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If you are not a member of the NCI Agency, but would like to receive a printed version of our Communicator magazine, please let us know at: communication@ncia.nato.int

CORE STRENGTH



The Agency holds

a significant number of records and prizes.

Just recently, one of our staff took top prize in a prestigious (ethical) hacking competition. But I was also pleased to hear that we hold a different kind of record. An Agency employee (not the same one) apparently holds NATO's unofficial record for the 'plank', a popular core training exercise.

As a former Olympic athlete, I welcome the fact that fitness trends like the plank get more people to challenge themselves. I particularly enjoy the quote by Jerry Rice, an icon of American football, which is embraced by the sports community: "Today I will do what others won't, so tomorrow I can accomplish what others can't."

This quote is very applicable to what the Agency does every day. In partnership with companies from across the Alliance, our customers and the budget authorities, we are innovating today, so that NATO's IT won't break tomorrow.

The threat is real. The number of cyber incidents on NATO networks is up by 60% over last year. At the same time, more is being asked of our IT systems. NATO networks now connect NATO's ballistic missile defence shield, they allow rapid consultation with the NATO Force Integration Units. Soon, the Alliance Ground Surveillance system will be coming online and processing huge amounts of data. Ambassadors and military commanders will benefit from extensive information to aid rapid decision-making.

In step with our soldiers

In this magazine, the team behind the Electronic Definitive Media Library talks about how we will be implementing a new model for sharing software developed for NATO and its Nations, in order to leverage those investments. In 2017, we will be further reducing the cost of IT to NATO, as part of a major efficiency drive.

You will also see how Agency staff stand in lockstep with the operational community – delivering a rapid technological upgrade that allowed NATO's AWACS planes to support the Global Coalition to Counter ISIL (Islamic State of Iraq and the Levant). We also supported NATO on land, at sea and in the new domain – cyberspace.

Last, but certainly not least, in our series of high profile interviews, NATO's Supreme Allied Commander Transformation shares his vision of an adaptable Alliance which can stand up to any challenge. In a similar vein, our Technology Watch column discusses current trends and their potential impact on future NATO IT.

It is normal for priorities to shift as the security landscape changes. Last year, we delivered a number of critical capabilities for the Warsaw Summit. Now other challenges loom. NATO IT cannot break. Lives depend on it. Like with Jerry Rice and many athletes, the Alliance's core strength comes from a mindset – anticipating tomorrow's challenges - that is determined to push the boundaries of what appears to be possible today.



Koen Gijsbers, General Manager

Telemedicine:

How digital technology is saving lives

Over 50 miners are trapped underground after a sulphur mine collapsed in western Ukraine. At least five of the miners have suffered severe burns as a result of the accident which took place this morning at 5am, close to Yavoriv, a town near the Polish border. Dozens of people were also injured as a gas explosion in the mine, 300 metres below ground, triggered earth tremors which destroyed nearby buildings and roads. Emergency services fear further casualties as it is believed the quake may have caused a chemical leak when it hit nearby factories.

Ukrainian authorities have now called for assistance with disaster relief efforts.

Life and death



The events mentioned above did not take place. They were part of a simulated exercise testing NATO's new Multinational Telemedicine System, a project partly developed by the NCI Agency which was completed in early 2017. While this scenario was fictional, the challenges it posed were very real.

In crisis situations, immediate access to advanced medical care can mean the difference between life and death.

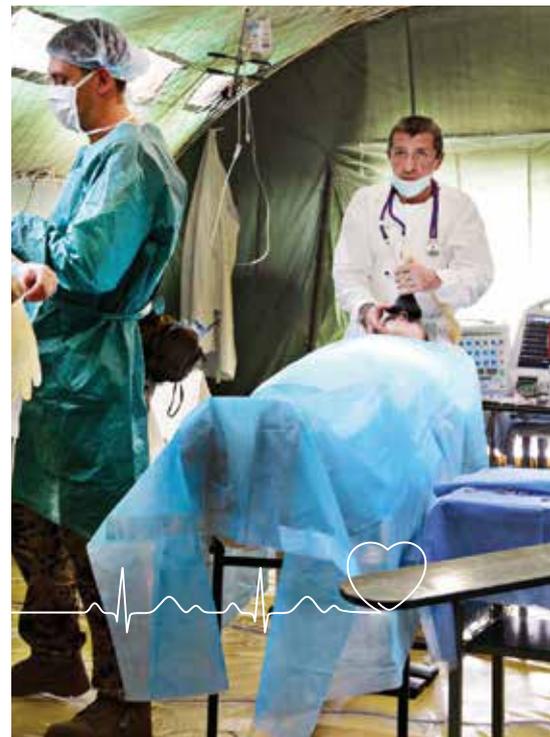
Unfortunately, medical specialists are not always available to treat casualties on site. Victims must thus rely on rescue workers or paramedics and the one of the only tools at their disposal – telemedicine. Telemedicine allows rescuers to contact doctors thousands of kilometres away, inform them of a patient's condition, and seek their advice on how best to treat them.

The information can be transmitted securely within a matter of seconds.

"In the event of a disaster, telemedicine can enable physicians, located in different parts of the world, the ability to provide healthcare services remotely, to those individuals in disaster zone," explained Ambassador Sorin Ducaru, NATO Assistant Secretary General for Emerging Security Challenges.

"Telemedicine can make a huge difference for a wounded person, allowing fast connectivity with high level medical expertise in the 'golden hour' between life and potential death.





I understood the meaning of this 'golden hour' during my missions with the North Atlantic Council to Afghanistan and other operational theatres, and consider telemedicine as a huge enabler for emergency response for victims of natural disasters or military conflicts."

Vital information sharing

In 2012, the NATO – Russia Council initiated a telemedicine project which was funded by NATO's Science for Peace and Security (SPS) Programme. Although Russia was involved initially, it was decided in 2014 that the Multinational Telemedicine System (MnTS) would be led by scientists and experts from NATO Allies Romania and the United States and Partner countries Finland, Moldova and Ukraine. Participating Nations and the Science for Peace and Security Programme contributed a total of 2 million EUR to the project, including 180,000 EUR which covered the cost of the support provided by the NATO Communications and Information Agency. The Agency was responsible for multiple aspects of the system. It created content, provided subject matter expertise, worked on the system's communications technologies and assumed the role of project coordinator.

As part of the project, the team had to decide which crucial information – or bio-signals - would need to be shared with

'long-distance doctors', the physicians providing medical expertise remotely. The team chose to include what is called the minimum viable dataset, namely: body temperature; heart rate; respiratory rate; blood pressure; additional signs such as any pain; a patient's level of consciousness; blood oxygen and glucose levels; gait speed; shortness of breath and functional capacity.

This led them to develop a software platform allowing all these details to be transmitted from a portable medical kit to a remote hub via satellite link or mobile network. *"One of the most serious problems experienced during disaster events is the lack of appropriate means to communicate efficiently, to collect, process, and transmit important information in the midst of the disaster,"* commented Filip Hostiu, NCI Agency Senior Engineer, Command and Control Services.

