and potential catastrophic events (= small scale causes with large first and second order impact consequences).	Capable of gathering, analysing and disseminating lessons learned in a timely fashion

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.2.6	Non-Military/ Non-Violent Threats	Risk prioritisation, balance of investments and scaling problem	The latter may overwhelm current capabilities – how to deal with that? For non-traditional threats there will be a (initial?) lack of threat predictability. There's a need to create new early warning mechanisms for cyber attacks, tsunami, pandemics, etc. (cont'd)	Capable of gathering, analysing and disseminating lessons learned in a timely fashion
10.3.1	Non-Military/ Non-Violent Threats	Legal embedding	Legal considerations for the employment of military forces in non-military endeavours, both nationally and (particularly) across borders.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
10.3.2	Non-Military/ Non-Violent Threats	Legal embedding	Legal considerations for the employment of military forces in non-military endeavours, both nationally and (particularly) across borders.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
10.4.1	Non-Military/ Non-Violent Threats	Establish a workable division of labour / collaboration structure with other agencies	Efficient responses will need to combine the actions of many different actors to achieve the overall effect. Includes avoiding duplication with other actors (NGOs, PVOs, economists, politicians, etc.). This comprehensive approach may have to include people who and institutions that don't want to be coordinated.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
10.4.2	Non-Military/ Non-Violent Threats	Establish a workable division of labour / collaboration structure with other agencies	Efficient responses will need to combine the actions of many different actors to achieve the overall effect. Includes avoiding duplication with other actors (NGOs, PVOs, economists, politicians, etc.). This comprehensive approach may have to include people who and institutions that don't want to be coordinated.	Capable of generating coherent and integrated policy options
10.4.3	Non-Military/ Non-Violent Threats	Establish a workable division of labour / collaboration structure with other agencies	Efficient responses will need to combine the actions of many different actors to achieve the overall effect. Includes avoiding duplication with other actors (NGOs, PVOs, economists, politicians, etc.). This comprehensive approach may have to include people who and institutions that don't want to be coordinated.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
10.4.4	Non-Military/ Non-Violent Threats	Establish a workable division of labour / collaboration structure with other agencies	Efficient responses will need to combine the actions of many different actors to achieve the overall effect. Includes avoiding duplication with other actors (NGOs, PVOs, economists, politicians, etc.). This comprehensive approach may have to include people who and institutions that don't want to be coordinated.	Capable of 'Sense and Respond'
10.4.5	Non-Military/ Non-Violent Threats	Establish a workable division of labour / collaboration structure with other agencies	Efficient responses will need to combine the actions of many different actors to achieve the overall effect. Includes avoiding duplication with other actors (NGOs, PVOs, economists, politicians, etc.). This comprehensive approach may have to include people who and institutions that don't want to be coordinated.	Capable of enabling an efficient support chain from home base to point of use in an operation within an integrated multi-national logistic environment
11.1.1	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of researching and executing strategies that mitigate the need for large numbers of forces
11.1.2	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
11.1.3	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of modelling cost of various force structure options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
11.1.4	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
11.1.5	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of developing and executing recruitment strategies
11.1.6	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
11.1.7	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
11.1.8	Regeneration	Quantitative regeneration	Ability to timely regenerate a down scaled capability "in numbers", and to employ those numbers in a coordinated, probably echeloned way. A crucial element might be agreements with dual-use industry to rapidly tailor commercial "look-alike" products and production lines to military applications.	Capable of replacing people with technology
11.2.1	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy).	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
11.2.1	Regeneration	Qualitative regeneration	Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military. (cont'd)	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
11.2.2	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of researching and executing asymmetric strategies that mitigate the need for large numbers of forces
11.2.3	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
11.2.4	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of modelling cost of various force structure options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
11.2.5	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
11.2.6	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
11.2.7	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
11.2.8	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy).	Capable of digesting lessons identified into lessons learned and anchoring this in the organisation (organisation learning)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
11.2.8	Regeneration	Qualitative regeneration	Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military. (cont'd)	Capable of digesting lessons identified into lessons learned and anchoring this in the organisation (organisation learning)
11.2.9	Regeneration	Qualitative regeneration	Ability to timely regenerate a phased-out capability to meet a (re-)emerging threat. Regeneration is an option that may compete with or is complementary to building new capabilities (and thus an instrument in an adaptive and robust organisation/strategy). Regeneration may apply to a complete capability or to, e.g., a discarded doctrine that may be re-applied (with current means) to deal with a re-emerging threat. A crucial element is the ability to routinely and effectively preserve knowledge within the military.	Capable of advanced distributed learning, training / exercises in a multi-level security environment through a single, comprehensive network architecture
12.1.1	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	The character of war is expanding from just traditional force-on-force engagements to include more asymmetric engagements/endeavours where the focus is on the mental and moral domains. The need to 'win the peace' must be incorporated into the force structure / capability development process as well as in the operational planning process and operations. As an example, it might become of prime importance for NATO to craft the message that is transmitted across multiple media to the numerous audiences that could impact operations. This will include friendly, adversary and neutral audiences. Also, effects in the physical domain may be instrumental to achieving effects in the information and the moral domain.	Capable of swiftly assessing media information and responding with truth data
12.1.2	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	The character of war is expanding from just traditional force-on-force engagements to include more asymmetric engagements/endeavours where the focus is on the mental and moral domains.	Capable of assessing in near real-time open sources of information for relevant data

