



NATO Parliamentary Assembly

SUMMARY

of the meeting of the Science and Technology Committee

*Rabati, Hotels & Preference Hualing Tbilisi
Tbilisi, Georgia*

Saturday 27 May 2017

ATTENDANCE LIST

Committee Chairperson	Philippe VITEL (France)
Vice-Chairpersons	Maria MARTENS (Netherlands) Bruno VITORINO (Portugal)
Rapporteur, Sub-Committee on Technology Trends and Security (STCTTS)	Matej TONIN (Slovenia)
Special Rapporteur	Osman Askin BAK (Turkey)
President of the NATO PA	Paolo ALLI (Italy)
Secretary General of the NATO PA	David HOBBS
Member delegations	
Belgium	Brigitte GROUWELS Philippe MAHOUX Olga ZRIHEN
Canada	Leona ALLESLEV Joseph A. DAY Cheryl GALLANT
Croatia	Miroslav TUDJMAN
Czech Republic	Antonin SEDA
Estonia	Hannes HANSO
France	André TRILLARD
Germany	Wolfgang HELLMICH
Greece	Andreas LOVERDOS Marios SALMAS
Italy	Roberto MORASSUT Domenico SCILIPOTI ISGRO
Lithuania	Ausrine ARMONAITE Mindaugas PUIDOKAS
Luxembourg	Nancy ARENDT KEMP Alexander KRIEPS
Poland	Przemyslaw CZARNECKI Jozef LYCZAK
Romania	Andrei POP
Spain	Guillermo MARISCAL Ramon MORENO
Turkey	Metin BULUT Ziya PIR
United Kingdom	Baroness ADAMS OF CRAIGIELEA Lord JOPLING Baroness RAMSAY OF CARTVALE
United States	Gerald CONNOLLY Bill JOHNSON Rick LARSEN

Associate delegations

Armenia
Austria

Edmon MARUKYAN
Hubert FUCHS
Reinhold LOPATKA
Peter PILZ

Azerbaijan
Finland
Serbia
Ukraine

Malahat IBRAHIMGIZI
Mikko SAVOLA
Jasmina NIKOLIC
Iryna FRIZ
Oleksii SKRYPNYK
Oksana YURYNETS

Regional Partner and Mediterranean Associate Member Delegations

Jordan
Morocco

Faisal EL-AWAR
Mohammed AZRI

Parliamentary Observers

Palestinian National Council
Republic of Korea

Walid ASSAF
Ju-Hong HWANG

Speakers

Dick ZANDEE, Senior Research Fellow,
Netherlands Institute of International Relations
'Clingendael'

Irakli MENAGHARISHVILI
Director of the Strategic Research Centre,
Georgia

Marshall BURKE, Assistant Professor, Department
of Earth System Science, and Fellow, Center on
Food Security and the Environment, Stanford
University

International Secretariat

Henrik BLIDDAL, Director
Karen WALKER-LOVE, Coordinator
Joseph SADEK, Research Assistant

I. Opening remarks by Philippe VITEL (France), Chairperson

1. In his opening remarks, **Chairperson Philippe Vitel (FR)** thanked the Georgian delegation for their warm welcome to Tbilisi. He followed by thanking Baroness Ramsay of Cartvale for her chairpersonship of the Science and Technology Committee (STC) over the last three years.

II. Adoption of the draft agenda [079 STC 17 E]

2. **The draft agenda was adopted without any changes.**

III. Adoption of the Summary of the Meeting of the Science and Technology Committee held in Istanbul, Turkey on Sunday 20 November 2016 [237 STC 16 E]

3. **The Summary of the Meeting of the Science and Technology Committee held in Istanbul, Turkey on Sunday 20 November 2016 [237 STC 16 E] was adopted without any changes.**

IV. Consideration of the *Comments of the Secretary General of NATO, Chairman of the North Atlantic Council, on the Policy Recommendations adopted in 2016 by the NATO Parliamentary Assembly* [049 SESP 17 E]

4. Members of the Committee did not remark on the *Comments of the Secretary General of NATO, Chairman of the North Atlantic Council, on the Policy Recommendations adopted in 2016 by the NATO Parliamentary Assembly* [049 SESP 17 E].