Increasing survival rates

"Mortality rates can be reduced if information exchange is reliable, fast and accurate, so establishing rapid and reliable telecommunications systems specifically directed toward the disaster medical field is one of the most important challenges," Mr Hostiu added.

"During a disaster, communication may be congested or overloaded and the local administration may be damaged or not

properly equipped to make contact with neighbouring areas to request help. Therefore, emergency communications systems, including contingency systems, should be quickly prepared and installed in areas where terrestrial communications lines or systems are unreliable, damaged, or non-existent."

The team also had to take into account any potential legal or language issues that may arise during emergency situations to ensure that telemedicine could be deployed.

After two years of development, NATO's Multinational Telemedicine System was tested live successfully in two of the Alliance's exercises, in 2015 in Ukraine and in 2016 in Montenegro. The Science for Peace and Security Programme Conference marked the completion of the project on 24 February 2017.

It has been suggested that this system could be used in the future by NATO in partnership with other organizations such as the European Union, the United Nations or the World Health Organization to provide humanitarian relief. Ambassador Ducaru remarked: *"[This] system can improve access to health services and increase survival rates in emergency situations that spans both geography and time zones."*

By Adelina Campos de Carvalho,
Creative Media Centre



NATO, innovation and Industry partnerships



An interview with Ambassador Kerry Buck

Permanent Representative of Canada to the North Atlantic Council

Fast-moving security challenges and rapid technology design in the private sector call for NCI Agency and Industry partners to work together in new ways in order to keep the Alliance's critical communications and information systems resilient. From 24 to 26 April in Ottawa, Canada, the Agency will explore new models for NATO-Industry collaboration and how they can be put into practice through its annual flagship conference, NITEC17, with the theme of 'Sharpening NATO's Technological Edge: Adaptive Partnerships and the Innovative Power of Alliance Industry.

As Canada prepares to host NITEC17, Ambassador Kerry Buck, Permanent Representative of Canada to NATO, discussed the importance of innovation for NATO, the role of Industry in supporting NATO's innovation agenda, and Canada's national innovation strategy. Read on for Ambassador Buck's thoughts on why procurement processes should consider multinational solutions, what NATO could learn from Canada's Defence Acquisition Guide, and more.

The 2016 Warsaw Summit Communique reinforced the imperative of supporting innovation through greater collaboration with Industry, emphasizing that to keep its technological edge, NATO should identify relevant emerging technologies in the commercial sector and implement them through innovative solutions. How will these efforts impact NATO's overarching mission?

The relationship with our defence Industry, throughout the Alliance, is vital in order to keep our technological edge. The NATO Communications and Information Agency plays an important role in that area by supporting innovation, evaluating products and implementing innovative solutions. In Warsaw, leaders also talked about greater defence industrial and technological cooperation across the Alliance, building relationships and partnerships toward a

common goal. Our efforts to be more innovative have had, and continue to have, an overall positive impact on NATO. Embracing innovation through increased collaboration with our Industries, in order to acquire and adopt emerging technologies, strengthens our capabilities. NATO standing forces draw upon the military expertise and capabilities of our Member Nations. Implementing emerging technologies helps ensure they are kept well equipped, well resourced and well trained in order to meet their objectives, whether engaged in crisis management, cooperative security or deterrence.

In my view, NATO is doing a good job of collaborating with Industry and we are always working to improve that relationship. Take for example the NATO Industrial Advisory Group, that has Industry experts from each of our Nations and Partner Nations advising the



NCI Agency Industry Conference and AFCEA TechNet International

Conference of National Armaments Directors. This is an important function for Industry inside NATO. There is the annual NATO Industry Forum, hosted by the Commander Supreme Allied Command Transformation and the Assistant Secretary General Defence Investment, where we can engage in high-level exchange with Industry leaders. Our procurement agencies hold annual Industry conferences that present upcoming business opportunities and I understand NITEC17 will once again include an innovation challenge. In addition, Industry has been invited to participate in NATO's Trident Juncture and Coalition Warrior interoperability Exercises. Partnerships with Research and Development (R&D) facilities are also important. In Canada, for example, the National Research Council (NRC) and Defence Research and Development Canada (DRDC) are carrying out leading-edge work involving Industry and academia, in collaboration with the Canadian Armed Forces to bring innovative technology to our military personnel. I should add that DRDC is also well connected with NATO's Science and Technology Organization. This industrial and technological cooperation across the Alliance allows us to benefit collectively.

Implementing innovative solutions responds to the challenge of operationalizing new technologies. This involves R&D and Industry, as well as acquiring these technologies through our procurement processes. Best value procurement has been a positive step forward in that regard, putting greater emphasis on the technical aspect rather than price alone. However, we need to be faster at implementing new capabilities and that is an area of focus not only at NATO but in our Nations as well. Innovative acquisition is our challenge and I am confident we will see progress in this area.

In previous interviews, you have indicated that diplomacy itself is in need of innovation, as the highly 'networked' world we now live in calls for new forms of engagement beyond traditional state-to-state relationships. How might efforts to improve NATO-Industry collaboration be part of an expanded approach to modern diplomacy?

In 2013, the North Atlantic Council approved the Framework for NATO-Industry Engagement, an important document that speaks to the principles of NATO-Industry relations and the many avenues for those relations. Universal principles such as trust and transparency, fairness and inclusiveness, mutual benefit and cooperation, are fundamental to building strong relationships.

The Framework also highlights two initiatives, the Smart Defence and Connected Forces initiatives, which aim to generate

opportunities for multinational cooperation where Industry can play a major role. It is this multinational cooperation and the universal principles mentioned above that bring our discussion in line with modern diplomacy.

Improving NATO-Industry collaboration, by being more transparent and inclusive, would enable Industry to bring forward better informed solutions. This could in turn lead to NATO's needs and priorities being better served. After all, innovation occurs in the commercial sector and harnessing the benefits of innovation can help achieve our common objectives and strengthen our relationships, not just on a bilateral but also a multilateral level.

Today, our NATO procurement process does not place value on bids from Industry that propose a multinational solution and perhaps it should. Encouraging multilateral Industry collaboration could support multilateral relationships and cooperation. Another potential area for consideration is the many Nations in NATO that are less active in NATO procurement or the defence Industry in general. Perhaps, we should look at how we acquire capability to strengthen the defence industrial base throughout NATO and the Alliance's overall capacity.

Canada is pursuing an ambitious national innovation agenda. How does that strategy impact defence organizations in Canada and their relationships with Industry? Are there lessons for NATO?

The Government of Canada has a vision to build Canada as a centre for global innovation. The Innovation Agenda, led by our Minister of Innovation, Science and Economic Development, touches all federal government departments, including Defence. It consists of six key themes: entrepreneurial and creative society; global science excellence; world-leading clusters and partnerships; growing companies and accelerating clean growth; competing in a digital world; and ease of doing business.

Regarding Canada's approach to innovation, we have developed key national strategies that move us forward in science, technology and innovation, and other areas. We have put in place an economic action plan and have built science and technology partnerships with established and emerging innovation networks around the world. Partnerships are an essential catalyst for innovation because these collaborations accelerate the pace of discovery and adoption of new products.

