SCIENCE AND TECHNOLOGY COMMITTEE (STC)

MISSION REPORT*

San Diego and Silicon Valley, United States

15-19 October 2018

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I.   INTRODUCTION

1.   From 15 to 19 October, the NATO Parliamentary Assembly's Science and Technology Committee (STC) visited San Diego and Silicon Valley. STC Chairperson Maria Martens (Netherlands) led the delegation, consisting of 19 members of parliament from 15 Allied countries.

2.   NATO's unrivalled defence Science and Technology (S&T) edge remains the lifeblood of current and future capabilities. Unfortunately, a real possibility exists that the Alliance could fall behind in defence S&T in the coming years. Consequently, the STC is redoubling its efforts to identify the challenges in maintaining the S&T edge and to lend political support to rectify any shortcomings. The visit to two of the most important hubs for S&T in the United States – and indeed worldwide – was therefore a key part of the Committee's efforts in 2018.

3.   The United States is currently reforming its approaches to defence S&T and research and development (R&D), in particular through the Pentagon's Defense Innovation Initiative (DII) and Third Offset Strategy. San Diego and Silicon Valley are central to this agenda.

4.   Throughout the week, members also explored specific emerging science and technology S&T fields, such as:

- artificial intelligence;
- big data analytics;
- super and quantum computing;
- robotics; and
- military and civilian naval, space, and unmanned technologies.

5.   In focus, too, were current challenges, opportunities, and trends arising from a changing cyber environment, including cyber defence and security, combatting extremism online, and the integrity of election infrastructure. Moreover, the delegation used the opportunity to visit military installations in San Diego, the fourth largest US naval base.

II.   DEFENSE INNOVATION

6.   The Alliance faces an increasingly volatile and unsettling international situation with challenges and threats from all strategic directions. More importantly, a changing global S&T landscape also presents new challenges in maintaining the S&T edge: potentially disruptive inventions and innovations are increasingly driven by smaller and more commercially-oriented companies, for example in Silicon Valley, as well as by nations or companies outside the Alliance.

7.   The US Department of Defense (DoD) has launched a number of new initiatives to adapt to changing realities. A key institution in this regard is the Defense Innovation Unit (DIU), which aims to improve relations and exchanges with and access to the commercial technology community.

8.   The first DIU office was established in 2015 in Silicon Valley. Delegates had the chance to discuss with a number of its representatives. In particular, members discussed its engagement with the private sector, maturing and adapting technologies for the DoD, its venture mechanism to bring in commercial technologies into the DoD, and its efforts to make it easier for personnel as well as private sector employees to come in and out of the department.

9.   Equally importantly, members discussed with non-traditional defence companies how they see the defence innovation challenge as they navigate the often complex acquisition business in the Pentagon.

10.   While important differences exist between North America and Europe when it comes to defence R&D, S&T, and innovation, lawmakers could recognise some common lessons and best practices to take home with them.

III.   ARTIFICIAL INTELLIGENCE

11.   Artificial intelligence (AI) and related technologies, such as big data analysis, machine learning, and human-machine teaming, already have a big impact on the defence sector and the armed forces. The delegation thus engaged with some of the top US experts and companies on this topic, which is one of the Committee's key priorities in 2019.

12.   Delegates heard that if current defence R&D projects did not have an AI component, they were probably behind. Indeed, AI would be at the heart of most – if not all – future cutting-edge technologies in the civilian and military world, interlocutors argued.

13.   At Palantir, a big-data analytics company working for civilian and defence customers, the delegation received presentations about the company's Foundry product, a big data tool to increase efficiency of aircraft maintenance across an airline's fleet, and the Gotham and Gaia products, used in the US military for data integration and transformation as well as intelligence purposes.