V. Presentation by Dick ZANDEE, Senior Research Fellow, Netherlands Institute of International Relations ‘Clingendael’, The Hague, on *The Future of European Defence Research and Development and implications for Burdensharing*, followed by discussion

5. **Dick Zandee** began his presentation by discussing the main drivers of European defence research. He argued that defence research and development (R&D) was increasingly relying on dual-use technologies, for example in information and communication technologies, intelligence, surveillance and reconnaissance as well as personnel protection.

6. Since 2006, austerity measures had significantly affected European R&D. To mitigate this, the European Commission (EC), the European Space Agency and the European Defence Agency (EDA) had been trying their best to increasingly synchronise defence research. Recently, however, the European Union (EU) started a Preparatory Action on defence R&D. The Preparatory Action would start in 2017 and run until 2019 at a total budget of EUR 90 million. The lessons learnt from the Preparatory Action would inform the modalities of a future EU Defence Fund (EDF), he told members. Mr Zandee argued that the EDF would be a game-changer for Europe. By 2027, if funded as requested by the EC, the EDF was projected to be Europe’s 4th largest defence research fund, behind Germany, France and the United Kingdom. The EC was proposing that the EDF, under a ‘research window’, would receive EUR 500 million per year from 2021 to 2027, i.e. EUR 3.5 billion in total. Under a ‘procurement window’, the EC was hoping to garner another EUR 5 billion annually, mostly from member state contributions to specific programmes.

7. In total, the EDF’s ‘research window’ would add about 25% to European defence research investment. However, member states would still need to approve the EDF in discussions beginning in June 2017. There would be two great challenges in moving forward with the fund: first for national defence ministries to win appropriations at home; and then to turn R&D into actual procurement. Mr Zandee emphasised early successes in EU R&D were needed to quickly turn research into actual

capabilities. However, given the current security environment, the EU and member states had begun taking the notion of common defence research seriously. However, filling the gap between research and implementation would take time even in the best circumstances.

8. In the ensuing discussions with Mr Zandee, the question whether EU member states agreed on defence priorities was raised. As the success of the EDF hinged on defence procurement, how motivated would the states be to agree on priorities? It was also asked if R&D issues were high on the agenda at the 25 May 2017 NATO summit. Mr Zandee responded that he doubted R&D was mentioned at the NATO summit. However, he argued that NATO-EU cooperation on R&D had improved in recent years and was optimistic that cooperation would continue to increase. The Speaker reminded the STC that the EU Capability Development Plan (CDP) was the way EU member states coordinated on R&D priorities. However, for the CDP to be relevant, general priorities in the Plan had to be translated into actual capabilities. Mr Zandee predicted that the next CDP would be seeking more investment in border security capabilities, for example in the maritime security sector (civilian and military). For Mr Zandee, the big question was if member states were ready to make it easier for defence programmes to pass “the valley of death” (i.e. the gap between R&D programmes and capability procurement)? Going forward, Mr Zandee was cautiously optimistic, as the security environment had worsened in the last few years and EU member states were beginning to adjust to this new reality. He pointed to rising defence spending, for example. If member states continued to invest through 2018, he had no doubt that R&D would turn into orders.

9. **Peter Pilz** (AT) argued that it was of utmost importance to make clear that there was no alternative to a common European security policy and a common European defence. He went on to say that there was a specific Austrian reason as well. He argued that Turkey had recently objected to Austria’s participation in NATO partnership programmes. Even though he would like to see Austria remain a NATO partner, he raised the possibility that Austria might withdraw from its partnership with the Alliance, if this continued. He posited that Austria’s bilateral differences with Turkey were based on a conflict about the values in the European Union and in NATO, and that at the core of NATO was not only the defence of states but also of common basic values. He was looking forward to further discussions with his colleagues during the Spring Session to prevent such a worst-case scenario. During the course of the discussions, two other speakers weighed in on this matter. **Ziya Pir** (TR) offered his support of Mr Pilz’ statement, mentioning that he was part of an opposition party in Turkey. He argued that the international community should put additional pressure on Turkey’s government. If successful, this would help both relations between the governments of Austria and Turkey and between the EU and the government of Turkey. **Gerald Connolly** (US) told the Committee that he understood the position Austria found itself in. He argued, however, that if Austria withdrew as a NATO partner, this would reward the behaviour Mr Pilz criticised. He hoped Austria would remain a NATO partner.

