



NATO'S LONG TERM MILITARY TRANSFORMATION

Read Ahead for Long-term Military Transformation Workshop 26-30 September 2016, Bydgoszcz, Poland

INTRODUCTION

1. Since we had our last workshop in Lucerne, extensive and profound events have taken place in the world; the UK BREXIT vote, The Hague arbitration tribunal rejection of China's claims to economic rights across large swaths of the South China Sea, the terrorist attack in Nice, France and a failed coup attempt in Turkey, just to name a few. These developments will continue to fuel the perception of insecurity that we are living in a very dangerous era.
2. NATO Warsaw Summit declaration highlights that *“(t)here is an arc of insecurity and instability along NATO’s periphery and beyond. The Alliance faces a range of security challenges and threats that originate both from the east and from the south; from state and non-state actors; from military forces and from terrorist, cyber, or hybrid attacks. Russia’s aggressive actions, including provocative military activities in the periphery of NATO territory and its demonstrated willingness to attain political goals by the threat and use of force, are a source of regional instability, fundamentally challenge the Alliance, have damaged Euro-Atlantic security, and threaten our long-standing goal of a Europe whole, free, and at peace.”*
3. The NATO Long-Term Military Transformation (LTMT) programme addresses the full range of security challenges, applies a unifying vision, and advances a conceptual framework for forces and capabilities required to succeed in future operations. Similar to the Lucerne Workshop, the Strategic Analysis Branch will conduct this workshop in two phases, one focused on the SFA and one focused on the FFAO. The presentation (see agenda – UK MOD DCDC and French MOD DGRIS) will provide thought provoking ideas to support the discussions on the second day of the SFA part of the Workshop. The conference I/O

questions will also help to promote discussions and follow on consideration in development of follow on actions.

4. The first component of LTMT, the Strategic Foresight Analysis (SFA), provides a trend analysis that describes the future security environment in order to derive defence and security implications for the Alliance over a long-term perspective (15+ years). The second component of LTMT, the Framework for Future Alliance Operations (FFAO), uses the SFA as a foundation in development of the instability situations, strategic military perspectives and military implications. The SFA provides SACT's best military advice concerning the future security environment in support of successful transformation of the Alliance.
5. Framework for Future Alliance Operations (FFAO) uses the SFA 2013 as its foundation and ACT developed the FFAO through a series of workshops, where experts from ACO and ACT, Member Nations, Centres of Excellence, Partner Nations, provided their input. The FFAO places the future into an Alliance specific context and proposes those abilities that the Alliance may wish to consider to succeed in the future security environment. The FFAO is Bi-Strategic Command direction and guidance and enables the Alliance to develop and maintain a collective set of forces and a NATO Command Structure (NCS) such that; they are interoperable and possess the full range of capabilities and organizations for the Alliance to meet its Level of Ambition in an uncertain and rapidly evolving security environment.

AIM

6. The aim of the SFA portion of the workshop is to build upon the findings of the Lucerne Workshop and finalise the trends and implications list accordingly. ACT will combine the workshop findings with follow-on activities to inform the development of the SFA 2017 Report.
7. The aim of the FFAO portion of the conference is to discuss, develop, and refine Chapter 1 of FFAO 2018. Specifically, the FFAO portion of the workshop will address the following problem statement: *Based on*

current trends, what are the challenges and opportunities for NATO in the security environment of 2035 and beyond? Following the conference, Chapter 1 of the FFAO will be finalized and submitted through the official staffing process for adjudication, and approval.

ENCLOSURES

- A – SFA Workshop Read-Ahead Material
- B – FFAO Workshop Read-Ahead Material

Enclosure A – SFA Workshop -II Read-Ahead Material

1. CORE DOCUMENTS

The SFA 2013 and SFA 2015 Update Reports are accessible at the following links.

- Strategic Foresight Analysis (SFA) 2013 Report:
http://www.act.nato.int/images/stories/events/2012/fc_ipr/sfa_security_implications.pdf
- SFA 2015 Update Report:
<http://www.act.nato.int/images/stories/media/doclibrary/160121sfa.pdf>
- Lucerne Workshop Final Report
http://www.act.nato.int/images/stories/events/2012/fc_ipr/sfa-ffao-ws-20160419-report.pdf

