

**NORTH ATLANTIC TREATY ORGANIZATION**



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**Strategic Foresight Analysis (SFA) Workshop Report**

**Strategic Foresight Analysis (SFA) 2015 Update Report  
Workshop - I  
18-19 March 2015  
Vienna, Austria**

**1. Background:**

1.1 Long-Term Military Transformation is NATO’s process for anticipating and preparing for the ambiguous, complex and rapidly-changing future security environment. This process consists of two parts: the Strategic Foresight Analysis and the Framework for Future Alliance Operations.

1.2 The Strategic Foresight Analysis is a trend analysis that describes the long-term aspects of the future security environment. The SFA 2013 Report describes a world in 2030 that will remain complex, uncertain, and increasingly dangerous, presenting threats as well as opportunities, and fuelled by an accelerating rate of social, scientific, technological and environmental changes. The 2015 Update Report will provide a review of the trends identified in the 2013 Report. The Update report will also capture emergent trends that need to be reviewed for potential inclusion in the 2017 Report.

1.3 The Strategic Foresight Analysis workshop was conducted 18/19 March 2015 in Vienna, Austria, at the Austrian National Defence Academy. This marks the first time that a Futures Work activity was conducted in a partner country. The success and acceptance of the work was clearly demonstrated by the very high level of interest throughout the workshop. There were 110 participants in total from NATO and Partner Nations (24 NATO, 4 Partners – including the global partner Australia), NATO International Staff, NATO command structures and Agencies, 11 COEs, industry and academia. This represents the highest level of participation for an SFA event.

1.4 The aim of the workshop was threefold:

- Review the existing trends that were identified in the SFA 2013 Report.
- Identify any potential new trends for the 2015 Update Report that will be further reviewed and considered in the SFA 2017 Report.
- Maintain work transparency through open collaboration with Nations, academia and industry.

**2. SFA 2015 Update Report Workshop Participants:**

Attendees	
ACT (including SEE & STRE)	17
ACO	1
NATO HQ	5
11 COEs	15
28 Nations	72
Total	110
<b>Member Nations</b>	ALB, BEL, BUL, CAN, CZE, DEU, DNK, HRV, ESP, EST, FRA, GBR, GRE, HUN, ITA, LTU, NLD, NOR, POL, ROU, SVK, SVN, TUR, USA
<b>Partner Nations</b>	AUS, AUT, CHE, FIN
<b>COEs</b>	C2, CIMIC, Cooperative Cyber Defence, CSW, DAT, ENSEC, EOD, JAPCC, MILENG, MILMED, MP
<b>Academia/Industry</b>	Austrian Institute of Technology, University of Bologna, University of Warwick, IBM Watson, Centre for Eastern Studies, Czech University of Defence, Peace Research Institute of Oslo, Danish Institute for International Studies, Atlantic Council, Canadian Defence and Research Development Centre

### 3. Foundational document - Strategic Foresight Analysis 2013 Report:

The Report builds upon the principles described in NATO's 2010 Strategic Concept as the basis for ensuring Alliance security in the future. The SFA is based on national and international studies that address the timeframe out to 2030 and beyond. The following are the 15 trends:

- **Shift of Global Power:** The rebalance of power from the West to other regions will present political and economic challenges to NATO members.
- **Shifting Political Structures:** The transition of autocratic / theocratic regimes towards democracy will continue.
- **Polycentric World:** The world is becoming increasingly interconnected and polycentric.
- **Changing Demographics:** Future demographics will be driven by diverse effects.
- **Urbanisation:** Cities will contain 65% of the world's population by 2040, and 95% of this urban population growth will occur within developing nations' mega-cities.
- **Human Networks / Transparency:** Human networks are expanding at an exponential rate with many varying effects.
- **Fractured Identities:** Several contributing factors may lead to a fracturing of national identity.
- **Technology Accelerates Change:** The accelerating cycles of exploration, discovery and exploitation of technologies along with the innovative fusion of existing, emerging and new technologies will combine to bring about change rapidly in the future.
- **Increased Access to Technology:** Commercial research and technology has begun to outpace that of governments in the development of new technologies.
- **Centrality of Computer Networks:** A globally connected and networked world creates a universal availability of information.
- **Globalisation of Financial Resources:** The financial networks and communication systems that manage the world's critical resources are increasingly intertwined.
- **Increased Resource Scarcity:** Nations need increasing amounts of energy and raw materials to sustain growth and maintain an advantage in the globalised economy.
- **Decreasing Defence Expenditures:** Governments faced with slow or non-existent growth, rising unemployment and increasing debt burdens will continue to have many competing priorities.
- **Environmental / Climate Change:** Global environmental change and its impacts are becoming readily apparent and are projected to increase in the future.
- **Natural Disasters:** The effects of natural disasters will become more devastating.