10. Mr Zandee was also asked how parliamentarians could help small- and medium-sized enterprises (SMEs) acquire more EU start-up capital. Mr Zandee agreed that it was difficult for SMEs when it came to this sector, especially when prime producers were located in big countries. In contrast to traditional defence equipment, SMEs were better positioned to produce civilian and military cyber capabilities. The EC offered a number of initiatives supporting SMEs. Mr Zandee stressed, however, that companies also needed to improve how they worked with the EC. Furthermore, he argued that the EU Directive 2009/81, meant to improve and coordinate contract procedures in the fields of defence and security, was supposed to help SMEs across Europe, but it was not working as well as it could, primarily because member states made use of national exemptions.

11. Mr Zandee agreed with one member that the choice of technologies to use for current crises was highly political. This was up to the EC and should be based on an examination of which capabilities were relevant to the mission. That being said, it did not mean that the EC should not invest in new technologies as well. Mr Zandee used space technology as an example, where the EU had invested heavily to become less dependent on the United States.

12. In the context of European defence investments, a delegate asked if the funds for the EDF the EC was proposing was sufficient to attract big European defence companies. Mr Zandee argued that the money would be enough. Indeed, the EC conducted its own research and discovered that large European defence companies indeed welcomed the investment funds in the EDF.

13. One delegate asked if the EUR 3.5 billion in the EDF 'research window' would count towards the 2% pledge made at the NATO summit in Wales in 2014. It was also asked who would own research and capabilities produced under the EDF. Mr Zandee believed that national contributions to the EDA, EC or EDF would not count towards the 2% pledge to NATO. Furthermore, he told delegates that intellectual property of research and capabilities would, as usual, be owned by the member states involved in producing them. He admitted, however, that the EC needed to clarify intellectual property issues under the EDF.

14. Another delegate asked if efforts were undertaken so that the EU and NATO were not duplicating R&D, capabilities and procurement. Mr Zandee responded that NATO-EU cooperation was much further along today in terms of defence than it was a few years ago. He admitted that there was often a fear that NATO and the EU might be pursuing overlapping R&D or capability procurement, but in the Speaker's experience, there were no examples of duplication since 2005 when the EDA was founded.

15. In the context of defence spending, the Speaker was asked if the EU had defined its investment priorities in terms of defence capabilities, i.e. if capability plans were in line with protecting the EU's strategic interests. Additionally, it was asked if the R&D process was quick enough to produce the necessary capabilities for the threat the EU was facing. Mr Zandee responded that the EC would need to be the driver of cutting red tape.

16. The conversation closed with questions concerning competition and ensuring the European defence market would not become a monopoly. The Speaker responded that, today, the market was very fragmented. Currently, EU member states could rely on export markets outside the EU. However, foreign demand was likely to drop due to the development of national defence industrial bases, for example in India. European companies would therefore have to look inward, and this would require consolidation in the European defence sector. In the long term, there were likely to be fewer European firms, he posited.

VI. Consideration of the draft General Report *Maintaining NATO's Technology Edge: Strategic Adaptation and Defence Research & Development* [080 STC 17 E] by Thomas MARINO (United States), General Rapporteur, presented by Maria MARTENS (Netherlands)

17. **Maria Martens** (NL) took the floor to present the draft General Report *Maintaining NATO's Technology Edge: Strategic Adaptation and Defence Research & Development* [080 STC 17 E] on behalf of **Thomas Marino** (US), who was unable to attend the Spring Session. Ms Martens sought to address how NATO could confront its new strategic reality of a re-emergent Russian competitor and the rise of China. The confluence of the emergence of these actors on the international stage and the birth of a new age of innovation presented challenges to the transatlantic Alliance. Emerging technologies and scientific innovations, she warned, could potentially disrupt the global strategic balance. The way innovation happened today, she went on, was fundamentally different from in the past. SMEs – and even individuals – were becoming the key drivers behind innovation. A consequence of the new age of innovation was that advanced economies no longer held a monopoly on advanced technologies. More and more states had access to such technologies – either because they were themselves able to produce them or because they could buy them from other states. In response to the new challenges technology innovation presented, NATO must adapt and invest in the next generation of defence capabilities.