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
12.1.2	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	The need to 'win the peace' must be incorporated into the force structure / capability development process as well as in the operational planning process and operations. As an example, it might become of prime importance for NATO to craft the message that is transmitted across multiple media to the numerous audiences that could impact operations. This will include friendly, adversary and neutral audiences. Also, effects in the physical domain may be instrumental to achieving effects in the information and the moral domain. (cont'd)	Capable of assessing in near real-time open sources of information for relevant data
12.1.3	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	The character of war is expanding from just traditional force-on-force engagements to include more asymmetric engagements/endeavours where the focus is on the mental and moral domains. The need to 'win the peace' must be incorporated into the force structure / capability development process as well as in the operational planning process and operations. As an example, it might become of prime importance for NATO to craft the message that is transmitted across multiple media to the numerous audiences that could impact operations. This will include friendly, adversary and neutral audiences. Also, effects in the physical domain may be instrumental to achieving effects in the information and the moral domain.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
12.1.4	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	The character of war is expanding from just traditional force-on-force engagements to include more asymmetric engagements/endeavours where the focus is on the mental and moral domains. The need to 'win the peace' must be incorporated into the force structure / capability development process as well as in the operational planning process and operations. As an example, it might become of prime importance for NATO to craft the message that is transmitted across multiple media to the numerous audiences that could impact operations.	Capable of monitoring emerging and developing technology in the commercial and defence sectors

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
12.1.4	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	This will include friendly, adversary and neutral audiences. Also, effects in the physical domain may be instrumental to achieving effects in the information and the moral domain. (cont'd)	Capable of monitoring emerging and developing technology in the commercial and defence sectors
12.1.5	Three Domains of War: Physical, Mental and Moral	Need to develop capabilities that act in the information and moral domain	The character of war is expanding from just traditional force-on-force engagements to include more asymmetric engagements/endeavours where the focus is on the mental and moral domains. The need to 'win the peace' must be incorporated into the force structure / capability development process as well as in the operational planning process and operations. As an example, it might become of prime importance for NATO to craft the message that is transmitted across multiple media to the numerous audiences that could impact operations. This will include friendly, adversary and neutral audiences. Also, effects in the physical domain may be instrumental to achieving effects in the information and the moral domain.	Capable of forward operational planning for complex endeavours across the different stages and in a multi-agency environment
12.2.1	Three Domains of War: Physical, Mental and Moral	Cyber security	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	Capable of controlling/influencing the cyberspace environment
12.2.2	Three Domains of War: Physical, Mental and Moral	Cyber security	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	Capable of being able to operate without control of the cyberspace environment
12.2.3	Three Domains of War: Physical, Mental and Moral	Cyber security	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	Capable of monitoring emerging and developing technology in the commercial and defence sectors
12.2.4	Three Domains of War: Physical, Mental and Moral	Cyber security	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	Capable of providing Information Assurance (IA) services for the implementation of a Networking and Information Infrastructure (NII)