#### 4. Workshop Findings:

4.1 **Political Theme:** The political theme breakout session suggests maintaining “Shift of Global Power” as a trend while stressing that there is a need for conceptual clarification of terms such as ‘power’ – i.e. military, economic, diplomatic, or hard /soft forms of power. The global power shift creates divergence and convergence of power without a clear cut distribution in an increasingly decentralized international system. Another key suggestion is to move the “Polycentric World” trend to the first part of the SFA that describes the characteristics of the future. Finally, the group further discussed “what is actually meant by *political structures* and who is the West?” These terms will need to be defined.

##### 4.1.1 Review of existing Trends:

- **The Shift of Global Power trend is still valid.** However, it should not be assumed that this will continue as a linear process. There are significant impediments along the way, including the middle income trap, aging (getting old before getting rich), and uneven distribution of different forms of power. NATO needs to understand its role in the “shift” and that it is not the only security provider.
  - Shifting global power is not about a particular country, although China and Russia should be monitored. How do countries such as China, India and other emerging powers exercise power and take global responsibilities towards 2035 will be the key for international security.
  - The transfer of power from West to East is gathering momentum and will be both vertical (hard/soft power) and horizontal (from west to east).
  - It is recognised that major power shifts between states/regions occur infrequently and are rarely peaceful. However, power shifts towards a more equal distribution may be positive and could lead to stability and more equality in regions.
  
- **The Shifting Political Structures trend remains valid but is slowing down.** Transitions can be either autocratic to democratic or democratic to autocratic.
  - The shift of political structures is not just about the domestic sphere and transition from authoritarian rule to democracy, but will also include changes in international organisations and the structure of the international system.
  - There is a need to look critically into western political structures and the potential consequences of unintentional social exclusion of groups/individuals.
  - There is a need to recognize individuals within domestic political structures (esteem).
  - The Future Security Environment is expected to offer western political institutions less political leverage, as is the case with NATO, and will see various overlapping political systems. The key will be to find common ground.
  - There is potential for several international orders – some compatible with western values, others may not be.
  - It is important to acknowledge other forms of political structures than just western ones – democracy may not be the answer for all countries.
  
- **The Polycentric World (Polycentricism) is not a trend but a characteristic of the future.** The state will continue to play a significant role in a polycentric world albeit in a more complex environment. The assumption is that there is a set of rules and norms within NATO, but in a polycentric world, rules and norms will have to be discussed and worked out. It poses a monumental challenge to find some degree of common ground.

- The influence of non-state actors in decision-making is expected to increase and be able to challenge existing structures – including some states. Attacks can come in many forms and multiple sources. Can Article 5 be considered if the attacks are funded/orchestrated by a proxy?

#### 4.1.2 Emergent Trends Identified:

- The worsened relationship with Russia and the long term effects of the Ukraine crisis might present a potential for a return of power-politics to the European security landscape.
- The de facto rules (liberal) for the new world order will be challenged. New patterns of cooperation will be required with the (re)-emerging powers such as integration of Asian Infrastructure Investment Bank (AIIB) and establishing new mechanisms for partnerships.
- The state's domestic political issues will influence its foreign policy and relations with international organisations.
- Failed and failing states are expected to create a power vacuum which can be exploited by radical/extremist groups that declared statehood i.e. Islamic State of Iraq and Levant.
- The collapse of the existing international system with a decline of the legitimacy of some global post-war institutions would create conditions for conflict in a polycentric world.
- Quantifying the threat will be increasingly complex. As a consequence, a coherent NATO response will be difficult to plan.