18. Ms Martens stressed that if NATO wanted to remain credible and relevant, competitors could never doubt the Alliance's ability to fulfil its commitments to each other, in particular, on collective defence. Defence R&D was crucial in this regard. Only with properly resourced and well-managed R&D could NATO continue to achieve dominance across the full spectrum of capabilities. In short, R&D lay at the heart of preserving tomorrow's credibility and freedom of action.

19. Ms Martens went on to describe the initiatives led by the United States and the EU to maintain their innovation edge. For its part, the US was embarking on its Defense Innovation Initiative and Third Offset Strategy, which also sought to find new ways to innovate, including reaching out to the private sector beyond traditional defence contractors. In terms of the EU, its defence innovation strategies are outlined in the EU Defence Action Plan, which rested on three pillars: the EDF; investments in defence supply chains; and the single market for defence. Under the Fund, a proposed 'research window' would aim to finance collaborative defence research projects at the EU level. The Commission wanted a funding level of EUR 500 million allocated for this per year. Also, a 'capability window' would support the joint development of defence capabilities. Under this window, member states could come together and pool national contributions to develop defence capabilities in the late R&D phase. This tool could bring together EUR 5 billion per year, the EC argued.

20. Ms Martens relayed Mr Marino's message that more coordination was needed between Allies. NATO had to remain the forum where such coordination and knowledge exchange happened, connecting the scientists and engineers across the Alliance. Indeed, Allies should harness the transatlantic S&T community's strengths and bolster NATO collaboration. Ms Martens closed with an appeal to the Committee that investing in collective defence was a priority for the General Rapporteur and that the Alliance had to meet the 2% of GDP commitment as outlined at the 2014 Wales Summit. She further argued that if all member states fulfilled the Defence Investment Pledge, NATO would have USD 100 billion more at its disposal every year. At the end of her speech, Ms Martens announced that she would convey specific questions she was unable to answer to Mr Marino.

21. **Bill Johnson** (US) thanked Ms Martens for her contributions and reiterated his delegation's support for S&T investment in NATO. In addition, he argued that defence investment should also focus on refining acquisition processes. Innovation was important, but many NATO member states, including the United States, should work to address inefficiencies in acquisition.

22. A number of delegates, including the Chairperson, expressed their support for increased defence spending and argued that all members in the Alliance had to proceed in good faith to allow the Alliance to address its capability needs. This included a serious commitment to the pledges made at the Wales summit, particularly the 2% defence spending pledge.

VII. Presentation by Irakli MENAGHARISHVILI, Director of the Strategic Research Centre, Georgia, on *Russian Military Modernisation and the Black Sea Region*, followed by discussion

23. Mr Menagharishvili's presentation covered a range of topics on the security architecture in the Black Sea region, with an emphasis on Georgian national security issues. The speaker began his presentation by stating the interconnectedness between stability and security in the Black Sea region and Russia's military modernisation. Mr Menagharishvili went on to say that Russia's military modernisation negatively affected security and stability in the Black Sea region beginning in 2008. The speaker gave two examples of Russia's role as a destabilising force: the occupation of two Georgian regions in 2008 and the incursion into Ukraine in 2014.

24. The speaker described Russia's military modernisation since 2008 in three stages. Between 2008 and 2011, Russia embarked upon a military optimisation and education reform. Following this

reform, the government focused on increasing salaries and pensions as well as professional retraining between 2012 and 2015. In 2016, the military began upgrading artillery and equipment.

25. Recently, the sanctions, arising from the illegal occupation and annexation of Crimea and Russian actions in eastern Ukraine, had slowed the pace of Russian military modernisation efforts. The number of both ground forces and officers had decreased, and forces placed in the Western Caucasus had also diminished. Still, Russia had been able to update its military technology, which included artillery, tanks, tactical equipment for soldiers and unmanned aerial vehicles.