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
12.2.5	Three Domains of War: Physical, Mental and Moral	Cyber security	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
12.2.6	Three Domains of War: Physical, Mental and Moral	Cyber security	To what extent is cyber security a military issue (as opposed to a more general societal problem)? When does the information domain become a (virtual) battle ground? What are doctrine and ROEs for cyberspace?	Capable of acting without access to cyberspace
12.3.1	Three Domains of War: Physical, Mental and Moral	Balance of investments in the three domains	Despite the growing focus on campaigns to win the 'hearts and minds' and an effects-based approach to operations, there will always be a requirement to maintain dominance in the physical domain. There is a need to find a balance of investment between capabilities that act in the physical, the information and the moral domain.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
12.3.2	Three Domains of War: Physical, Mental and Moral	Balance of investments in the three domains	Despite the growing focus on campaigns to win the 'hearts and minds' and an effects-based approach to operations, there will always be a requirement to maintain dominance in the physical domain. There is a need to find a balance of investment between capabilities that act in the physical, the information and the moral domain.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
12.3.3	Three Domains of War: Physical, Mental and Moral	Balance of investments in the three domains	Despite the growing focus on campaigns to win the 'hearts and minds' and an effects-based approach to operations, there will always be a requirement to maintain dominance in the physical domain. There is a need to find a balance of investment between capabilities that act in the physical, the information and the moral domain.	Capable of modeling the interaction between the physical, mental and moral domains
12.3.4	Three Domains of War: Physical, Mental and Moral	Balance of investments in the three domains	Despite the growing focus on campaigns to win the 'hearts and minds' and an effects-based approach to operations, there will always be a requirement to maintain dominance in the physical domain. There is a need to find a balance of investment between capabilities that act in the physical, the information and the moral domain.	Capable of modelling cost of various force structure options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
12.3.5	Three Domains of War: Physical, Mental and Moral	Balance of investments in the three domains	Despite the growing focus on campaigns to win the 'hearts and minds' and an effects-based approach to operations, there will always be a requirement to maintain dominance in the physical domain. There is a need to find a balance of investment between capabilities that act in the physical, the information and the moral domain.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
12.4.1	Three Domains of War: Physical, Mental and Moral	Acceptance of the tenets of irregular warfare	Societal, political and military understanding of the character of irregular (unrestricted, continuous) warfare and acceptance of the requirements it poses. Critical elements are, e.g., public resilience, an effective integration of instruments of state power and 'staying power', both physically and mentally. An important prerequisite is to have the ability to map the mental and moral domains. Fields such as sociology and anthropology must be tapped to establish methodologies that will include the mental and moral domains, both in a strategic sense and for operational purposes (intelligence preparation of the mental and moral "battlefield").	Capable of monitoring emerging and developing technology in the commercial and defence sectors
12.4.2	Three Domains of War: Physical, Mental and Moral	Acceptance of the tenets of irregular warfare	Societal, political and military understanding of the character of irregular (unrestricted, continuous) warfare and acceptance of the requirements it poses. Critical elements are, e.g., public resilience, an effective integration of instruments of state power and 'staying power', both physically and mentally. An important prerequisite is to have the ability to map the mental and moral domains. Fields such as sociology and anthropology must be tapped to establish methodologies that will include the mental and moral domains, both in a strategic sense and for operational purposes (intelligence preparation of the mental and moral "battlefield").	Capable of researching and executing asymmetric strategies that mitigate the need for large numbers of forces
12.4.3	Three Domains of War: Physical, Mental and Moral	Acceptance of the tenets of irregular warfare	Societal, political and military understanding of the character of irregular (unrestricted, continuous) warfare and acceptance of the requirements it poses. Critical elements are, e.g., public resilience, an effective integration of instruments of state power and 'staying power', both physically and mentally.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
12.4.3	Three Domains of War: Physical, Mental and Moral	Acceptance of the tenets of irregular warfare	An important prerequisite is to have the ability to map the mental and moral domains. Fields such as sociology and anthropology must be tapped to establish methodologies that will include the mental and moral domains, both in a strategic sense and for operational purposes (intelligence preparation of the mental and moral "battlefield"). (cont'd)	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
13.1.1	Coalition Operations	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of modelling cost of various force structure options
13.1.2	Coalition Operations	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
13.1.3	Coalition Operations	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable to assure access to common resources in a variable configuration of coalitions
13.1.4	Coalition Operations	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable to determine in which institutional setting (EU, NATO, UN) a particular endeavour can be carried out optimally
13.1.5	Coalition Operations	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of dynamically managing budgets within a complex environment
13.1.6	Coalition Operations	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
13.2.1	Coalition Operations	Legal issues and caveats	Legal issues that deal with coalition operations. Application of laws of armed conflict. Geneva Convention and International Court of Justice. Applies a sense of coalition in a broad sense, not NATO led but with NATO Nation participation.	Capable of generating coherent and integrated policy options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
13.2.2	Coalition Operations	Legal issues and caveats	Legal issues that deal with coalition operations. Application of laws of armed conflict. Geneva Convention and International Court of Justice. Applies a sense of coalition in a broad sense, not NATO led but with NATO Nation participation.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
13.2.3	Coalition Operations	Legal issues and caveats	Legal issues that deal with coalition operations. Application of laws of armed conflict. Geneva Convention and International Court of Justice. Applies a sense of coalition in a broad sense, not NATO led but with NATO Nation participation.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
13.2.4	Coalition Operations	Legal issues and caveats	Legal issues that deal with coalition operations. Application of laws of armed conflict. Geneva Convention and International Court of Justice. Applies a sense of coalition in a broad sense, not NATO led but with NATO Nation participation.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
13.2.5	Coalition Operations	Legal issues and caveats	Legal issues that deal with coalition operations. Application of laws of armed conflict. Geneva Convention and International Court of Justice. Applies a sense of coalition in a broad sense, not NATO led but with NATO Nation participation.	Capable to create a workable legal framework in (and for) coalition operations while doing justice to national legal considerations
13.3.1	Coalition Operations	Capability pooling, sharing, specializing	Niche capabilities and role specialization. Critical reliance on assets of one country and the risk that that country's need will trump the coalition need. Span of metrics and benchmarking efforts. Need for interoperability / open standards across DOTMLPFI. Needs for capabilities and information models/architectures to be 'born' interoperable.	Capable of generating coherent and integrated policy options
13.3.2	Coalition Operations	Capability pooling, sharing, specializing	Niche capabilities and role specialization. Critical reliance on assets of one country and the risk that that country's need will trump the coalition need. Span of metrics and benchmarking efforts. Need for interoperability / open standards across DOTMLPFI. Needs for capabilities and information models/architectures to be 'born' interoperable.	Capable of developing information/weapons systems with open architectures and common standards that will incorporate legacy systems