2. SUMMARY OF THE LUCERNE WORKSHOP FINDINGS

THEME	TRENDS	IMPLICATIONS
Political	The Re-distribution of Geostrategic Power. The shift of global power is multi-directional and could be reversed. Geostrategic power embraces both hard and soft power including military, economic, diplomatic and normative aspects that serve the pursuit of national interest in an instrumental fashion.	Alliance cohesion and consensus could be challenged, increasing recourse to “coalitions of the willing.
		NATO will need to innovate, be more proactive (shape), and tell its story more effectively.
		NATO may need to continue to cooperate with other actors in order to maintain its legitimacy
	Challenges to Governance. ‘The Shifting Political Structures’ trend was renamed because the context includes not only political structures but also focuses on governance as a function.	There will be an increasing requirement for a comprehensive approach to address challenges in these countries/regions.
		NATO may need to continue to cooperate with other actors to actively secure its base of legitimacy. Although opportunities exist to enhance partner capacity, results take time to deliver.
		Extremism (e.g. religious, ethnic, etc.) will continue to increase and impact the security environment.
		These countries and regions are expected to be more prone to instability that might cause large-scale migration to Europe.
Non-state Actor Influence in Domestic and International Affairs. ‘The increasing role of non-state actors	NATO may be required to develop a clear understanding of political/legal issues in its relations with non-state actors that could be supportive, benign or confrontational.	

	both in domestic and international affairs' was rephrased and accepted as a strong trend.	NATO will likely be required to cooperate more closely with non-NATO organizations, including within the realm of security networking and intelligence sharing.
	Power Politics. 'The return of power politics, challenges to the liberal world order and increasing potential for interstate conflict' was rephrased but remains as a valid trend.	The potential for the use force to influence key regions is likely to increase in the future (e.g., high North, global commons, Balkans, etc.). This increased use of force could risk crisis escalation and potential for interstate conflict.
		Individual countries may act to protect national interests in ways that are counter to NATO interests and limit response options.
		In an environment where power politics is perceived as a tool, NATO needs to review its deterrence measures and decision-making processes continually.
	Public Discontent and Disaffection. 'The increasing democratic discontent' trend was renamed and remains valid. Public discontent and disaffection is likely to increase due to income inequality and governments' inability to provide employment opportunities and social security to the masses.	NATO may find it more difficult to reach consensus if national interests prevail over collective interests (e.g. basing, defence spending, etc.).
		The willingness to commit new resources to defence could decrease due to changing priorities.
	Interconnectedness and Polycentricism. The group saw 'Interconnectedness and Polycentricism' as a strong trend that could also be considered as part of the characteristics of the future.	The complexity and ambiguity will increase and it could be difficult to conceptualize the issue.
		All institutions, including NATO, will need to adapt and innovate quicker than they have had to in the past.
		Due to interconnectivity, chances of failure and unintended consequences are higher.
Human	Asymmetric Demographic Change. 'Changing Demographics' as a trend is still valid and was renamed to 'Asymmetric Demographic Change'.	Ageing within Western nations may increase the demand on resources for medical and social welfare. This may negatively influence the willingness to spend on security within the Alliance as well as the willingness to use military forces.
		Failed integration of migrants within NATO may increase fanaticism, crime and extremism.
		Asymmetric demographics may lead to instability within and outside of NATO Nations.
	Increasing Urbanization. Urbanization as a trend is still valid and was renamed 'Increasing Urbanization'. The increased speed of the urbanization process might not only create new challenges, but also intensify the effort to cope with and solve problems.	The environment of a megacity may challenge a necessary intervention by merging different responsibility realms (e.g. police vs. military) which demands proper legislation beforehand.
		Increasing inequalities within the process of urbanization may not only lead to instability within a megacity but to discontent within NATO.
		Within a megacity the information domain may be highly contested.

		Most of the megacities in the future will be coastal cities, where control of the sea might be a prerequisite to the control of the city.
	<p>Fractured and/or Polarized Societies: ‘Fractured Identities’ as a trend is still valid and was merged with the emergent trend ‘Ideological Polarization’. The trend was renamed to ‘Fractured and/or Polarized Societies’.</p>	Due to fractions, the Allied Nations may become distracted and internally focused
		Fractions could lead to a lack of unity which may result in the Alliance’s inability to agree on big goals.
		Internal fractions and polarization might undermine trust within NATO, potentially making the Alliance vulnerable to adversaries.
		Internal fractions and polarization might undermine cohesion and complicate governance and decision-making, which may be exploited by adversaries.
	<p>Increasingly Connected Human Networks. ‘Human Networks’ as a trend is still valid and was renamed to ‘Increasingly Connected Human Networks’.</p>	Increasing individualism may result in a decreased effectiveness of Alliance STRATCOM, thereby exacerbating the security challenges and affecting unity within NATO.
		The understanding of human networks, within and outside the Alliance may support security in an unpredicted positive manner.
		Cultural awareness should become an essential element to the Alliance’s professional training curriculum to better understand cultural influences to the future security environment.
		The increasing demand of monitoring human networks might need the closest cooperation across all possible areas.
Science & Technology Theme	<p>Rate of technology advance (previously Technology accelerates change). There was much discussion on the meaning of the original trend. It was felt that, as originally stated, it implied that technology was causing an acceleration of change of an undefined area.</p>	The rapid pace of advance poses a challenge across a variety of other domains, such as policy and regulations, societal use norms, and cultural adaptation to name but a few.
		Defence and security organizations’ acquisition processes are challenged to keep pace, potentially resulting in less than state-of-the-art capabilities in some areas.
	<p>Access to Technology. This trend is based on the trend with the previous title, but has been re-written with a focus on the increasing global access to technology, i.e. the ability of the individual or state to access technology.</p>	Access to technology enables disruptive behaviours, allowing individuals to become non-state actors and acquire capabilities similar to those of states (in some areas).
		Non-state actors may be less constrained as to how they employ technologies, unlike state actors who are obliged to remain within internationally agreed norms such as the Law of Armed Conflict.
	<p>Global network development (previously Centrality of dynamic networks): This trend was renamed to more accurately reflect the text that underpins the trend. It was observed</p>	The increase in global networks results in vulnerabilities from a defence and security perspective. The elements of surprise and covert operations are increasingly challenged due to these networks, which are increasingly difficult to find, monitor, and control.