26. Russia had been able to test many of its new armaments in Syria, including its naval and airborne assets. Despite pronouncements of the Russian leadership, financial hurdles had hampered further defence investment. For example, for 2017, the Russian armed forces had requested orders of 1,000 T14 tanks, but only 14 of them had been produced. The 2014 modernisation plan, the speaker asserted, was only 64% fulfilled. Large orders were backlogged because components had to come from abroad but the sanctions regime blocked this.

27. When asked if Russia's ambitious military spending would lead to a collapse of the military, Mr Menagharishvili did not think it was possible. He pointed out that although modernisation was only 64% fulfilled, Russia's nuclear modernisation was up to 90% complete. Mr Menagharishvili cautioned delegates that they should not expect a collapse of the military, but a retooling of their modernisation plans.

28. Despite the challenges for Russia's planned modernisation efforts, Russia had been able to improve other war-fighting systems. Most notably, modernisation and advancements had been achieved in the areas of reconnaissance and hybrid warfighting capabilities. Russia's infamous propaganda tools were as capable as ever, with every brigade equipped with a special unit for hybrid warfare capabilities. This is wreaking havoc in the Black Sea region because many states and societies were susceptible to Russian propaganda and hybrid attacks. He added that Russian leadership was attempting to reassert its domination over the Southern and Western Caucasus to block the enlargement of Euro-Atlantic institutions. Also, in an attempt to assert itself in the maritime domain, Russia was working to restrict NATO's access to the Black Sea and gain a strong foothold in the Mediterranean Sea. Russia's Syria policy was evidence of its Mediterranean ambitions, the speaker stated.

29. The final point of Russia's Black Sea security strategy pertained to energy resources. The annexation of Crimea and incursions in the South Caucasus improved Russia's geostrategic advantage in energy domination in the region, he argued.

30. Mr Menagharishvili concluded with his thoughts on what the Russians had do to complete modernisation by 2020. He argued that Russia had a long way to go, but progress was being made in air defence systems, which were set up in the region in August 2016. Russia had focused on anti-access/area denial strategies in the Black Sea region. With the installation of nuclear-capable Iskander missiles in Crimea, conventional threats to Russian operations could potentially be met with a nuclear response.

31. In addition to equipment and armaments, the delegates were interested to know the quality of Russian troops. Mr Menagharishvili suggested that in relative terms to Russian operations in Chechnya in the 1990s, Russian troops were better trained and more effective today.

VIII. Consideration of the draft Report of the Sub-Committee on Technology Trends and Security *The Internet of Things: Promises and Perils of a Disruptive Technology* [081 STCTTS 17 E] by Matej TONIN (Slovenia), Rapporteur

32. **Matej Tonin** (SI) presented his draft report, *The Internet of Things: Promises and Perils of a Disruptive Technology* [081 STCTTS 17 E], to the STC. The Internet of Things (IoT), Mr Tonin said, would computerise most of everyday objects, from cars to lightbulbs. In fact, by 2020, between 30 and 60 billion devices would be connected worldwide and, in economic terms, the market could generate USD 4 to 12.8 trillion per year by 2025.

33. While Mr Tonin described the great promise of the IoT, he also warned of risks to information systems and internet infrastructure. For its part, the NATO Science and Technology Organization (STO) has launched a three-year task group on the military applications of the IoT. The EU has also launched its own initiatives, resting on three main pillars: a single market for the IoT; a thriving IoT ecosystem; and a human-centred IoT approach. Further, the EU planned to invest EUR 192 million in IoT research from 2014 to 2017.

34. As NATO and the EU began thinking about investing in the future of IoT, perhaps the most important topic that needed to be addressed was making the IoT secure, Mr Tonin argued. In 2015, when a large number of business leaders were asked in a survey, 71% said that when connected devices came onto the market, they were normally one or two years behind on security. Mr Tonin gave a couple of examples of vulnerable technologies; Wi-Fi networks and critical infrastructure. Fortunately, Mr Tonin stated, fundamental security issues for the IoT was not very different than the security issues for the rest of cyber space. In other words, solutions were available and implementable. Parliaments played an especially important role with regards to security because they could regulate the market, make IoT companies liable for security faults and introduce regulatory environments for insurance policies. However, Mr Tonin reminded the committee that a delicate balance had to be struck between regulation of IoT technologies and allowing technology to flourish in a dynamic market.