14.   Already, AI is increasingly fundamental for a range of applications in the civilian world, as the delegation heard at Facebook and Google. At Facebook, AI helps the company automatically detect and neutralise the majority of phishing attacks, attempts at fraud and scam, and malware distribution. Automated software also supports defence against information operations. Today, 99% of the deleted terrorism-related content on Facebook is being taken down thanks to automated detection mechanisms.

15.   Google also invests heavily into AI. the company had developed its recently-launched AI principles on a set of strong ethical first principles. For the company, AI applications should, first and foremost, be developed to be socially beneficial and minimise the risks of harm. These principles led Google to opt out of working with the US Department of Defense for example. Indeed, the question of how much technology companies should engage with the armed forces has become a critical debate in the United States, the delegation learned. Google also explained how they employed AI to combat online radicalism throughout its services, often working with US law enforcement agencies.

16.   The Pentagon's DIU has made AI one of its five pillars of work as it aims to grow the Pentagon's vendor base by attracting non-traditional contractors and to change its capability development processes. For the US military, AI is an instrumental step. For the Pentagon, ethics and safety concern come first, however. Its AI technologies must be robust, reliable, and resilient, and the military must be at the forefront of AI norms building.

17.   Not only is AI central to *future* defence technologies, it can also help to sustain *current* capabilities. For example, the company Uptake saves the US Army around USD 23 million per year on maintenance through a contract for the M2 Bradley infantry fighting vehicle.

IV.   CYBER SECURITY, DEFENCE, AND TRENDS

18.   The Committee has an enduring focus on issues of cyber defence and security and will tackle the subject in a detailed report in 2019. The visit leveraged the enormous cyber experience in both locations to support this work.

19.   In San Diego, the delegation organised a round table on cyber issues, in collaboration with the Armed Forces Communications and Electronics Association (AFCEA), San Diego Cyber Center of Excellence (CCOE) and San Diego Regional Economic Development Corporation (EDC), all not-for-profit organisations. AFCEA provides a forum for military, government and industry communities to collaborate on issues of information technology, communications, and electronics. The CCOE is a non-profit dedicated to accelerating the region's cyber economy and positioning it as a global hub of cyber innovation. The EDC is an organisation with the goal to maximise the region's economic prosperity and global competitiveness.

20.   The round table developed into a lively and wide-ranging conversation between the lawmakers, local government officials, military leaders, experts, and company representatives. Discussions centred on cyber response planning and mitigation through government, industry, academia, law enforcement, and military partnerships, as well as how these partnerships impact economic, technology, and workforce development. Key questions revolved around the need for effective collaboration from the local over the state to the federal level and across the private, academic, and government sector. Citizen responsibility emerged as important too as personal digital cyber hygiene is the foundation of cyber security. Participants also explored the new business opportunities the cyber sector creates, alongside the need to attract and nurture cyber talent at the local level.

21.   At Facebook and Google's headquarters – and shortly before the 2018 US midterm elections – delegates gained insights into their cyber security policies, as they received presentations on cyber security, disinformation campaigns, and the fight against radicalism online.

V.   UNMANNED AERIAL VEHICLES

22.   In San Diego, the delegation visited the headquarters of General Atomics Aeronautical Systems Inc. (GA-ASI) in Poway. With more than 9,200 employees, GA-ASI is a leading manufacturer of unmanned aerial vehicle (UAV) systems, radars, and electro-optic and related mission systems solutions. While GA-ASI has developed 23 variants of UAVs since 1990, its most well-known is Predator family of UAVs, with over 5,2 million flight hours in total.

23.   The delegation received an update on the latest developments within the company, including on its current and future platform offerings and its international programme. Delegates were especially interested increasing the endurance of the platforms, improving maritime capabilities, and new features making UAVs Arctic-capable. Members also had the opportunity for a brief tour of the manufacturing facility.