Canada puts considerable emphasis on supporting Industry and academic partnerships, it has undertaken government-based R&D work, and is investing to support and encourage private sector investment in innovation. The Government of Canada continues to invest significant resources into ensuring that Canada retains its place as a global leader in science, technology, and innovation.

Defence procurement creates conditions that encourage Canadian companies to innovate in order to improve upon existing products and technologies, as well as develop new ones, to serve domestic and international markets. It is important to nurture the relationship between defence and Industry so that the customer and provider are on the same page and capability demands are met. Ultimately, our defence organizations benefit from these relationships with Industry and partnerships with innovation networks.

It is important to keep our defence Industry well informed about what we are doing and our capability needs. Take for example Canada's Defence Acquisition Guide, which is updated annually and available on the Internet. All of Canada's Defence programmes and projects are described in terms of requirements, budget estimate, timeline and point of contact for additional information. Canadian Industry called for that information and the government responded. Perhaps NATO could do the same with the capability packages. We want Industry to be engaged early, to allow it to deliver the best it has to offer and the innovative solutions we need.

Canada is the Host Nation for the NCI Agency annual conference, NITEC17, from 24 to 26 April in Ottawa. The conference theme is focused on innovation. Can you give us a preview of the themes conference goers might expect to hear from Canadian Defence officials?

Canada is pleased to host NITEC17 in our Nation's capital, the city of Ottawa, from 24 to 26 April. Similar to previous conferences, NITEC17 will present substantial NATO business opportunities to high tech companies attending and will offer participants an excellent networking opportunity. This is a great event for Industry.

I should also add that 2017 is a special year for Canada; it is our Nation's 150th anniversary. The city of Ottawa is ready to host the world, so come and join us for NITEC17 and experience not only a fantastic conference but also a fantastic 150th birthday celebration.

Themes that conference goers might expect to hear about from Canadian Defence officials include: the transatlantic bond between Europe and North America, which remains at the core of the Alliance; the security and defence advantage

gained through innovation; the vital relationship with Industry in advancing innovation; and finally, the importance of partnerships between government, Industry, academia and international partners.

With Industry from throughout NATO converging in Canada to attend NITEC17, let me say a few words about Canada's defence and ICT sectors that will be represented there and about doing business in Canada.

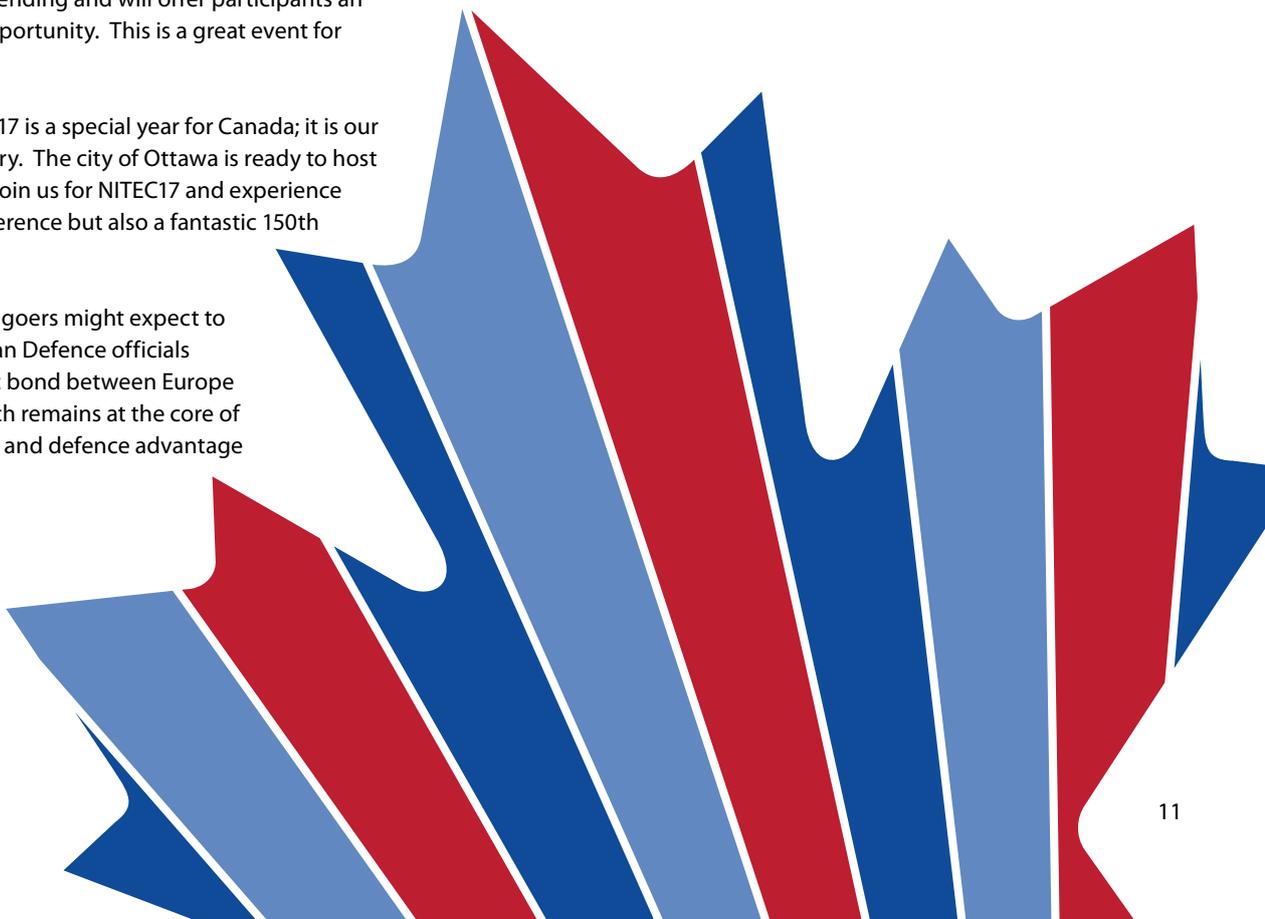
You may be interested to know that Canada's defence sector represents about 700 firms doing approximately 10 billion CAD (7.5 billion USD or 7 billion EUR) per year in sales with activities spanning the full range of defence. Our ICT sector generated revenues of 172 billion CAD (129 billion USD or 121 billion EUR) in 2015 from 37,400 companies. As I have already mentioned, Canada has an assertive innovation agenda. Our high tech sector is highly innovative and we are open for business with Industry from likeminded NATO Nations. Canada offers a competitive environment for investment, innovation, production and trade. We have a competitive tax regime; an open trading economy; integrated infrastructure and proximity to the US market; strong technical education; a skilled workforce; good R&D support infrastructure; and supportive government policies.

Visiting companies are welcome and encouraged to connect and partner with Canadian companies in pursuit of not only NATO business opportunities, but also North American defence and ICT business opportunities.

Come to NITEC17 and let's talk.

To view the full agenda for NITEC17, visit www.nitec.nato.int.