4.2 **Human Theme:** The human theme breakout session suggests maintaining “Changing Demographics” as a trend while stressing that it becomes more tangible because of the regional unbalance which results in threats. Furthermore, the importance of urbanization was highlighted, especially the effect of urban areas crossing national borders being a factor of instability in the future. Another key suggestion is to rename “Fractured Identities” to “Fractured National Identities” or “Conflicting Identities” in order to clarify if the trend is related to national or individual identities. Finally, the group stressed the increasing relevance of decentralized networks while suggesting to part “Transparency” and maybe consider it as an own trend.

#### 4.2.1 Review of existing trends:

- **Changing Demographics as a trend is still valid.** The effects of population change will become more tangible than they are today because the ability of states to provide for the needs of their populations is not in balance. Increased social welfare spending as a response to changing demographics (e.g. healthcare in regions with ageing) leads to decreased spending on defense and security.
- **Urbanization as a trend is still valid and increasing but at a slower rate.** Cities will start to cross national borders (e.g. San Diego-Tijuana) which is likely to have implications for effective governance. At the same time, cities will gain political power and influence with the possibility to overpower national authorities.
- **Fractured Identities as a trend is still valid, but the name is ambiguous because it is unclear whether it is related to individual or national identity.** The suggestion is to change the name to *Fractured National Identities* or *Conflicting Identities*. Having a national identity is no longer the most important type of identity for many people (e.g. being identified as ‘Hispanic’ could be more important to some). Culture or religion may be a more important identifier than one’s nation.

- Technology is having the most influence on identity (e.g. social media). Dealing with fractured identities for a nation is not a threat. The threat is the transition from a fractured identity to becoming part of a radicalised network.
- Data suggests there is decreasing freedom to practice one's own beliefs.
- **Human Networks/Transparency as a trend is still valid and increasing toward decentralized networks.** Decentralized networks may be harder to control or to disrupt than centralized networks.  
Transparency needs to be considered as a separate trend.

#### 4.2.2 Emergent Trends Identified:

- **Higher priority trends**
  - **Advancing the Gender Perspective.** This trend has been highlighted in other reports (e.g. NATO, the UN and DCDC) but is distinctly lacking in the current SFA report.
  - **Lack of Global Leadership.** The world is more complex, therefore fewer people are qualified or capable to lead in this new world. Organisations are often 'decentralized' with no clear single leader. National leaders are losing power to other organisations.
  - **Increasing Privatization of Security Forces** – This is an increasing trend, however the implications of using private military security companies needs to be further explored.
- **Medium priority trends**
  - *Opening of New Territories* – to include cyber territories (e.g. a group formed on the internet declaring themselves a virtual 'nation' with associative power and influence). Other territories include Space, Arctic / Antarctic (opened up through climate change), seabed.
  - *Changing Perception of What is a State or a Nation.* In the future, a group of people may have the same (or more) power and influence as a state, but not tied to a geographic region. This virtual state may demand to be a member of organisations like the UN.
  - *Changing Nature of Conflict* – terrorism, organised crime, and hybrid warfare are all part of modern conflicts. Nations rarely declare war against one another. The nature of conflict is changing, and likely to change more in the future.
  - *Conflicting Individual Identities* – the Fractured Identities trend was related to fracturing of National identity, but the group recommended a new trend, focusing on individual identities. Linked to self-radicalisation. A person's identity can change much easier now (and into the future), and there is more competition from different groups to control that identity.
  - *Growing Dependence on Technology.* The group linked this to the growth of Artificial Intelligence (AI), e.g. if AI becomes more powerful than humans, and becomes a new threat. Increased dependence on technology introduces new vulnerabilities.
- **Lower priority trends**
  - *Changes in education* – the group identified it as important, but did not have time to explore fully how it is important to NATO.
  - *Genetic engineering* – the technology exists, NATO Nations are debating the moral aspect – maybe other nations or groups do not have the same morals and will freely use the technology for their own benefits.
  - *Growing importance of strategic communications* – the group thought *strategic communications* was both becoming more important, and changing, in the future.