VI.   SPACE TECHNOLOGY

24.   At Moffett Federal Airfield on the southern shores of San Francisco Bay, delegates visited NASA's Ames Research Center (ARC), one of ten NASA field centres. Since 1939, as one of the first US federal aeronautical laboratories, ARC leads NASA in conducting world-class research and development in aeronautics, exploration technology, and science. About 1,200 civil servants, 1,400 contractors, and 1,600 tenants call ARC their home. Its

current annual budget runs to about USD 918 million. The centre also collaborates with international partners, including NATO Allies.

25.	Delegates received a thorough briefing on ARC's science and technology breakthroughs and the centre's current research priorities. ARC's core competencies today are:

- air traffic management;
- entry systems;
- advanced computing and IT systems;
- intelligent/adaptive systems;
- cost-effective space missions;
- aeronautical sciences, astrobiology and life science; and
- space and earth sciences.

27.	ARC possesses some of the world's most high-tech research facilities to support these competencies. The delegation had the privilege to tour some of these facilities during its stay. This included tours of:

- "Hyperwall" big data visualisation system;
- the supercomputer facilities and the Quantum Artificial Intelligence Laboratory;
- the Unmanned Aerial Systems Traffic Management (UTM) Laboratory;
- the Future Flight Central in the Aerospace Simulation Research and Development Branch; and
- the Robotics/Astrobee facilities.

## VII.	US MILITARY INSTALLATIONS IN SAN DIEGO

28.	In San Diego, delegates had the unique opportunity to step aboard the USS Pinckney (DDG 91), an Arleigh Burke-class guided-missile destroyer and currently part of the Nimitz Carrier Strike Group. Officers and sailors on the Pinckney showcased the capabilities of the destroyer and engaged in discussion on the vessel's recent missions, including its engagement with international partners to ensure maritime security and the free flow of commerce, as well as current naval affairs.

29.	San Diego is also home to the United States' 3rd Fleet. The 3rd Fleet provides the realistic, relevant training necessary for an effective global US Navy and leads naval forces in the Eastern Pacific. The command fosters joint, interagency and international relationships, which strengthens the US ability to respond to crises and protect the collective maritime interests of the US and its allies and partners. Members were briefed on a range of topics falling within the Fleet's purview, including current threats in its area of operations. They were particularly interested in what lessons the 3rd Fleet had for the new 2nd Fleet in Norfolk, Virginia. The 2nd Fleet will play a very similar role in the North Atlantic, where it is a sign for the United States continued commitment to the transatlantic Alliance and a counter to the renewed Russian threat in the North Atlantic.

30.	The delegation also paid a visit to Space and Naval Warfare Systems Center Pacific (SSC Pacific) in San Diego. It provides the US Navy and military with essential capabilities in the areas of command and control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), cyber, and space. A recognised leader in the cyber domain and for autonomous unmanned systems, SSC Pacific is providing the technological and engineering support critical to naval information warfare.

31.   Delegates received a briefing on the future of command and control in the Navy, including how artificial intelligence can support military decision-making in operations. SSC Pacific also showcased select research projects which showcased the wide range of ground-breaking research the institution is engaged in. Members thus had the opportunity to meet and discuss with the scientist who work on these issues.

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OVERVIEW OF INTERLOCUTORS

<u>Companies</u>

- Booz Allen Hamilton
- Facebook
- FICO
- General Atomics Aeronautical Systems (GA-ASI)
- Google
- Palantir Technologies
- Qualcomm
- Sentek
- Uptake
- Xsite

<u>Department of Defense</u>

- Defense Innovation Unit (DIU)
- Space and Naval Warfare Systems Centre Pacific (SSCPAC)
- Space and Naval Warfare Systems Command (SPAWAR)
- US 3rd Fleet

<u>Government</u>

- NASA Ames Research Centre (ARC)
- San Diego Office of Homeland Security

<u>Not-for-Profit Organisations</u>

- Armed Forces Communications and Electronics Association (AFCEA)
- Business Executives in National Security (BENS)
- San Diego Cyber Centre of Excellence (CCOE)
- San Diego Regional Economic Development Corporation (EDC)

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