Interview by Jill O'Donnell, Industry Relations



Cognitive Computing: The rise of the smart machine

For decades, results of Artificial Intelligence (AI) research remained relatively unimpressive. But the creation of viable AI products, and this technology becoming more mainstream have changed the way we look at smart machines. We've seen the headlines: Deep Blue, IBM's supercomputer, defeats chess champion Garry Kasparov – 1997; IBM's supercomputer Watson trounces its two competitors on television – 2011; Google's AlphaGo beats Go master Lee Se-dol – 2016. This technology is definitely arriving in a hurry. And if predictions on the rate of adoption over the next few years are accurate, this will transform our lives in many profound ways.

Today

20%

of Google searches on Android in the US are now done by voice

25%

of Cortana searches on the Windows taskbar are also done by voice.

65%

of smartphone owners already use voice assistants on their phone



This article will present a definition of Artificial Intelligence or Cognitive Computing (CC) as it is better known today, and some categories of current applications of the technology. It will also suggest how the technology might affect the defence business, either benefiting our communities or threatening them.

What is Cognitive Computing?

There are no agreed definitions of CC; however, we can identify the following commonly acknowledged characteristics:

1. Natural Language Processing – The machine should be able to understand everyday languages, in the spoken or written form. This means that the user does not interact with it using special ‘programming languages’ or even menus with finite choices. The machine is able to deal with data that does not possess any predefined structure.

2. Machine Learning / Deep Learning – Normally machines are programmed by experts, using programming languages which command the machine to behave in specific ways. A CC machine is rather programmed in a manner similar to a human being, it learns based on its experiences.

3. Perception – The machine needs to be able to take into account its changing environment. It has sensors that extract information which it uses to learn and make decisions. These might include: sight, sound, speed, temperature, network probes, etc.

4. Mimics Human Abilities – The machine behaves in ways similar to a human. It does not have a predefined set of rules which it applies to a problem, but rather it reasons, defines hypotheses, and makes recommendations as to appropriate courses of action. This can lead to unanticipated and novel results.

Predictions

30%

of our interactions with technology will be through ‘conversations’ with smart machines by 2018

More than
50%

of the Tier 1 support services at government contact centres will be provided by virtual personal assistants by 2018

More than
50%

of enterprise software products will include some Conversational AI-rich capabilities by 2018

Categories

This categorization of Cognitive Computing is intended to discuss the types of applications of this technology which are being made today and in the near future.

1. Category 1 – Intelligent Personal Assistants. We have all used Cortana, Siri or Google Assistant on our mobile phones to ask questions, play our favourite tunes, or switch on our household lights. These are much more than voice recognition applications as they are connected to other applications and respond to our commands.

2. Category 2 – Specialized Applications. This category consists of specialized, and somewhat limited applications, designed to solve particular problems. One interesting example is x.ai's Amy, an application designed to schedule meetings for you. Once you've indicated the meeting's participants, it searches all their calendars to find a slot when everyone is available.

3. Category 3 – Intelligent Agents. These applications use cognitive technologies to replace people, carrying out repetitive low to medium skill jobs. Examples include ipSoft's Amelia, a cognitive agent that replaces / augments call centres and is able to answer calls, diagnose problems, resolve issues or escalate the call to the next support level. Amelia communicates using everyday languages, works 24/7, senses the emotional state of the caller, and can even help defuse a situation.

4. Category 4 – Platforms. While many companies are working with the technology to build applications to solve a narrow class of problems, others are working to create general-purpose cognitive platforms that can be used to build solutions to a wide range of problems. This includes, among others IBM's Watson. Applications such as GoMoment's Ivy have been built on top of Watson to satisfy a particular need – in this case, a 24-hour hotel concierge service.

5. Category 5 – Robotic Agents. This is an exciting, rapidly developing category that is likely to have a very profound effect on our lives in coming years. It differs from Category 3: Intelligent Agents, as it mixes CC with a physical presence and mobility. Self-driving cars will soon be on our roads, there are hotels in Japan where everything from the concierge to the bell boy are robots, reducing labour costs by around 75%.

So What?

Opportunities. It is likely that we will see the introduction of these technologies into NATO systems in the coming five years. Some Nations are already using cognitive technologies for specialized analysis, particularly in the intelligence world or to supplement call centre staff.

One of the first areas we might see adoption is in the Centralized Service Desk (CSD) type of applications. Using technology that is available today, we can provide a 24/7 service that can resolve perhaps 50% of help tickets. This is in line with what is reported by large banks and other institutions that have adopted this technology. This can save money and increase service levels.

Cognitive technologies are very good at analysing large amounts of data and identifying anomalies. In our world, this could include automated extraction of intelligence data from video imagery, pattern analysis of maritime traffic looking for unusual behaviour – perhaps indicating smuggling or piracy – or looking for patterns of behaviour which could help identify insider threats.

Another area where we see this technology being adopted in the short term is in healthcare. These tools can be used to assist in a diagnosis, reducing the possibility that overworked or fatigued doctors might overlook symptoms. A doctor will still be involved, but as a tool assisting the doctor to make better diagnoses, this technology has great potential. We may see this in our medical applications and field hospitals.

Threats. As smart machines become increasingly capable, they will become viable alternatives to human workers under certain circumstances, leading to what has come to be known as 'Virtual Talent'. This is likely to have a profound impact on the labour market. This may lead to a utopic society where robots do all the work and we enjoy much more leisure time. However, it is equally likely to lead to high rates of unemployment and unrest. This may create tensions in societies affecting our business.

"A super intelligent AI will be extremely good at accomplishing its goals, and if those goals aren't aligned with ours, we're in trouble."

- Stephen Hawking



We also have seen new types of cyber threats emerge as these technologies have proliferated. Because they learn from their experiences, they can be taught bad behaviours as well as good. There was a recent case where Microsoft released a 'chatbot' via Twitter named Tay that could reply to simple text exchanges in an intelligent way, providing a virtual friend. Within 24 hours of its launch, people had taught Tay behaviours associated with the Nazi regime and so it was decommissioned by Microsoft.

Well-respected scientists and Industry leaders are cautiously warning about the potential negative impacts of these technologies, prophesizing a danger to our very existence. As machines get smarter and more independent, it is possible that they will start to make decisions and take actions that are not to our advantage. Industry leaders such as Elon Musk are suggesting that there should be some sort of regulation of this technology to ensure it benefits mankind.

Conclusions. Cognitive Computing is advancing rapidly and will affect us in many predictable and unpredictable ways. This advance cannot be stopped so we must be ready for it - either to adopt it to our advantage or to be prepared to defend ourselves against it. With the open sourcing of Google's TensorFlow, this technology is within everyone's reach – for good or bad.

By Peter Lenk, Service Strategy

Leveraging a precious legacy



Each year, the Alliance invests several hundred million Euros in advanced software to support coalition operations. By nature, this software is 'born interoperable' and designed to help Nations operate together. More importantly, it is combat-proven, a direct legacy of operations in Afghanistan, Libya and the Balkans. An innovative project, with an aptly cryptic technical name (Electronic Definitive Media Library), now makes this software much more easily accessible to Nations interested in re-using it for national use. The project led to the creation of a 'NATO app store'.