**4.3 Technology Theme:** During the Technology Theme review it was questioned as to whether or not it needs to be redefined or enhanced, specifically due to a lack of science curiosity within the theme. This *curiosity* is important to scientific discovery and experimentation as it provides a key driver of technology - the demand factor. Technology and innovation are functions of that demand. One must also take into account the risks that are taken in scientific experimentation, the failures, and the ability to innovate based on these failures.

Creativity and spontaneity are human factors which help to structure and accelerate new technologies. Technology is a balance of supply and demand while innovation is the application of new technology. Therefore, the group agreed that the theme would be better titled as *Science and Technology*.

#### 4.3.1 Review of Existing Trends:

- **Technology Accelerates Change as a trend remains valid but could be renamed as technology promotes dynamic change:** The accelerating cycles of exploration, discovery, and exploitation of technologies along with the innovative fusion of existing, emerging and new technologies will combine to bring about change rapidly in the future. The dynamics of science and technology will expand into all domains of everyday life and will put economic, political, and technological structures in a continued state of transition.
  - A key idea within this trend is that technology has to be USED in order for it to accelerate *something*. Without use, technology (and its applications) cannot accelerate any change. Technology influences change elsewhere and is a catalyst for change.
  - Two components of that *change* are that it affects not only one's self but society as well. It becomes unclear as to the delineation of private and public responsibilities and thus governmental controls. When speaking of control and governance, technology becomes a double-edged sword. Technology can be controlled through government intervention and policies yet can be used by those very governments in the *control* of others - the biggest threat being *Intelligence and Surveillance* (must take into account the countering of these issues via technology). These controls (in which the technology wasn't originally designed for) could also affect the state overall and have political repercussions.
  
- **Increased Access to Technology:** This trend needs to be reviewed at global and local levels. It has enabled other than regular (state, government) players to enter and play in global and regional power structures. The ability for non-state actors to access new technologies and harness their use will continue to have an effect on all regions – the power that non-state actors possess grows with the advance of technology. It may soon be evident that *states* will be defined not by geography but by technology.
  - Accessibility to technologies covers the entire spectrum of technologies: InfoTech, Biotech, Nanotech, Medical, Energy, Transportation/Logistics and Weaponry. These emergent clusters of technology bring both opportunities and risk, specifically AI. Is AI a technology or an enhancement of a group of technologies? AI could be of value or a detriment to both society and NATO. It needs to be studied further.
  - One of the side effects of technological accessibility is the loss of monopolies of government/state in the technology field. Non-state actors and the emergence of private organisations to enhance technology will cause both political and economic hardships for a state.

- **Centrality of Computer Networks:** This trend should be modified and focus less on the *computer* aspect and more on the *network*. *Centrality of Dynamic Networks* is more realistic. Google Executive Chairman Eric Schmidt stated at a World Economic Forum that, *the Internet will disappear*. This is due in part from the aspect that it will be imbedded in our lives – it will be interwoven into everything that we do that it will seamlessly *fade into the background*.
  - The implications that there will be an increased potential for cyber-intrusion, espionage and attacks against Alliance networks and military systems are still very valid. Open access to information with these networks drives the importance of network security and electronic resources for strategic communications and influence. Control of such networks is of primary concern.

#### 4.3.2 Emergent Trends Identified:

- The expansion of capabilities based on the exponential advances in technology originally defined the *Technology Theme* but should be viewed as a new trend in itself.
- *Loss of state/government monopolies*. This could be brought about due to technological advances and the exponential increased use of technology by non-state actors.
- *Trending toward network capacity*. The speed, direction, and change of technology could be affected by research and development (R&D) shortfalls. Governmental budgetary restraints (to include NATO) could directly affect the rate of change of technology.
- *Technological Control*. Must take into account governance, the strategic political environment, defence budgetary constraints, and the evolution of NATO.
- *Artificial Intelligence*. AI is gaining traction with the exponential growth change of technology. This brings about opportunities and risk and could pose ethical questions as well as increased threats.