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
13.3.3	Coalition Operations	Capability pooling, sharing, specializing	Niche capabilities and role specialization. Critical reliance on assets of one country and the risk that that country's need will trump the coalition need. Span of metrics and benchmarking efforts. Need for interoperability / open standards across DOTMLPFI. Needs for capabilities and information models/architectures to be 'born' interoperable.	Capable of assessing the optimal level of multi-nationality for a given capability
14.1.1	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of preserving space as a sanctuary for NATO assets
14.1.2	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of acting without access to space assets
14.1.3	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
14.1.4	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of space traffic management
14.1.5	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of employing lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
14.1.6	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of protecting space assets and communication links

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
14.1.7	Space is Opening Up	Critical dependence upon space assets	The dependence on space assets for, e.g., communications, surveillance, navigation causes increased vulnerabilities and risks to NATO's capabilities, both in an economic sense as military.	Capable of intercepting and destroying in-flight ballistic missiles
14.2.1	Space is Opening Up	Legal issues and caveats	Without a clear understanding of the legalities of space usage or control the possibilities of accidents or deliberate actions being construed as an "Act of War" rise considerably. Potential state and non-state opponents, enemies and aggressors could exploit the "grey areas" and cause undo tensions in the world. Placing weapons in space to protect space assets could lead to placement of offensive weapons as well. Need for an arms control system. Clearly defined military responsibilities in this domain will help draw the line on what are acceptable roles and missions and what are not. Rules/controls are required for, e.g., aerospace control and management, debris handling, weaponization, commercial usage.	Capable of developing, assessing and implementing standardised business rules and practices among military, industry, NGO, IO and other entities
14.2.2	Space is Opening Up	Legal issues and caveats	Without a clear understanding of the legalities of space usage or control the possibilities of accidents or deliberate actions being construed as an "Act of War" rise considerably. Potential state and non-state opponents, enemies and aggressors could exploit the "grey areas" and cause undo tensions in the world. Placing weapons in space to protect space assets could lead to placement of offensive weapons as well. Need for an arms control system. Clearly defined military responsibilities in this domain will help draw the line on what are acceptable roles and missions and what are not. Rules/controls are required for, e.g., aerospace control and management, debris handling, weaponization, commercial usage.	Capable of developing systems with open architectures and common standards
14.3.1	Space is Opening Up	Ubiquity of supply	Commercial interest in the lucrative space arena allow for more players to have access to increased situational awareness which would otherwise be limited.	Capable of monitoring emerging and developing technology in the commercial and defence sectors