Why pay twice?

Several Nations, including the United Kingdom and the Netherlands, have already made a policy to re-use existing NATO solutions to save on national investments while at the same time ensuring interoperability with NATO systems. The solutions are also available to NATO Partner countries. The NATO Software Tools (NST) initiative covers 19 NATO software tools that can be used for free by NATO Nations for testing, evaluation and operational purposes. Consequently, 25 NATO Nations, six NATO Response Force units, US Army Europe and US Special Operations Command Europe have signed a licence agreement with the NCI Agency for the delivery of the NST.

"For some NATO Nations, the fighting in Afghanistan, for instance, in terms of the number of casualties or rounds fired, was the most intense land fighting since the Korean War," stressed Koen Gijsbers, NCI Agency General Manager. *"Afghanistan was perhaps the single biggest breakthrough for Alliance interoperability, how we can operate effectively as a coalition in terms of sharing information. That is a precious legacy that we need to preserve."* The Electronic Definitive Media Library now provides a secure one-stop shop for NATO software, accessible from anywhere in the world. It offers a number of specific benefits including user registration and controlled user access, public key encryption and access login and auditing.

Better support to Agency customers

The project, completed on schedule, was initiated by the Service Engineering and Architecture branch of the Agency's Service Strategy directorate with the support from Demand Management, Service Support and Business Application, as well as the Service Management and Control team. It was sponsored by the Command

and Control Service Line Chief. *"Our mission was to replace a manual software delivery process - costly and slow in terms of resources and performance - with a modern toolset providing fast and reliable services to a constantly growing customer base,"* said Mariano Valle, NCI Agency Senior Architect, Service Strategy. The service is now up and running, and has already been used to distribute NATO software to NATO Enterprise units, Nations and Partners. It is also used to support operations such as patch management, and NATO Response Force exercises.

Speeding delivery, fast project

In developing the project, the Agency focused on agile development, minimizing costs. The project is another step forward in NATO embracing the creative use of cloud solutions. The EDML is implemented in the public cloud and Agile (SCRUM) development based on three iterative Sprints with DevOps tools and best practices in line with the "Cloud First" approach stemming from the NATO Cloud Computing Policy. Introducing public cloud technologies is breaking new ground for the NCI Agency and NATO, resulting in policy and procedures being adapted.

By the Electronic Definitive Media Library team

For more information, contact the NCI Agency POC

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Clear communication essential to success

Justin 'Tom' Unthank, Project Manager for the NCI Agency's Network Services and IT Infrastructure Service Line, was recently responsible for delivering the connectivity of five out of eight NATO Force Integration Units (NFIUs) in record time. In this article, he talks about getting the job done under tight deadlines, with the help of participating Nations.

Justin began managing communications and information systems (CIS) projects long before he was recruited by the NCI Agency. Prior to his current role, he served 24 years in the British Royal Corps of Signals, sometimes in operational theatre. In 2012 for example, Justin worked as Technical Project Manager delivering Intelligence, Surveillance, Target, Acquisition and Reconnaissance (ISTAR) capability to 72 locations across the Helmand province, in southern Afghanistan.

When asked about the difference between managing projects for the military and managing them for the Agency, Justin explained that Agency project management is very much in line with the defence sector as they both involve dealing with Urgent Operational Requirements.

"They [the requirements] need to be delivered very quickly, and without fuss. In the military, you have very clear chains of command through which decisions are pushed through rapidly and uniformly. In a customer-funded Agency, stakeholder and customer management together with clear and simple communication skills are vital mechanisms for success," Justin said.

Every project has a carefully planned timeline, group of stakeholders and budget. Nevertheless, when carrying out the plans, there is always an element of surprise, even for the project manager. *"This is where the Project Manager really earns his or her salt! We had many instances such as these during the installation phases of the NFIU project."*

Justin recalled one of many emergency situations which was solved by great teamwork: *"On the third day of the installation of NFIU Slovakia, we visited both ends of the network, only to find that nothing worked! We chose not to panic, tested our equipment but everything looked in good order. Some minor changes were made but there was still no connection. This is when stress levels in the technical team started to rise, but we still did not panic."*

After thorough testing by the service provider and by our team, who spent a day and night troubleshooting, plan B seemed to get closer and closer and with the clock ticking, it was looking increasingly uncertain that we would succeed in the allotted timeframe. But we eventually found a glitch in the service provider's network. It was as if a huge weight had fallen off our chests – the sun was shining again. After losing a day and a half with troubleshooting, we did what we're good at – we rolled

up our sleeves and got back to work as quickly as possible to stick with the original plan and finish on time!"

The NFIU project stretches over the whole eastern part of Europe. This sort of scope comes with complications, and delivering the NFIUs all the way from Brussels may have seemed complicated, if not impossible. In order to deliver the project successfully, Justin said he made sure to get personally involved, travelling to the various sites as often as needed, so as to have a better understanding of the customers' requirements.

"For me, the best results are achieved most effectively when requirements are discussed face-to-face. Sure enough, highly detailed and accurate project documentation sets are key for delivery, but I find that customers appreciate a more human approach. If you're present on site, you can manage tasks and resources firsthand. You have to speak a language people understand, and make sure your message and directions are received clearly."

This level of personal involvement and the number of NFIU locations meant managing the project required a lot of travel. While this sort of commitment might not suit everyone, it was part of the job's appeal for Justin: *"The main elements that attracted me to the project were the opportunity to travel and meet people, as well as being able to engage with them."*

And what happens to a project manager when his project has come to an end? A well-deserved rest and a lot of self-reflection, before looking for new projects to lead. *"During the project delivery phase, I would self-reflect on key points and ask myself: 'Did that go well?' or 'Could I have done anything differently?' I would recollect all the problems and challenges I had to solve and think: 'What would have happened if I hadn't been there to deal with those issues?' So, in the end, feeling accomplished, feeling that I largely contributed to solving an 'unsolvable' problem is what really counts. Now that my involvement with the NFIU project has all but come to an end, I have a number of new projects and activities for which I fully intend to deliver the same level of service. I will become the Change Project Manager for the Kosovo Force's Operations and Maintenance services, and who knows, maybe I'll be working on the NFIUs again,"* Justin said.

By Livia Jusztin-Majercsik, Chief Strategy Office

Connecting NATO's deployed forces by satellite

Construction of satellite hubs, which will provide critical connectivity to NATO's deployed forces, is underway. The development of two Satellite Ground Stations (SGSs) in Kester, Belgium and Lughezzano, Italy, is being undertaken by the NCI Agency and Industry partners.

The stations are being built on the sites of existing Satellite Ground Terminals (SGTs), and will connect deployed forces to the Commands, supporting operations such as Sea Guardian, which helps stem the flow of human trafficking in the Aegean Sea.

The SGS project is not only procuring multiple antennas for the sites, it will also improve physical security and replace key site facilities, such as standby generators. Additionally, it will upgrade two further stations in Greece and Turkey, and provide options for industrial support arrangement for the resulting capability for 20 years.