	<p>that this trend is still increasing, as more and more global networks (carrying both information and physical items) are being created.</p>	<p>Global networks will have the ability to promote the transfer of knowledge at an unprecedented rate without discrimination based on the intent of the end user; potentially placing dangerous knowledge in the hands of non-state actors with malicious intent.</p>
	<p>Dominance of commercial sector in technological development (previously Increased access to technology). This trend was considered still viable and increasing. Commercial investment in technological development and their ability to rapidly turn these investments into new products significantly outpaces the ability of state owned / controlled entities in many areas.</p>	<p>State acquisition approaches are not in keeping with the commercial sector, which is driven by and responds to a different market, one that currently demands quick advances over high quality control. Maintaining state-of-the-art capabilities may require serious changes in national R&D and acquisition policies.</p>
		<p>Exploiting commercial-off-the-shelf (COTS) may seem appealing due to the lower cost and rapid rate of advance, however, the quality control, security, and fit-for-purpose implications should not be underestimated.</p>
		<p>Product support and alignment with national procurement programmes and regulations will remain a challenge in the area of COTS.</p>
	<p>Reliance on certain technologies. This trend emerged from the discussions on both society's and also defence and security's increasing reliance on certain technologies.</p>	<p>Reliance on certain technologies creates vulnerabilities within how defence and security capabilities are delivered, as well as within the operation of first world societies (and in particular their economic and political systems). As militaries fall back onto single stream technological solutions, there is a potential for erosion of skills that would enable the necessary resilience to counter these vulnerabilities.</p>
		<p>There is an increased necessity to protect critical infrastructure, as it increasingly becomes part of how military capability is delivered, not just meeting a civil societal use.</p>
		<p>Increasing reliance on certain technologies may drive towards an increasing demand by society for the use of technology to solve problems.</p>
Economics & Resources	<p>Globalization of Financial Resources. 65 questions were submitted on this trend which included 26 questions from the rise of the network based smart economy discussion on the bitcoin and 3D technology.</p>	<p>The threshold for major conflict (state on state) may be rising due to economic interdependencies; i.e., self-interest, the risk to any state is too great, thus providing a stability factor. This also helps explain hybrid warfare, because nations will use those actions that are short of conventional war.</p>
		<p>Financing of terrorism and organized crime will become less visible and transactions less tractable by leveraging decentralized networks. The rise of Bitcoin-like on-line, unregulated currencies may erode individual nations' economic strength.</p>

<p>Increased Competition for Natural Resources (Increased Resource Scarcity). There was a lengthy discussion concerning the validity and clarity of this trend. Recommendations for new titles included ‘Geopolitical Dimensions of Resources’, ‘Increased Resource Challenges’, ‘Increased Complexity to Resource Challenges’, or ‘Increased complexity in natural resource geopolitics’.</p>	<p>With oversupply comes instability, with 2nd and 3rd order effects. Present day example is the impact and upheaval on the economies and stability of oil exporting nations caused by the dramatic reduction in the cost of oil in direct relationship to oversupply and competition with increased natural gas production. A 2nd order effect compounding natural energy oversupply in the US is the increase in coal exports to Europe. A 3rd order effect discussed was environment /climate concerns due to burning natural gas vs. coal, where methane is four times more damaging to ozone than CO2.</p>
	<p>New technologies demand new resources and change geopolitics. This is particularly indicated in rare-earth resources required in advanced electronics. Nations that have an advantage in rare earth resources can leverage this in power politics and hybrid warfare.</p>
	<p>Increasing interdependencies between energy, raw materials, water and other resources can have either a balancing, stabilizing effect (quid pro quo) or cause further compounding destabilization if held by a single power broker.</p>
<p>Decreasing Defence Expenditures in the West. This trend produced a lot of energetic discussions based on the Wales Summit declaration where nations all agreed to stop the budgetary decline in defence spending and reach the aim of 2% GDP guideline within a decade.</p>	<p>Competition and stressed government budgets limit NATO reaction options, i.e. level of ambition and expectation will have to align with fiscal realities and constraints.</p>
	<p>Nations may be forced to specialize in military capabilities in order to meet sovereign defence requirements and/or form collaborative partnerships with allies to manage costs and limit expenditures in defence spending. This may create potential critical shortfalls in the Alliance Minimum Capability Requirements.</p>
	<p>A weakening of Alliance resilience through capability and capacity shortfalls.</p> <p>A reduction in defence spending caused by government revenue shortfalls from a declining tax base as jobs are replaced by technology and automation. Additionally, powerful MNCs will increasingly use tax avoidance strategies, further constraining national budgets.</p>
<p>Increased Global Inequality. 13 questions were reviewed by the break out group. The group discussions suggest that the consequences, cross trend implications, and follow-on effects of global inequality will continue to increase.</p>	<p>Instability caused by mass migration. Mass population movement either (or both) across national borders, or within, may further mega city trend and urbanization lending to fragmentation and fracturing of political stabilities, cultural (nation state) identification, stress on resources as tax base is reduced.</p>
	<p>Terrorism, radicalization, and polarization. A 2nd order effect of mass migration. Hiving of populace, either by design (segregation), or through cultural identities may increase civil unrest, and pose a threat to democratic government systems.</p>