35. Mr Tonin urged the delegates to begin to proactively shape an IoT environment that maximised opportunities and minimised the risks of this emerging technology. To achieve this, Mr Tonin recommended that delegates pay close attention to critical parts of IoT; the military IoT and connected devices touching critical infrastructure. He went on to say that cyber defences had to be strengthened in the civilian and military domain. Delegates should vigorously promote standardisation of IoT technologies. Parliaments should also adequately fund research and development to enable the large-scale adoption of IoT in the long term. Finally, the way the government and the military adapted emerging technologies had to be reformed because they were currently unable to keep up with the commercial sector.

36. The question and answer session began with a conversation about how cooperation and regulation would develop across NATO and EU member countries. Several states were already cooperating on military IoT and this would likely continue. The next concern was ensuring burgeoning IoT technology was not hampered too much by market regulations. The challenge was that as these technologies interacted with the real world, they could present security threats. However, if military application was going to develop for the Alliance, the R&D ecosystem had to remain open. The Rapporteur argued that too many regulations could kill the industry.

37. In continuation of the conversation on IoT risks and threats, delegates agreed that the internet's critical infrastructure had to be protected from state and non-state actors and improved inside the Alliance. Delegates emphasised that IoT technologies could not function reliably without modern internet infrastructure. Also, only by improving network infrastructure would the EU and NATO remain competitive with emerging regional actors in Africa and Asia. Both the EU and NATO understood the importance of protected cyber networks, and the rapporteur reminded delegates that

the EU was spending EUR 193 billion in cyber security on IoT. Some also believed that the EU should produce a public awareness campaign on burgeoning IoT technologies.

IX. Presentation by Marshall BURKE, Assistant Professor, Department of Earth System Science, and Fellow, Center on Food Security and the Environment, Stanford University, on *Potential Economic Consequences of Climate Change*, followed by a discussion.

38. **Marshall Burke** presented how, as an economist, he measured the potential impacts of climate change on a range of economic and social outcomes. He began with the fact that global temperatures continued to increase and that this science was not new. Dr Burke argued that climate change indeed had an effect on social and economic outcomes, but that climate was not the only factor impacting outcomes.

39. Dr Burke began with a presentation on several key climate indicators, including global temperature. Since recording of global temperatures began, the Earth's average temperature had increased by one degree Celsius. Dr Burke went on to say that all parts of the globe had warmed, but that high-latitude geographies had experienced more warming than other areas. The discussion moved to a presentation of future scenarios of climate change. Depending on the extent to which climate change was mitigated in the future, temperature rise might vary between one to four degrees Celsius, depending on future policy choices.

40. Dr Burke then offered specific data on the Middle East and North Africa. The speaker cited that, without proper mitigation strategies, parts of the region could average above 40°C - 60°C by 2100. Human habitation and the functioning of modern transport systems under this increased warming scenario would be extremely difficult.

41. Dr Burke offered new research that identified four key areas of climate impacts with regards to economic and social outcomes: agriculture, human conflict, human migration and aggregate economic output (i.e. GDP). Dr Burke first lay out his research methodology to study climate's independent effect on countries across the world. He warned that countries responded differently to climate events; therefore, his research studied individual countries across time.

42. The speaker went on to discuss ways in which climate change affected agriculture. Dr Burke's research found that there was a negative relationship between temperature and crop yield. That is, for every one degree Celsius that the climate warmed, crop yield decreased by 10% across a basket of globally important crops (i.e., soy, wheat, maize and rice).

43. The next climate-related impact was conflict. Dr Burke's research mainly covered Africa. His research suggested that as crop prices, which depended on the quality of crop yields, had an impact on conflict statistics. However, this varied depending on whether a region had more producers or consumers of agricultural goods. For example, there was more social unrest in urban areas, where most people were consumers of agricultural goods, when food prices increased. These phenomena were not just experienced in places like sub-Saharan Africa, but also in the United States.