The Lughezzano station was originally part of a complex comprising more than 20 stations, spread across NATO territory. These original stations were built in the 1970s and 1980s primarily to provide resilient consultation capabilities between NATO Nations.

In the 1990s, the end of the Cold War changed the geopolitical landscape and led to awareness of the need for greater flexibility. This was formalized following the NATO Washington Summit in 1999 with a reorientation towards greater mobility and

requirements to support command and control for deployed operations. It soon became apparent that a widely-distributed network of satellite communications (SATCOM) sites was not suited to these new requirements. Meanwhile, increasing pressure on Operations and Maintenance (O&M) budgets and personnel costs pushed for rationalization, which could be delivered by new technologies.

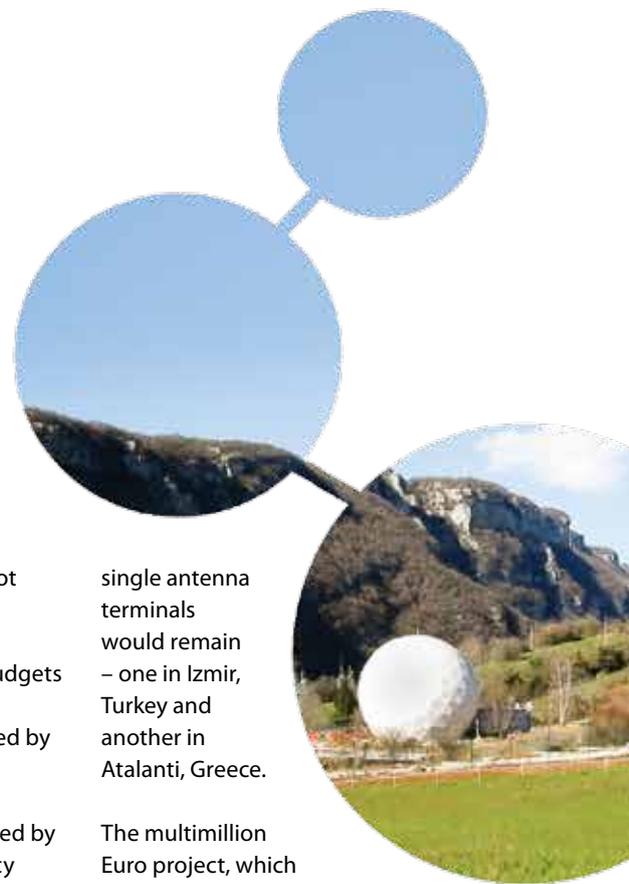
As a result, static networks were replaced by deployable systems and the NCI Agency produced a new generation of Transportable Satellite Ground Terminals (TSGT), ready to deploy within short notice. However, these terminals have to be linked to fixed stations exploiting new technologies, in order to connect all of the Alliance's assets in the air, sea and on the ground.

Enabling rapid deployment

After a feasibility study, the Military Committee selected two 'hub' stations among all the terminals - Kester and Lughezzano. It was also decided that two

single antenna terminals would remain – one in Izmir, Turkey and another in Atalanti, Greece.

The multimillion Euro project, which was developed with the assistance of the Territorial Host Nations, was then put out to tender. Leonardo MW Ltd (formerly SELEX ES Ltd) was appointed as the prime contractor for the work, selecting partners such as Telespazio, ViaSat, Saint-Gobain, Siemens, Ausonia along with other local contractors to conduct the work. Although the individual solutions are unique to each site, the general approach divides work into separate phases: civil works buildings, physical security elements, new antenna bases, facilities (such as power distribution), CIS installation and, finally, a test and acceptance phase.





Later this year, the NCI Agency will be competing a major contract, worth some 1.5 billion EUR for satellite bandwidth capacity, as well as a 200 million EUR contract for satellite terminals to support NATO's Response Force, designed to deploy anywhere in the world at short notice.

"We have a static infrastructure that provides connectivity to our Commands throughout

NATO, located throughout our 28 nations. That static piece is one we sustain from day to day, and an important piece of that static communications is satellite. Deployments for operations have become a somewhat primary use of satellite communications for NATO.

We depend on Industry heavily. Of course, we do have our ability from a ground infrastructure perspective to allocate bandwidth and do the separations that are necessary to get our abilities to deployed forces," said Dr Gregory Edwards, Director of Infrastructure Services at the NCI Agency about the importance of satellite capabilities for NATO.

*By Luca Campanile,
Satellite Ground Station F14 Lughezzano.*

EYES ON ISIL



It is important that the NCI Agency moves as rapidly as the Alliance's operations demand. It is a badge of honour that our staff has directly supported every single operation and mission NATO has ever conducted. Therefore, it comes as no surprise that when NATO's 'Eye in the Sky', the AWACS (Airborne Warning and Control System) aircraft were sent to boost the Global Coalition to counter the so-called Islamic State of Iraq and the Levant (ISIL), NCI Agency services played a critical role. Thanks to technology and support provided by the Agency, NATO's AWACS aircraft can provide forces with an overall picture of the airspace over Iraq and Syria, making the skies safer. This picture is put together by flying over Turkey, a NATO ally, as the AWACS' sensors can detect activity hundreds of kilometres away from their location.



Shoulder to shoulder

Matt Roper, Chief of Joint Intelligence, Surveillance and Reconnaissance (JISR) Services for the NCI Agency, explained how his team is constantly enhancing the technology provided to the AWACS so they can be deployed whenever they are needed.

"The NATO AEW&C [NATO Airborne Early Warning and Control] Force, which operates the E-3A AWACS, has continuously used our services for over 30 years. They come to us when they feel they have a shortfall, a deficit or an emerging requirement, to help them continue to deliver their mission effectiveness.

We're in very close partnership with the NAEW&C force, we operate as a joint team that brings together the best of the competencies across the Agency, integrated with the customer team, with the users, the aviators at the Geilenkirchen airbase in Germany and their command headquarters.

Probably one of the most recent and relevant examples of our support is where we've worked with the force to provide them with an airborne IP (internet protocol) chat capability. In other words, the ability for mission operators on board the aircraft to engage within the command and control (C2) architecture, using airborne chat in a similar way as you and I may chat with one another using our mobile devices.

However, putting the equipment for this kind of capability onto an airborne platform posed a real challenge due to the need to meet stringent airworthiness requirements and information security protocols."

A different kind of chat

The airborne IP chat capability was first developed to facilitate participation of the NAEW&C Force in the Alliance mission in Afghanistan from 2011 to 2014. Since then, the Agency has continued to update the capability, to keep it as operationally effective and secure as possible. These efforts have also ensured the AWACS could contribute to the Coalition's efforts to counter-ISIL.