		Aging demographics reduces tax revenue. Amplified by increased life spans, thereby time as a beneficiary. This gives rise to an increased social welfare burden on young adults and young families who increasingly cannot find well paying full time employment. Younger adult job opportunities are in direct competition with a loss of jobs caused by automation.
Environment Theme	<p>Environment and Climate Change. This trend has a large and growing body of data to support it, in particular the work presented by the Inter-Governmental Panel on Climate Change in its 5th Annual Report (2014).</p>	Allies will need to consider climate drivers, extreme weather events etc. in their Situational Awareness.
		Allies will more frequently be working in areas of humanitarian aid, which will require fully comprehensive (military, governmental and non-governmental) interoperability.
		Climate migration away from certain areas may open up ungoverned space and leave power-vacuum or safe-havens for others to fill.
		Nations will need to address climate adaptation measures for their defence and security infrastructure and equipment. Increased pressure will probably be placed on the military defence to shoulder its share of climate mitigation plans as well.
	<p>Natural Disasters. It was suggested to clarify the wording of previous SFAs, which indicate that natural disasters are on the increase in frequency and severity.</p>	As nations increasingly respond to disasters with the use of their military forces to aid civil powers, there will be a subsequent effect on military availability. A large scale, environmentally-triggered disaster within a NATO Nation is possible and could affect the collective abilities of the Alliance.

3. DELIVERABLES

At the end of these two-day of discussions, we will have reviewed and finalized the ‘trends and implications’ and the breakout sessions will provide recommendations to maintain, merge or remove trends and implications to form the foundation for the development of the SFA 2017 Report. Breakout sessions will focus on the analysis of the trends to determine the defence and security implications: the “So what?” question for NATO and Euro-Atlantic Security. The Moderator/SMEs will lead the discussions to make sure trends and implications are finalized and a list of trends and implications will be provided with the underlying reasons for their selection.

Enclosure B – FFAO Workshop Read-Ahead Material

1. CORE DOCUMENTS

The FFAO 2015 Report is accessible at the following links.

- Framework of Future Alliance Operations (FFAO) 2015 Report:
<http://www.act.nato.int/images/stories/media/doclibrary/ffao-2015.pdf>
- Lucerne Workshop Final Report
http://www.act.nato.int/images/stories/events/2012/fc_ipr/sf-a-ffao-ws-20160419-report.pdf
- Draft Chapter 1 of the FFAO (see below).

2. SUMMARY OF THE LUCERNE WORKSHOP FINDINGS

At the last conference in Lucerne, the participants discussed that the development of FFAO 2018 should follow same general development process as the last FFAO but with the addition of independent reviews and use of an expanded list of contributors. For the instability situations, there were proposed changes to account for Strategic Foresight Analysis 2015 emerging trends. In addition, the group felt that the assessment of the Future Security Environment should include opportunities and challenges which would put the future in a more positive light, and encourage NATO to innovate where it can. Concerning the Strategic Military Perspectives, the findings indicated that most of the ideas are relevant but the connections to other parts of the FFAO should be clarified. One of the notable recommendations was that the FFAO should include a general operational concept that illustrates how NATO might employ its forces to overcome the challenges of the future. Another positive development during this conference was that NATO STO is engaging more with FFAO, which should improve the quality and rigor of the final product.