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
14.3.1	Space is Opening Up	Ubiquity of supply	Privatization of services that might be applied military permits misuse (or smart use) by state and non-state opponents. This causes risks to NATO's capabilities. (cont'd)	Capable of monitoring emerging and developing technology in the commercial and defence sectors
14.4.1	Space is Opening Up	Technology sharing	The large expense related to technology development limits the number of countries on the leading edge of military exploitation of space. If there is severe limitation or disruption in the technology flow to all NATO countries interoperability and distrust issues will arise.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
15.1.1	Cost Escalation	High-technology costs are increasing	Cutting-edge weapons systems and system-of-systems continue to rise in cost. Simultaneously, defence budgets remain stable or decrease in real terms. In a platform-centric paradigm, this means fewer platforms available/ affordable. In a network-centric paradigm, transformation and system-of-systems development may be unaffordable. In general this trend, certainly nationally, results in unaffordable capabilities.	Capable of modelling cost of various force structure options
15.1.2	Cost Escalation	High-technology costs are increasing	Cutting-edge weapons systems and system-of-systems continue to rise in cost. Simultaneously, defence budgets remain stable or decrease in real terms. In a platform-centric paradigm, this means fewer platforms available/ affordable. In a network-centric paradigm, transformation and system-of-systems development may be unaffordable. In general this trend, certainly nationally, results in unaffordable capabilities.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
15.1.3	Cost Escalation	High-technology costs are increasing	Cutting-edge weapons systems and system-of-systems continue to rise in cost. Simultaneously, defence budgets remain stable or decrease in real terms. In a platform-centric paradigm, this means fewer platforms available/ affordable. In a network-centric paradigm, transformation and system-of-systems development may be unaffordable. In general this trend, certainly nationally, results in unaffordable capabilities.	Capable of generating coherent and integrated policy options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
15.1.4	Cost Escalation	High-technology costs are increasing	Cutting-edge weapons systems and system-of-systems continue to rise in cost. Simultaneously, defence budgets remain stable or decrease in real terms. In a platform-centric paradigm, this means fewer platforms available/ affordable. In a network-centric paradigm, transformation and system-of-systems development may be unaffordable. In general this trend, certainly nationally, results in unaffordable capabilities.	Capable of developing modular systems ready for technology insertion
15.1.5	Cost Escalation	High-technology costs are increasing	Cutting-edge weapons systems and system-of-systems continue to rise in cost. Simultaneously, defence budgets remain stable or decrease in real terms. In a platform-centric paradigm, this means fewer platforms available/ affordable. In a network-centric paradigm, transformation and system-of-systems development may be unaffordable. In general this trend, certainly nationally, results in unaffordable capabilities.	Capable of developing information/ weapons systems with open architectures and common standards that will incorporate legacy systems
15.2.1	Cost Escalation	Running costs are escalating	Trend for real wage growth, coupled with more complex equipment and more demanding legislation makes operating costs prohibitively expensive (Baumol's cost disease). Simultaneously, defence budgets remain stable or decrease in real terms. Nations are unable to afford the 'cost spike' for new equipment, because current running costs absorb most of the budget. Also the cost of commodities might (continue to) rise to extreme levels.	Capable of modelling cost of various force structure options
15.2.2	Cost Escalation	Running costs are escalating	Trend for real wage growth, coupled with more complex equipment and more demanding legislation makes operating costs prohibitively expensive (Baumol's cost disease). Simultaneously, defence budgets remain stable or decrease in real terms. Nations are unable to afford the 'cost spike' for new equipment, because current running costs absorb most of the budget. Also the cost of commodities might (continue to) rise to extreme levels.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
15.2.3	Cost Escalation	Running costs are escalating	Trend for real wage growth, coupled with more complex equipment and more demanding legislation makes operating costs prohibitively expensive (Baumol's cost disease). Simultaneously, defence budgets remain stable or decrease in real terms. Nations are unable to afford the 'cost spike' for new equipment, because current running costs absorb most of the budget. Also the cost of commodities might (continue to) rise to extreme levels.	Capable of generating coherent and integrated policy options
15.3.1	Cost Escalation	Costs of actual operations are escalating	The real cost of operations far exceeds budget lines and estimates, resulting in Nations not willing to commit to operations, certainly not long-lasting ones. Balance is needed between the vital interests at stake and the military investments to protect those actively.	Capable of modelling cost of various force structure options
15.3.2	Cost Escalation	Costs of actual operations are escalating	The real cost of operations far exceeds budget lines and estimates, resulting in Nations not willing to commit to operations, certainly not long-lasting ones. Balance is needed between the vital interests at stake and the military investments to protect those actively.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
15.3.3	Cost Escalation	Costs of actual operations are escalating	The real cost of operations far exceeds budget lines and estimates, resulting in Nations not willing to commit to operations, certainly not long-lasting ones. Balance is needed between the vital interests at stake and the military investments to protect those actively.	Capable of generating coherent and integrated policy options
16.1.1	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
16.1.2	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise.	Capable of generating coherent and integrated policy options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
16.1.2	Political Transformation	Achieving campaign level surprise	In general military operational tempo is often not matched by pol-mil decision-making. (cont'd)	Capable of generating coherent and integrated policy options
16.1.3	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate
16.1.4	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
16.1.5	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
16.1.6	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
16.1.7	Political Transformation	Achieving campaign level surprise	Because of its current political decision process, including red-card holders and national caveats, NATO-led endeavours can hardly achieve campaign level surprise. In general military operational tempo is often not matched by pol-mil decision-making.	Capable of establishing how military activities contribute to achieving political objectives and end-states, and vice versa
16.2.1	Political Transformation	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of modelling cost of various force structure options