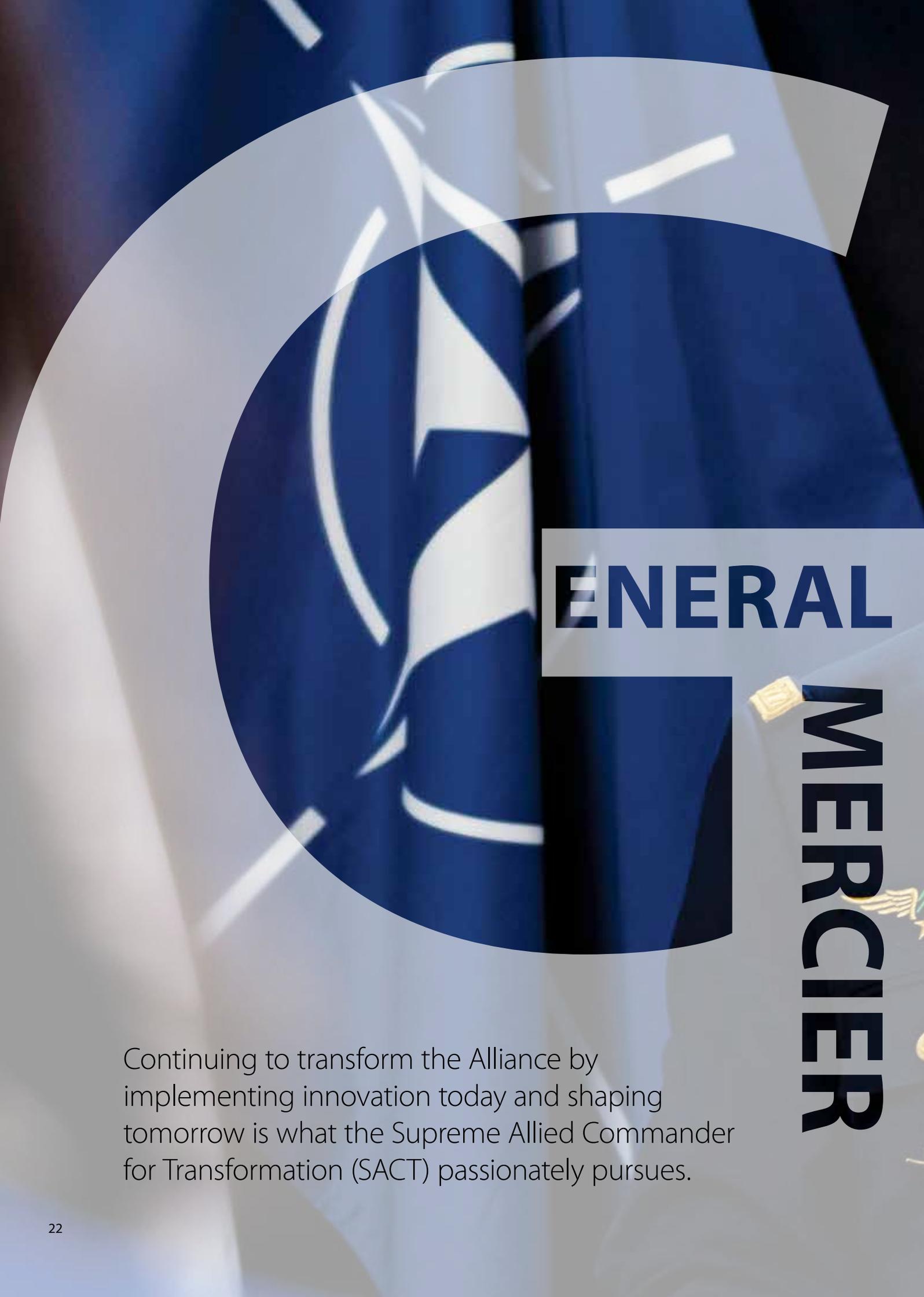
"The airborne chat capability was an important entry ticket for the NAEW&C Force to get into the mission in Afghanistan, as the theatre commander required all key command and control assets to be able to coordinate within a common communications environment. Essentially, he said: 'Unless you can get into the IP chat network, then don't come, because you won't be able to communicate with us'. It's the same now with their latest operation - in order to add real operational value, the AWACS must be able to share timely and accurate information collected with other players in the landscape," Mr Roper noted.

The AWACS do not coordinate Coalition air strikes or provide command and control for fighter aircraft. However, their surveillance function can make a huge difference to operations. Air Commodore Paddy Teakle, Deputy Commander, NATO AEW&C Force Command, previously commented: *"There are Coalition assets flying in Syria who have no picture of the air traffic and the movement of aircraft around them. AWACS can provide that picture which will give those pilots a greater situational awareness to be able to use the airspace safely.*

This is a true military capability and the coalition have been crying out for coverage in that region and NATO in direct support of the coalition are providing that picture in an area that previously has only been covered sporadically."

The Agency is also working with the NATO AEW&C Programme Management Agency (NAPMA) to help keep the E-3A AWACS platform relevant until 2035 - when it is likely to be replaced. *"NAPMA and the NAEW&C Force have already identified a range of things they believe are essential to keep NATO AWACS operationally viable - some relate to the aircraft itself, others to the mission system," Mr Roper revealed.*

"There is a need to ensure the air vehicle is able to operate safely and the mission system capability is operationally relevant in current and future NATO missions. Part of what we'll be looking at in the near future is ensuring the cryptographic capabilities are upgraded so all the information [from the AWACS] is protected. That's increasingly difficult in the cyber context of today's world."



GENERAL

MERCIER

Continuing to transform the Alliance by implementing innovation today and shaping tomorrow is what the Supreme Allied Commander for Transformation (SACT) passionately pursues.



NCI Agency representative, Ms Nadja El Fertasi sat down with General Denis Mercier to discuss his vision for NATO transformation.

General Mercier, you have an impressive career path in leading transformation and innovation. Could you please share some of the transformation efforts you led in the French Air Force? Why was cultural change necessary?

The French Air Force saw many different reforms in the past, which brought discrepancies across the organization. This is why I led a huge transformation effort during my time as the head of the French Air Force. My objective was to ensure coherence across the organization and to focus on the strengths of our forces – reactivity and responsiveness.

At the foundation of this transformation were four main axes: the modernization of our capabilities, the consequences on the different organizations themselves, the human capital which is a key factor, and the consequences on partnerships. And I see the same method today in the approach to NATO's adaptation.

Cultural change is very important and a key is Command and Control (C2). C2 is the backbone of any decision-making process that enables all of our forces to work differently.

When I was the Chief of Staff for the French Air Force, we had several assets deployed under different commanders, because we had regional commands. This caused issues with transport aircrafts in one command as there was no possibility to use aircrafts from other regional commanders. So we decided to establish an air component command in France because there was no reason to deploy it.

It brought huge flexibility, adaptability and reactivity to our structure. This is just one example of one of the big adaptations. It required a big change of mindset, especially for all the commanders to understand that they would no longer have the ownership of any one asset.

And this is what we try to promote in NATO. More focus on the effect than on the capabilities themselves, which is really a big change of mindset. What is essential for me is to make everyone understand that innovation is about the implementation of concepts. Innovation is not an idea in itself, but how we bring it into the field.

The people permanently stationed in [operational] theatres will not have ownership of capabilities, but will make a request and we will find the best way to deliver. This is why we need to ensure a robust command and control structure to deliver these effects.