3. FFAO WORKSHOP OVERVIEW

At the Fall 2016 conference, the primary topic of discussion will be revisions to Chapter 1 of the FFAO. This read-ahead includes a first draft of this chapter as a basis for discussion at the conference. Conference

Problem Statement. *Based on current trends, what are the challenges and opportunities for NATO in the security environment of 2035 and beyond?*

a. Syndicate 1 & 2:

Understanding that war has an enduring nature, what are the anticipated characteristics of future armed conflict in the 2035 period and beyond?

Based on the current trends in the security environment, what are the potential ethical questions NATO leaders may have to face in 2035 and beyond?

b. Syndicate 3 & 4:

Based on the current trends in the security environment, what are possible instability situations which would present challenges to NATO's military forces in 2035 and beyond?

Based on the current trends in the security environment, what are the opportunities for NATO's military forces in 2035 and beyond?

4. **DELIVERABLES**

The primary deliverables for this conference are recommend changes to the draft Chapter 1 of the FFAO. Following the conference, Chapter 1 of the FFAO will be finalized and submitted through the official staffing process for adjudication and approval.

FFAO Chapter 1 – DRAFT WORKING COPY

The Future Security Environment towards 2035 and Beyond

1. The Strategic Foresight Analysis and other futures documents describe the future security environment as dynamic, ambiguous, uncertain, and volatile. The volatile. Even though globalization and technology are expected to provide ample opportunities for positive developments in health, welfare and security. Increasing interdependency amongst countries has the potential to create stability in the long-term. However, the ongoing transition from a unipolar to a multipolar and multi-dimensional world has created instability that is likely to continue. This transition will test NATO's ability to adapt to the challenges of a rapidly changing global security environment. Cultural divides between civilisations have the potential to promote the growth of extremist, radicalized groups. The global economy is changing, with power shifting from the West to other regions and also within the nation-state system. Advances in technology and the worldwide sharing of ideas and ideologies, research and education, supported by social media and big data, are accelerating these developments.¹

Picture of a Recent Crisis or War
2. In the study of war, there are some factors that change over time and some that remain the same. Since the beginning of armed conflict war has always been a contest of human wills driven by fear, honour and interest.² War has remained a phenomena where three key factors interact: (1) Primordial violence, hatred, and enmity; (2) the play of chance, fog, and friction, and (3) an its purpose as an instrument of policy.³ However, each instance of conflict is different than the last as the character of war changes

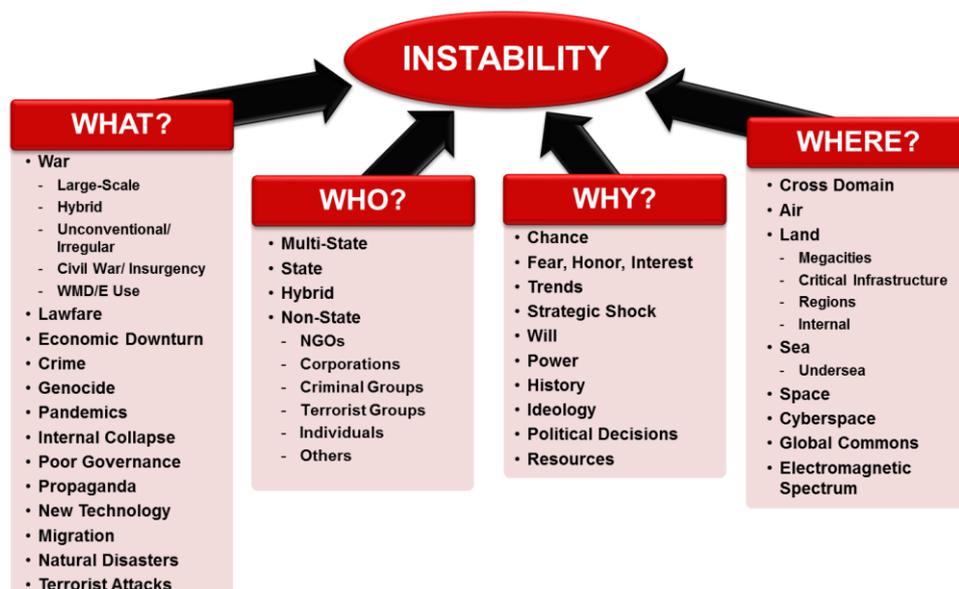
¹ NATO-ACT. (2015). Strategic Foresight Analysis 2015 Update Report. Retrieved from <http://www.act.nato.int/strategic-foresight-analysis-2015-report>; NATO-ACT (2013). Strategic Foresight Analysis. Retrieved from <http://www.act.nato.int/futures-ws-1>

² Thucydides (trans Warner, R., & In Finley, M. 1972). History of the Peloponnesian War. Harmondsworth, Eng: Penguin Books

³ Clausewitz, C. (1832). *On War*. Translated and edited by Michael Howard and Peter Paret. Princeton, N.J.: Princeton University Press.