**4.4 Economy/Resources Theme:** Increasing inequality within and between countries will remain a significant source of instability as residual effects of the economic crises meddling in Western financial system. Emerging powers and non-state actors continue to challenge existing international system as they compete to advance their influence. Although energy prices are expected to remain low, they will be much more dynamic and will vary significantly between regions/countries. The global energy demand will continue to increase while production levels maintain the same pace. Finally, defence expenditures will continue to be affected by economic conditions in the West, while in other parts of the world an exponential increase is observed.

#### 4.4.1 Review of Existing Trends:

- **Globalization of Financial Resources as a trend remains valid.** The financial system continues to be vulnerable mainly because of the increase of debt (government, corporate, household and financial) and inequalities (inter and intra nations), long-term economic stagnation, vulnerable critical infrastructure and volatile capital flows.
  - The competition for economic influence from emerging powers and international institutions continue to challenge the Post-World War II institutions. The growing power of non-state actors also continues to challenge financial markets that might undermine public finances by tax evasion and threatens international economic stability. This might include cyber-attacks (state, state proxies and criminal) to financial markets and public/private institutions.

- Globalisation also continues to create economic opportunities albeit growing interdependence accompanied by rising tension between emerging powers and keepers of the Bretton-Woods system. The nexus between economic competitiveness (demography, innovation) and relative energy prices will continue to remain in favour of the United States imposing further pressures on the European financial system.
- **Increased Resource Scarcity as a trend is still valid.** A fossil fuel scarcity is not anticipated by 2040. The oil and gas prices have decreased by more than 60% since July 2014. This may indicate that energy prices are shifting to more dynamic period characterised by unexpected fluctuations. This would have potential implications to major producers and importers in the short/mid-term.
  - The global energy demand is expected to increase in parallel with global energy product.
  - Water is necessary to produce energy, in particular in fracking techniques. Combined with environmental and climate changes, water needs to be addressed as a critical scarcity in the future.
  - The US shale gas and oil revolutions need to be monitored more closely to analyse their potential impacts on the geo-economic and geopolitical international systems and the potential replication in other parts of the world, in particular Europe or Asia. This impact may create new tensions in the geopolitical environment as a potential driver for instability.
  - Rare Earths/Raw materials supply security should be analysed in more detail because of the potential impacts of scarcity of these materials required to manufacture current and future technological devices, weapons systems that are used by NATO forces.
- **Decreasing of Defence Expenditures as a trend is still valid.** The legacy of the 2008 economic and financial crisis will continue to hinder a significant increase in defence expenditures (DEFEX) in most NATO countries.
  - The Russia-Ukraine crisis and the rise of Islamic State of Iraq and Levant (ISIL) are sources of instability to the East and South of Europe; but public opinion (after the withdrawal of ISAF) remains unconvinced about reinvestment in defence albeit current crises in NATO's periphery. The change in perception of emerging threats may increase DEFEX in NATO countries, but will be constrained by the growth of the cost of aging demographics, health care systems, and energy prices.
  - The rise in defence spending in the BRICS countries and particularly in the East Asia region sharply contrasts with NATO and increases regional tensions. This could trigger global economic and financial uncertainty and disadvantage the economic and trade interests of the European members of NATO.
  - There are three gaps in NATO DEFEX that should be further analysed in more detail: the intra-European defence spending gap, the transatlantic gap, and the global gap - the trend between NATO and emerging countries.

#### 4.4.2 Emergent Trends Identified:

- The increasing economic inequality needs to be monitored more closely as it impacts on the social and international stability. In the context of the globalization of financial resources following sub-trends requires further attention: the unregulated digital monetary revolution; the emerging powers increasing influence on international institutions and their potential challenge to the Bretton-Woods system; and the changing balance of international economic power.

- In the area of resource scarcity, the oil price instability and its direct impact on geopolitical stability of major producer countries and their national budgets should be monitored closely. In addition, the more dynamic energy prices may have an impact in the economic stability of major importer countries. The differences of energy production and dependence between US/Canada and Europe not only may influence the security priorities in the Middle East and North Africa (MENA) region, but it may also lead to a slowdown of European economic recuperation and, therefore, potential reductions in DEFEX.
- The expansion of renewal energy systems and other green energy technologies have increased interdependencies between *Energy Supply Security* and *Raw Material Supply Security* (i.e. rare earths). The focus on the nexus and interlinkages of various resource scarcities, such as energy, water, and raw material security should be increased. Finally, the electricity supply security is becoming more important in the context of cyber threats to electricity infrastructure and distribution systems.
- Allied nations may increasingly seek more effective and efficient defence spending through smarter approaches in some areas, such as logistics, budgetary accountability and transparency, and management.