44. Dr Burke also presented climate change's impacts on migration. His research found that as average temperature increased in a migration source country, asylum application to the EU also increased. In short, when it was hotter, the EU received more asylum applications.

45. The speaker concluded with a discussion about how increased average temperature affected countries' aggregate economic outputs. Dr Burke's research found that the optimal conditions for economic output were at around 13°C. Therefore, for countries in northern and western Europe where average temperatures were below 13°C, economic growth accelerated with global warming. Conversely, if countries' average temperatures were above 13°C (for example the Middle East and

North Africa (MENA) region and Sub-Saharan Africa) any additional warming causes economic output to decrease.

46. Dr Burke concluded with the following statements: as average temperatures increased globally, crops yield decreases, violent conflict increased, migration increased, and aggregate economic growth slowed down.

47. Delegates began the question and answer session on the topic of agricultural yields. Some states had experienced agricultural booms with certain crops, how was it possible that certain crops succeeded and others failed due to climate change? Dr Burke offered two explanations. First, different crops responded differently to temperature increases. Grapevines, for example were tolerant, but California's wine industry had already begun to suffer, in fact. Second, effects depended on geography. While effects would not be uniform, the overall effect was negative, he argued. A model example of this was Dr Burke's explanation that Canada, because of its latitude, might indeed be a beneficiary of climate change as land might become more productive as temperatures increased. However, parts of the globe that were currently warm might experience inhospitable climates in the near future. On a similar topic, when asked about resistance to genetically modified organisms (GMOs), Dr Burke stated that there was no evidence to suggest that GMOs were necessarily more resistant to increased temperatures.

48. Delegates asked Dr Burke about the robustness of his research and the sources of his data. He replied that his research included a combination of primary data collection and data collected from government and nongovernmental agencies (e.g., US government, OSCE, the United Nations).

49. Several delegates recalled their visit to Svalbard, Norway, and expressed their surprise that climate change was having a more rapid effect on the High North than what was experienced in European or North American capitals. Dr Burke agreed that, indeed, climate change did impact those parts of the globe much more quickly.

50. A delegate from Azerbaijan argued that modern warfare had a negative impact on ecosystems and that occupied territories suffered from environmental degradation and this had produced adverse economic consequences for Azerbaijanis. Soon afterwards the delegate from Armenia responded that no such economic destruction was being caused by the Armenians in Nagorno-Karabakh.

51. Given the context of the 2015 Paris Climate Agreement and the grim prospects for addressing the root causes of climate change, delegates asked if climate change could be stopped. Further, delegates asked if reaching the goals of the Paris Agreement was worth it. As an economist, Dr Burke did not offer a scientific answer but a cost benefit calculation. Given the benefits of combatting climate change it was worth the costs in his opinion. The speaker used the US as example of an economy that was not adversely affected by making climate-friendly changes to its economy. The Paris Agreement was an important first step, and he was optimistic that future progress could be made.

52. With regards to the link between political violence and climate change, Dr Burke was cautious. Delegates mentioned violence in Syria and Nigeria and the links between the violence and crop prices and increased temperatures. Dr Burke stated that it was dangerous to reduce Syria to a single cause, and as he stated in his presentation, climate likely played a role in instigating instability, but was only one variable. One solution to combatting violence and migration, Dr Burke proposed, was to make crops in some parts of the world more productive.

X. Consideration of the draft Special Report *Food and Water Security in the Middle East and North Africa* [082 STC 17 E] by Osman Askin BAK (Turkey), Special Rapporteur

53. Special Rapporteur **Osman Bak** (TR) took the floor to present his draft report on *Food and Water Security in the Middle East and North Africa*. The draft report was informed by a joint visit of the STC together with the Economics and Security Committee to Israel and the Palestinian Territories in February/March 2017.

54. Mr Bak reminded the delegates of the threat climate change poses to the Alliance and the wider world. More specifically, given the importance and attention NATO is paying to its southern periphery, food and water stability had to be addressed. For countries in the MENA region, food and water security was already a national security issue. In the MENA region, Mr Bak stated, many of the negative global climate trends were amplified, for example desertification. To further elaborate, Mr Bak stated that the region was home to 5% of the global population, but it had only access to 1% of the world's renewable water supply. It might seem incredible, he said, but the region also had the highest percentage of withdrawal of total renewable water resources.