over time. Factors such as technological advances, new operating concepts, changes in the security environment, and shifts in the geopolitical landscape will greatly influence the security environment of the future.⁴

3. Thinking clearly about the future is difficult because often improbable events occur that have tremendous effect on world events. Commonly called *strategic shocks* or *black swans* can have either positive or negative consequences. Military forces, and society in general, often fails to expect extreme events and focuses on preparing for what is likely. Although identifying the specifics of future events is nearly impossible, by seeking to identify general possibilities, NATO can become more resilient to challenges and become ready to seize upon opportunities when they arise.⁵



Variables of Future Instability

⁴ Gray, C. (2010). War – Continuity in Change, and Change in Continuity. Parameters. Retrieved from <http://strategicstudiesinstitute.army.mil/pubs/parameters/articles/2010summer/gray.pdf>

⁵ Taleb, N. (2007). The Black Swan. <http://www.amazon.com/Black-Swan-Improbable-Robustness-Fragility/dp/081297381X>

Challenges

Instability Situations

4. There are many different variables at play which could result in future instability. These variables combined could create *instability situations* which NATO military forces may need to address in the future. In this context, instability situations, are generic descriptions of possible future events across a broad spectrum of crises or conflicts that NATO may have to face from now through 2035 and beyond. The instability situations span the full range of military operations and give defence planners scenarios that could likely lead to NATO involvement in the future. Instability situations could combine and occur simultaneously creating a state of *hyper-instability* where effects are compounded. These situations are all equal in terms of importance and are not listed in any order of priority:

INSTABILITY SITUATIONS

- Anti-Access/Area Denial (A2/AD)
- Artificial Intelligence Society
- Changing Nature of Statehood
- Cyber Conflict
- Disruption of Space Capability
- Disruptive Migration
- Hybrid Conflict
- Mega-city Conflict
- Natural Disasters
- Non-State Actor Conflict
- State-Actor Conflict
- Structural Disintegration of Economic/Financial Systems
- Weapons of Mass Destruction/Effect Use/Threat

a. **Anti-Access/Area Denial**

(A2/AD): Alliance access to and use of the Global Commons challenged. Substantial increase of threats to global flows. Increasing lack of resources and climate change creating new contested areas, threatening lines of communication/ commerce and limiting access to global commons. In the future, weaponized autonomous systems could challenge access. Potential adversaries could develop new A2/AD capabilities and employ them against NATO forces. This could include a broad, high impact cyber-attack, whether by a nation state or non-state actor threatens the global commons. In the future, states may challenge international laws and norms in the global commons that increase instability. In addition, instability situations may arise when history, treaties and agreements are purposefully re-interpreted or re-defined to shape territorial claims particularly in heretofore international waters or littoral environments to benefit the claiming state.

- b. **Artificial Intelligence (AI) Society:** Artificial intelligence evolves through several phases beginning with general support for AI within society, to AI discontent, to unemployment, and ending in superseded governments.
- c. **Changing Nature of Statehood:** The redefining nature of Statehood by de-globalization or regionalization can cause a small region or city to succeed from their capitals and become independents. The changing nature of statehood will influence NATO's action in the future as the Westphalian model of state wanes. However, this could reverse course and states may consolidate their power and become stronger in the future.⁶
- d. **Cyber Conflict:** The cyber domain could develop in numerous ways in the future. One possibility is that Cyber domain conflict tomorrow could look like that of today: high levels of crime and espionage but no massive cyber wars. Another possibility is that the Cyber domain could break into national fiefdoms: with no one Internet, just a collection of national internets. Cyber domain could also become an overwhelmingly secure place, as espionage, warfare, and crime have no hold. Another possibility is that Cyber domain, always unruly and unruly, has become a "failed state" in a near-permanent state of disruption.⁷
- e. **Disruption of Space Capability:** In the future, adversaries may challenge the strict international space regulations if they do not serve perceived national interests. In the future, space capability disruption can also be executed by non-kinetic means, such as jamming or cyber-attacks to determined satellites.
- f. **Disruptive Migration:** Disruptive migration is driven by many variables including security, economic well-being, natural disasters, disease and famine. Massive migration could cause disruptive impact and instability, uncontrolled refugees, displaced persons and economic migration. Non-state actors, and unforeseen natural events can act as a catalyst for increased migration. The implementation of restrictive immigration policies may result in changes to the migration patterns exacerbating instability and the long-term diaspora that could contribute to other instability situations occurring.
- g. **Hybrid Conflict:** Competitors pursuing meaningful revision or rejection of the current the NATO-led status quo are employing a host of hybrid methods to advance and secure interests that are in many cases