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
16.2.2	Political Transformation	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of measuring, analysing, predicting and anticipating risk within a complex environment
16.2.3	Political Transformation	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of generating coherent and integrated policy options
16.2.4	Political Transformation	Burden sharing	Ways to distribute risks and costs in a fair way – not in the least to ensure coalition solidarity and lasting (national) political and societal support.	Capable of establishing the cost of ongoing operations and of giving a decent estimate for possible future operations
16.3.1	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of conducting civil-military cooperation in an inter-agency environment
16.3.2	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of formulating and executing shared and realistic actions
16.3.3	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of formulating and executing shared and realistic actions
16.3.4	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
16.3.5	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
16.3.6	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs
16.3.7	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
16.3.8	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of undertaking in-depth foresight analysis to develop models of the future security environment
16.3.9	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of realistic computer modelling and simulation to support military operations training, experimentation, decision-making and comprehensive approach planning
16.3.10	Political Transformation	Comprehensive approach	Embedding military capability/efforts in inter-agency endeavours.	Capable of advanced distributed learning, training/exercises in a multi-level security environment through a single, comprehensive network architecture
17.1.1	The Role of Information and the Media	24-hour media cycle	The Alliance will work in an environment where the news media will be pervasive and will have access to (near) real-time transmission capabilities to a global audience. This could harm military operations. Or is this something that the military can try to influence or take advantage of? The speed with which media can report on incidents during operations far exceeds ability of Commanders to present a comprehensive insight into the NATO 'side of the story'.	Capable of controlling/influencing the cyberspace environment

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
17.1.1	The Role of Information and the Media	24-hour media cycle	This can most certainly result in incorrect, possibly volatile, information being spread through a theatre of operations bringing about serious consequences. (cont'd)	Capable of controlling/influencing the cyberspace environment
17.1.2	The Role of Information and the Media	24-hour media cycle	The Alliance will work in an environment where the news media will be pervasive and will have access to (near) real-time transmission capabilities to a global audience. This could harm military operations. Or is this something that the military can try to influence or take advantage of? The speed with which media can report on incidents during operations far exceeds ability of Commanders to present a comprehensive insight into the NATO 'side of the story'. This can most certainly result in incorrect, possibly volatile, information being spread through a theatre of operations bringing about serious consequences.	Capable of (near) real-time news processing
17.1.3	The Role of Information and the Media	24-hour media cycle	The Alliance will work in an environment where the news media will be pervasive and will have access to (near) real-time transmission capabilities to a global audience. This could harm military operations. Or is this something that the military can try to influence or take advantage of? The speed with which media can report on incidents during operations far exceeds ability of Commanders to present a comprehensive insight into the NATO 'side of the story'. This can most certainly result in incorrect, possibly volatile, information being spread through a theatre of operations bringing about serious consequences.	Capable of designing effective media strategies
17.2.1	The Role of Information and the Media	Information operations and media bias	The media reporting on Alliance operations can influence the attitudes of the indigenous residents. Due to the proliferation of technology that gives anyone access to a wide audience, adversaries and media organizations with different agendas could seek to use the mediums of the internet, television, radio, etc., to promulgate positions that are negative to NATO. Information operations will have an impact particularly in the mental and moral domains, and, most certainly, will have an impact on the physical over time.	Capable of assessing in near real-time open sources of information for relevant data