**4.5 Environment Theme:** The environment will be increasingly important and the effects will become more severe in the future. Taking into consideration the growing severity of environmental issues, more states may struggle to cope independently with the consequences of climate change and natural disasters. There may be second and third order effects of these catastrophes that go beyond national boundaries. Therefore the related impacts could be tangible more broadly across the eco- and human systems. Critical infrastructure might be affected thereby interrupting essential services (e.g. global supply chains). Finally it was stressed during the discussions that global policies would be necessary to address *Climate Change*, but mitigation policy decisions have been largely taken at the nation level considering national interests.

#### 4.5.1 Review of Existing Trends:

- **Climate Change and Environmental Change as a trend are still valid and increasing in regard to severity of extreme weather events.** The evidence of human influence on the global climate system has grown. However, it is still uncertain what the environmental effects will be by the end of the 21<sup>st</sup> century. This uncertainty is complicated further by the fact that Climate Change-related environmental effects may have second or third order effects on other domains (e.g., economic, resources, urbanization and demographics) and may also be affected by future trends in these domains.
  - To date, decisions on Climate Change and mitigation policies have been considered globally, but have been largely taken at the national level in line with national interests.
  - Climate change and other anthropogenic factors will have a corresponding environmental impact on bio-diversity, land use and fresh water. These impacts will be unevenly distributed across the globe, but will have a greater impact on those areas that are already expected to be resource stressed.
  - Continuing urbanisation in coastal areas and the growing size and number of urban slum areas on marginal land that is prone to inundation and more vulnerable to extreme weather will exacerbate the impact of climate change and sea level rise. Climate change will increase the risks from heat stress, flooding, storm surges and resource scarcity.

- Food security will be imperilled as the production of staple crops is impacted by changing agricultural conditions. These conditions will likely lead to the displacement of large numbers of people and a corresponding increase in conflict rooted in the competition for resources and living space.
- **Natural Disaster as a trend is still valid, and increasing.** Natural disasters could include earthquakes, tsunamis, volcanoes, large storms, tornadoes, floods and pandemics.
  - The related impacts could be broadly felt across more ecosystems, human systems and critical infrastructure up to the global-level (e.g., interruption of global supply chains due to natural disasters affecting key manufacturing or distribution nodes).
  - National authorities may not be able to cope with the consequences of natural disasters which could have second and third order consequences for a certain region. This may be driven by an inherent lack of resources, the resultant destruction of infrastructure or the disruption of functional government as a result of the disaster. The threat will increase if the disaster occurs in an urbanized environment or growth of coastal/littoral and floodplain-located cities. In areas that were already stressed due to other factors, the outcome of the disaster may be greatly magnified lessening the ability of local authorities to deal with it.
  - *Resilience* will likely need to be considered as part of adaptation measures to both climate change and natural disasters.
  - At times, the impacts of man-made disasters such as industrial accidents could approach the magnitude of natural disasters. The increasingly interconnected global economic system will transmit the impact of these disasters to all parts of the world.

## 5. Conclusions and the Way-ahead:

The SFA Workshop proved extremely useful, characterised by successful discussions and idea exchanges throughout the analysis of SFA's current trends and the identification of either absent or emerging trends. This report reflects the discussions during the workshop and breakout sessions and should not be perceived as the views of the Alliance or ACT.

As the workshop findings reveal and trend analysis work continues, it is determined easily that no trend from the SFA 2013 Report will remain totally unchanged, but also that the emergent trends warrant greater research and analysis. The brief findings outlaid in this paper will be captured in greater detail in the SFA 2015 Update Report to be released later this year. This will keep the SFA findings fresh and the futures community engaged while giving a solid stepping-off point as work commences on the next full iteration of the SFA, the 2017 Report.