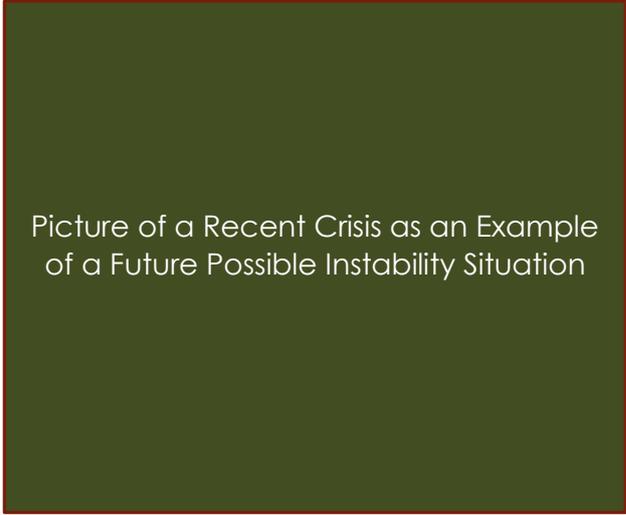
⁶ Instability Situations 11-13 were developed at the Spring 2016 FFAO conference in Lucerne Switzerland and will be validated during discussions at the Fall 2016 conference in Poland.

⁷ http://journal.georgetown.edu/wp-content/uploads/2015/07/110_gj124_Healey-CYBER-20111.pdf

contrary to those of the Alliance. These challengers employ unique combinations of influence, intimidation, coercion, and aggression to incrementally crowd out effective resistance, establish local or regional advantages, and manipulate risk perceptions in their favour. It is in this “gray zone”— space between traditional conceptions of war and peace—where the Alliance and its defence enterprise face systemic challenges into the future.

- h. **Mega-city Conflict:** Turmoil in a mega-city, the inability of the nation state to provide security / basic needs in megacities, rising urbanisation and resource competition could create widespread instability. Triggers to megacity turmoil are vast, and mega city turmoil may be a 2nd or 3rd order effect of other causalities (e.g., mass migration), contributing or compounding factors (natural disaster, persecution, resource scarcity, economic inequalities).
- i. **Natural Disasters:** A large-scale disaster occurs; opportunistic actors could take advantage of chaos, pandemic outbreaks, natural disasters, and disaster relief in a world financial centre. The culmination of several smaller individual disasters could occur in a way that may have an effect similar to a large-scale disaster. The Alliance should be equally concerned with large-scale disasters in developed regions as undeveloped regions. Developed states/regions in littorals or highly active geological regions remain as vulnerable as underdeveloped regions. Developed states and regions, due to their interdependence and interconnectedness, may require greater support to return to normalcy than underdeveloped states.
- j. **Non-State Actor Conflict:** Non-state actors may affect NATO members on NATO territory as well as the periphery and directly challenge the established international order and authority.
- k. **State Actor Conflict:** Spill over of conflict from neighbouring countries along NATO borders, interstate conflict over access to resources, state-on-state conflict including Article V situations, resource wars, new spheres of influence. The return of power politics trend is a potential trigger for state on state conflict, aggravated by non-state actors who could promote conflict between states.
- l. **Structural Disintegration of Economic/Financial Systems:** Economic and financial systems degrade and cause instability. For instance, a new energy technology can cause an economic collapse for economies dependent upon fossil fuels.

m. **Weapons of Mass Destruction/Effect Use/Threat:** Attack from terrorist groups possessing Weapons of Mass Destruction/Effect (WMD/E) affecting NATO, using WMD/E to create a crisis on the edge of NATO. In the future the effects of a cyber-attack may produce similar effects to a traditional WMDs. In the future, the adversaries could use autonomous systems to deliver WMD/E weapons in a manner that makes it difficult for NATO to intercept. As societies (and military forces) become more interdependent new vulnerabilities may arise. In the future, adversaries may seek to use WMD/Es against targets such as critical infrastructure, political leadership, the global financial system, or locations of symbolic importance.⁸



Picture of a Recent Crisis as an Example of a Future Possible Instability Situation

Ethical Questions

5. In analysis of the future security environment, numerous *ethical questions* arise. Developing suitable and acceptable answers to these questions may challenge NATO leaders in this time period. Some of the major ethical questions of the future could include the following:
 - a. **Human Augmentation:** Should NATO forces use human augmentation techniques to enhance the military effectiveness and efficiency of the Alliance? If so how? Conversely, how can NATO forces fight and defeat adversaries that use advanced human augmentation techniques?⁹
 - b. **Autonomous Systems:** How should NATO use lethal autonomous systems in the future alone or integrated with traditional systems? How does NATO address adversaries that use lethal autonomous systems?¹⁰
 - c. **Cyber:** In the cyber domain, what constitutes an attack that would warrant a NATO military response? How far should NATO pursue offensive cyber capabilities as an Alliance? How does the Alliance balance personal privacy with the need for timely intelligence? How does NATO

⁸ Instability Situations 1-10 come from FFAO 2015, and were validated at the Spring 2016 FFAO conference in Lucerne Switzerland.