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
17.2.1	The Role of Information and the Media	Information operations and media bias	The high numbers of transmission channels for information operations and the high level of access to the supporting technology make information operations a likely component of Alliance operations. Due to complexity of future operations and the high likelihood of these operations requiring, at least, the tacit approval of the indigenous population, the possible impact of enemy information operations could be significant. (cont'd)	Capable of assessing in near real-time open sources of information for relevant data
17.2.2	The Role of Information and the Media	Information operations and media bias	The media reporting on Alliance operations can influence the attitudes of the indigenous residents. Due to the proliferation of technology that gives anyone access to a wide audience, adversaries and media organizations with different agendas could seek to use the mediums of the internet, television, radio, etc., to promulgate positions that are negative to NATO. Information operations will have an impact particularly in the mental and moral domains, and, most certainly, will have an impact on the physical over time. The high numbers of transmission channels for information operations and the high level of access to the supporting technology make information operations a likely component of Alliance operations. Due to complexity of future operations and the high likelihood of these operations requiring, at least, the tacit approval of the indigenous population, the possible impact of enemy information operations could be significant.	Capable of exploiting one's own media strategy in information space
17.2.3	The Role of Information and the Media	Information operations and media bias	The media reporting on Alliance operations can influence the attitudes of the indigenous residents. Due to the proliferation of technology that gives anyone access to a wide audience, adversaries and media organizations with different agendas could seek to use the mediums of the internet, television, radio, etc., to promulgate positions that are negative to NATO. Information operations will have an impact particularly in the mental and moral domains, and, most certainly, will have an impact on the physical over time.	Capable of countering opponent's use of information space

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
17.2.3	The Role of Information and the Media	Information operations and media bias	The high numbers of transmission channels for information operations and the high level of access to the supporting technology make information operations a likely component of Alliance operations. Due to complexity of future operations and the high likelihood of these operations requiring, at least, the tacit approval of the indigenous population, the possible impact of enemy information operations could be significant. (cont'd)	Capable of countering opponent's use of information space
17.3.1	The Role of Information and the Media	Media as an intelligence source for the enemy	The proliferation of media and mediums through which information related to operations can be accessed has significantly increased the use of media reports as sources for intelligence. Adversaries have used traditional media reports, as well as more non-traditional sources such as YouTube and Google, to access geographic data and receive results of attacks and assessments of the quality of tactics. Ambient intelligence?	Capable of (near) real-time news processing
17.3.2	The Role of Information and the Media	Media as an intelligence source for the enemy	The proliferation of media and mediums through which information related to operations can be accessed has significantly increased the use of media reports as sources for intelligence. Adversaries have used traditional media reports, as well as more non-traditional sources such as YouTube and Google, to access geographic data and receive results of attacks and assessments of the quality of tactics. Ambient intelligence?	Capable of exploiting information space for disinforming opponents
18.1.1	Super-Empowered Individuals	Massive destruction power in the hands of a single person	Proliferation of relatively low-cost, easy to obtain dual-use technology with extreme destructive capabilities leads to this new, difficult to predict/control threat.	Capable of monitoring emerging and developing technology in the commercial and defence sectors
18.1.2	Super-Empowered Individuals	Massive destruction power in the hands of a single person	Proliferation of relatively low-cost, easy to obtain dual-use technology with extreme destructive capabilities leads to this new, difficult to predict/control threat.	Capable of detection, warning and neutralization of full spectrum of CBRN agents or contaminants and identifying the type of agent or contaminant and the area affected