55. Food security was also threatened in the MENA region. Mr Bak cited that the region was the only part of the world where there had been an increase in hunger over the past decade, from 16.5 million people in the 1990s to 33 million in the 2000s. The pressures of population growth would also affect food supply to the MENA region, where the population was expected to double by 2050.

56. Political factors and mismanagement also undermined long-term food and water security. For example, some countries promoted self-sufficiency policies where this was nearly impossible. Another flawed policy was offering water subsidies, which allowed some in the region to engage in unsustainable farming practices. But in the long term, the biggest headache was probably climate change. The Intergovernmental Panel on Climate Change estimated that, by the end of the century, the MENA region would face a temperature increase of 0.9°C in the best-case scenario and up to 4.1°C in the worst-case scenario. Climate change would also bring a decrease in rainfall and an increase in evaporation.

57. Mr Bak proposed mitigation and adaptation measures in his presentation. First, he mentioned supply-oriented solutions. Agriculture claimed close to 70% of all freshwater that humans used. States could adopt helpful low-cost measures, such as planting suitable crops and using sustainable and modern irrigation techniques. Another solution was introducing desalination technology, which was particularly developed in both Saudi Arabia and Israel. Recycling and reusing wastewater was another supply-oriented solution, Mr Bak said. The rapporteur also offered market-oriented solutions, including foreign land acquisitions and investments in the agricultural sector.

58. Addressing water and food insecurity in the MENA region, Mr Bak concluded, was not going to be easy, but it was possible.

59. Delegates did have questions regarding some of the graphs/figures within the report. For example, a delegate asked if data in figure four was adjusted for population growth. The Special Rapporteur said he would follow up and make adjustments as necessary to the relevant figures.

60. Delegates also offered their thoughts on food waste. They mentioned that Europe did a good job of reducing food waste because of legal statutes that prevent waste. They continued to say that the trip to Israel and examples from Qatar proved that efficient water management would help optimise water supplies for those facing scarce supplies in the region. One delegate from South Korea added that his country was a model for smart water systems management and that similar solutions could be brought to bear in the MENA region as well.

61. The Special Rapporteur broadly agreed with delegates, but emphasised that it was important for the Alliance and European states to help the MENA region better manage its resources, because

European technology and water management strategies were further along than those in the MENA region.

62. One delegate thought it was important to consider current political challenges in the discussion, specifically with regards to the current refugee crisis. States like Lebanon and Jordan hosted large refugee populations. Around 10% of displaced refugees lived in large camps, especially in Jordan. The delegate believed that it would be important to examine the stresses refugee camps impose on underground aquifers. Mr Bak was attentive to the delegate's concerns and would consider his suggestions.

63. Delegates spoke about the threat of using fossil fuels in both the civilian and military sectors. Delegates spoke specifically about making humanitarian aid missions more environmentally sustainable. Some warned that, as fossil fuels had become a weapon of war, water might also be used to coerce states in the future.

XI. Summary of the future activities of the Science and Technology Committee and the Sub-Committee on Technology Trends and Security (STCTTS)

64. The Chairman reminded the delegates that a joint visit to Canada with the Economics and Security Committee's Sub-Committee on Transatlantic Economic Relations would take place from 11 to 15 September 2017. Topics to be discussed include security challenges in the High North as well as the challenges of climate change in the High North. Delegates could register with their Secretaries of Delegation. The chairman added that delegates would soon receive more details. Also, the STCTTS was planning a visit to Berlin, Magdeburg and Bremen in Germany to learn more about the IoT, artificial intelligence, mega data, robotics and German climate policy.

XII. Other business

65. No other business was raised.

XIII. Date and place of the next meeting

66. The next meeting of the STC will take place in Bucharest, Romania, at the Annual Session on 6-8 October 2017.

XIV. Closing remarks

67. The Chairman thanked everyone for their contributions and engagement on the issues presented at the meeting. He thanked the Georgian delegation, interpreters, and the international secretariat.