⁹ <http://www.fhi.ox.ac.uk/ethical-issues-in-human-enhancement.pdf>

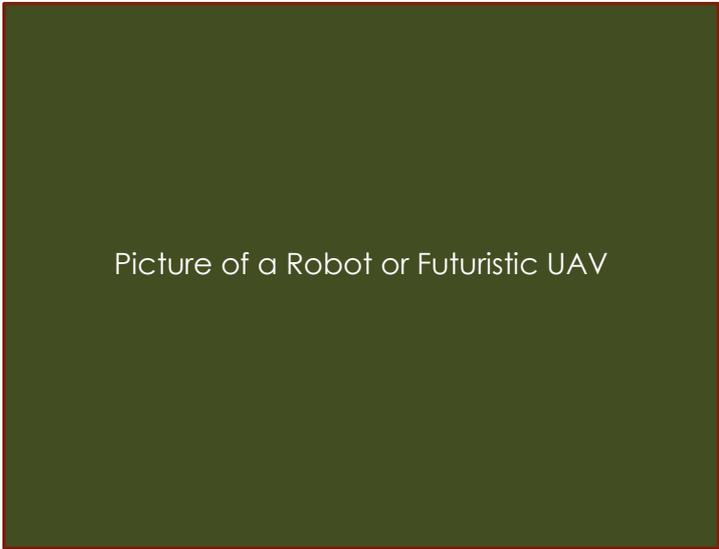
¹⁰ <http://www.nature.com/news/robotics-ethics-of-artificial-intelligence-1.17611>

find the right balance between information security and the need for transparency?¹¹

- d. **Combatants and Non-Combatants:** In the future, the lines between combatants and non-combatants may blur even more, if so how does NATO deal with this? What capabilities does NATO need to separate combatants from non-combatants in congested high-population areas? How does NATO deal with child soldiers on the battlefields of the future? How does NATO address civilian corporations that provide defence services in combat areas in the future? How does NATO address a future where non-combatants can become combatants at any moment?¹²

Opportunities

6. In the future, there are many opportunities that NATO could seize upon to strengthen the Alliance. Technology of this time period will offer unprecedented and unforeseen advantages that NATO forces or adversaries could capitalize on. In this period developments are likely to be the greatest in five broad areas: (1) biology, biotechnology and medicine; (2) robotics, artificial intelligence, and human augmentation; (3) ICT and cognitive science; (4) nanotechnology and advanced materials; and (5) energy technology (*BRINE*). NATO should adapt to the continually changing global landscape. NATO should seize upon this opportunity to redefine its culture and organizational processes to become more networked, nimble, and knowledge-based.¹³ If proactive and adaptive in its technology acquisition Nations could shape, and not simply react to, the outcomes. As the greatest technological advances of the future will likely come from civilian entities, NATO should seek to develop close habitual



¹¹ <http://www.tandfonline.com/doi/abs/10.1080/15027570.2013.782633>

¹² *Just War in the Age of Terror*. By Jean Bethke Elshtain. New York: Basic Books, 2003.
The Lesser Evil: Political Ethics in the Age of Terror. By Michael Ignatieff. Princeton, NJ: Princeton University Press, 2004.

¹³ <http://ctnsp.dodlive.mil/files/2014/09/DTP1061.pdf>

relationship with academia and industry to posture itself to seize upon these opportunities.

7. The trends indicate that in this period, NATO may have new opportunities to grow and improve its cooperative security efforts.¹⁴ Cooperative security brings a proactive stand towards achieving increased international harmony and cooperation, synchronizing efforts to deal with the new multidimensional threats and providing a better understanding of common problems.¹⁵ As NATO seeks to balance soft and hard power and political and military leverage, the Alliance could improve upon its ability to coordinate a wide network of partner relationships with non-NATO countries and other international organizations around the globe in order to ensure Euro-Atlantic security.
8. One of the NATO strengths it may be able to capitalize on in this period is its crisis management capacity. This capacity enables NATO to deal with a wide range of crises in an increasingly complex security environment, employing an appropriate mix of political and military tools to help manage emerging crises, which could pose a threat to the security of the Alliance's territory and populations. Allies decide on a case-by-case basis and by consensus, to contribute to effective conflict prevention and to engage actively in crisis management, including non-Article 5 response operations. Some operations may also include partners, non-NATO countries and other international actors.

¹⁴ NATO-ACT. (2015), Strategic Foresight Analysis 2015 Update Report. Retrieved from <http://www.act.nato.int/strategic-foresight-analysis-2015-report>; NATO-ACT (2013). Strategic Foresight Analysis. Retrieved from <http://www.act.nato.int/futures-ws-1>

¹⁵ http://www.nato.int/cps/en/natohq/topics_77718.htm