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
18.1.3	Super-Empowered Individuals	Massive destruction power in the hands of a single person	Proliferation of relatively low-cost, easy to obtain dual-use technology with extreme destructive capabilities leads to this new, difficult to predict/control threat.	Capable of consequence management
18.1.4	Super-Empowered Individuals	Massive destruction power in the hands of a single person	Proliferation of relatively low-cost, easy to obtain dual-use technology with extreme destructive capabilities leads to this new, difficult to predict/control threat.	Capable of employing lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
18.1.5	Super-Empowered Individuals	Massive destruction power in the hands of a single person	Proliferation of relatively low-cost, easy to obtain dual-use technology with extreme destructive capabilities leads to this new, difficult to predict/control threat.	Capable of employing non or less lethal precision strikes from land, sea, air and space with assurance and minimum risk of collateral damage
18.2.1	Super-Empowered Individuals	Individuals posing a threat blending in with the environment	Finding, identifying, tracking and taking action against (individual) opponents immersed in a local population is highly challenging. More so if this has to be done non-obtrusive and (in case of action) without unintended collateral damage. Getting inside the decision cycle by anticipating or even predicting 'next moves' is even more complex and certainly needs to develop understanding of the drivers/motivations, modus operandi, etc., of such opponents.	Capable of collecting in a timely manner the imagery, data, information and intelligence on opponents and the environment required to meet Alliance end-user requirements
18.2.2	Super-Empowered Individuals	Individuals posing a threat blending in with the environment	Finding, identifying, tracking and taking action against (individual) opponents immersed in a local population is highly challenging. More so if this has to be done non-obtrusive and (in case of action) without unintended collateral damage. Getting inside the decision cycle by anticipating or even predicting 'next moves' is even more complex and certainly needs to develop understanding of the drivers/motivations, modus operandi, etc., of such opponents.	Capable of processing, fusing and exploiting the imagery, data, information and intelligence provided by all-source Alliance Joint ISR (JISR) capabilities and generating products that end-users can readily assimilate

Theme-Issue-Capability or TIC Number	Theme	Issue	Issue Description	Capability
18.2.3	Super-Empowered Individuals	Individuals posing a threat blending in with the environment	Finding, identifying, tracking and taking action against (individual) opponents immersed in a local population is highly challenging. More so if this has to be done non-obtrusive and (in case of action) without unintended collateral damage. Getting inside the decision cycle by anticipating or even predicting 'next moves' is even more complex and certainly needs to develop understanding of the drivers/motivations, modus operandi, etc., of such opponents.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
18.2.4	Super-Empowered Individuals	Individuals posing a threat blending in with the environment	Finding, identifying, tracking and taking action against (individual) opponents immersed in a local population is highly challenging. More so if this has to be done non-obtrusive and (in case of action) without unintended collateral damage. Getting inside the decision cycle by anticipating or even predicting 'next moves' is even more complex and certainly needs to develop understanding of the drivers/motivations, modus operandi, etc., of such opponents.	Capable of building a common, shared holistic knowledge base of the operational environment and identifying a potential adversary's strengths, vulnerabilities and potential behaviour
18.2.5	Super-Empowered Individuals	Individuals posing a threat blending in with the environment	Finding, identifying, tracking and taking action against (individual) opponents immersed in a local population is highly challenging. More so if this has to be done non-obtrusive and (in case of action) without unintended collateral damage. Getting inside the decision cycle by anticipating or even predicting 'next moves' is even more complex and certainly needs to develop understanding of the drivers/motivations, modus operandi, etc., of such opponents.	Capable of improved timely, accurate, complete and relevant planning and decision support to improve feedback to decision-makers and other staffs

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TICs

14. Abstract

Phase III of the NATO SAS-066 – Joint Operations 2030 Long-Term Scientific Study advanced upon the work initiated in the earlier phases of the study and produced two major outputs: the JO 2030 Capability Set and a subsequent prioritization effort which divided this set into three sub-sets. The JO 2030 Capability Set is a set of 355 different Theme-Issue-Capability (TIC) combinations which incorporate both a set of core NATO military capabilities and a set of future capabilities that attempt to anticipate future operational challenges. The prioritization effort assessed each of the TICs against three criteria and offers some meaning and a traceable basis for sub-dividing this large set of capabilities into three sub-sets: the most challenging of which formed the basis for the follow Phase IV effort.

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