IT is the Alliance's nervous system and lifeblood, the core of our ability to consult and rapidly make decisions. It must be robust and resilient.



As Supreme Allied Commander for Transformation, can you walk us through the key tenets of your vision?

This transformation vision is perfectly consistent with the huge adaptation that has been decided for NATO at the Wales and Warsaw Summits.

It recognizes that we were in a complicated world and that we have shifted to a complex world. Complex means that we now have so many parameters making it difficult to address all challenges simultaneously. So we need to think and act differently.

The key elements are first the reactivity and responsiveness of our forces. If we have

forces with the highest level of readiness, how will you deploy them if you do not have a robust and resilient C2 structure for decision-making? And when I say C2, I mean Command, Control, but also Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR).

Second is logistics and sustainability. We need to have a very robust concept in order to enable a swift deployment of our forces.

Third is training and exercises. We are an Alliance; if we do not exercise correctly, we will not be interoperable from day zero.

Fourth is partners – we know we will never operate in the future without our partners, so improving interoperability with our partners is essential. And when I say partners, I mean Nations and international organizations.

Fifth, we need to have the right capabilities to cover the full spectrum of operations.

And finally, the most important thing is our human capital. How do we train our future leaders to deal with this complexity? These six areas is how we have refocused the outcome of ACT.

Can you tell us how NATO ensures a robust and resilient Command and Control structure?

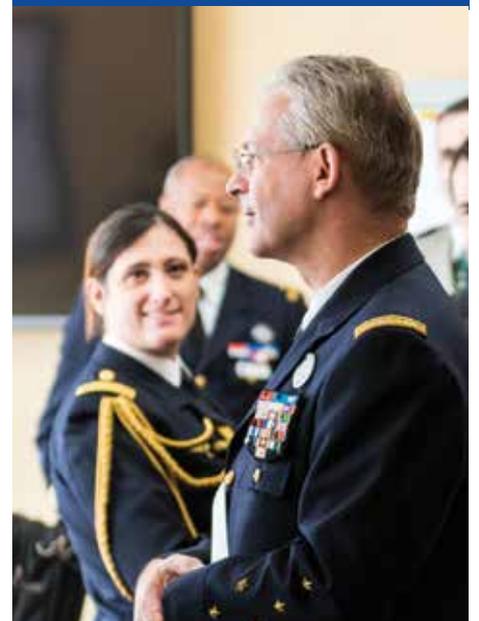
NATO's Command and Control structure is one of our Alliance's main strengths. Why? Because it is the only international organization that has a permanent robust Command and Control structure which enables military operations and responsiveness.

Currently, we are looking at modernizing the NATO Command Structure (NCS) to ensure we can address all the complex security challenges of today and tomorrow simultaneously. If the Alliance is organized differently, we will be able to find all of the capabilities to deal with these challenges in the NATO Nations and our partners.

This is why I am a strong believer of the Persistent Federated Approach (PFA). PFA is how we link up the NATO Command Structure, the NATO Force Structure (NFS), national facilities and even sometimes the private sector, to have a permanent exchange of information and a very agile, flexible federated network.

This is an important aspect of my discussions with the Agency, as the key question is: 'How do we build these IT architectures?' We will rely more and more on IT architectures as they will enable the exchange of information and the distribution of operational control if necessary in a more agile structure.

If you have access to information quicker than your opponent, decide faster with a robust Command and Control and through secure IT, then you can act on it as a cohesive force rapidly, defending the Alliance effectively.



How can we better leverage partnerships with Nations, NATO Agencies and Industry in capability development?

The value of NATO is that we have clear political guidance. Based on this, the two Strategic Commands and the Military Committee define military requirements.

We survey what exists in the Nations and then define the shortfalls and ask the Nations to develop these areas as priorities for their targets in their future defence development plans. And it works quite well. But we still have the tendency to define capabilities by equipment, instead of defining the effect we want to achieve.

The AWACS for example are delivering surveillance and control. So for the next generation aircraft in 2035, we are looking at

how surveillance and control will look like by then, what effect we will want to achieve and based on this, we build the requirements. Think effect and architecture. And there is a strong role for the Agency to develop this architecture, the interoperability and link them together.

Technological developments are happening at an unprecedented speed. With this in mind, how can NATO better support capability development?

We need to think in terms of flexible and agile architectures, instead of capabilities and platforms. We will need to continue to shorten the cycles of development. Otherwise we will be disconnected from the highly rapid change of technology.

That is the value of it, knowing that when we deploy together, we will link up our systems, and it works.

Why are training and exercises critical enablers for NATO's defence and deterrence posture? How does Information Technology fit into this?

As an Alliance, if we do not train together, then we have difficulty operating together from day zero. This is why training and exercises are so important. SACEUR [Supreme Allied Commander Europe] defines training requirements, and my responsibility is to put these training requirements into the exercises. Together with SACEUR, we are reviewing this process as we need to shift the emphasis from the exercises themselves to focusing on training requirements.

in many different areas. That does not mean that we have decided that those systems will decide the engagement of forces. This is an essential question and we should not refuse progress; we just have to organize in the way that we decide where we can use autonomous systems and where it is not possible to do that. We should not be afraid to address these questions at all times. This is why the human capital in different areas is so important in our transformation.

In the event of a crisis or conflict, NATO and its partners must be able to respond as one, immediately. How is this being done?

Over its 70 years of existence, NATO has proved it can implement huge interoperability between Nations and we can see the

We must win the battle for speed, we have the world's most powerful private sector, and yet we are so slow to implement technology, leaving us behind the curve. This must change. We have a lot of best practices in the Nations, and we need to now introduce them to NATO.



Why are cloud-combat platforms so important for NATO operations and exercises?

When thinking in terms of desired effect, cloud-combat platforms combine the different domains - land, air, sea and cyber - to ensure we deliver the appropriate effect. For me, the key combat system is C4ISR and how we associate these different capabilities.

If we look at a single platoon for instance, it has many sensors on the ground. But how are we fusing this vast amount of information using artificial intelligence and re-distributing this intelligence at the appropriate levels?

Interoperability standards are essential, which is why we are developing Federated Mission Networking (FMN) to ensure interoperability between the different national systems. In Iraq for example, this is not a NATO operation, but all the forces can operate together because they use NATO standards.

In 2019, when the next process starts, we will have a prioritized list of training requirements and build the exercise programmes accordingly. We do this today already, but this approach will bring more flexibility in moving the requirements from one exercise to another.

NATO conducts roughly 100 exercises a year, and Nations conduct 200 that have a link to NATO through the Connected Forces initiative.

We also need to be innovative to ensure we correctly exercise using very important new systems in complex threat-based scenarios. A key example is how we integrate cyber in exercises to ensure the objective of the exercises is not destroyed by cyber-attacks.

Putting people at the heart of technology is now more important than ever. Can you tell us why?

We have no choice but to develop artificial intelligence and more autonomous systems

benefit of that today. But future interoperability and architectures will be a bit different based on the challenges we need to tackle. These interoperability standards will be at the heart of our combat-cloud systems. And I know the Agency has an essential role to play and it is important we continue to work together, based on operational requirements and on our vision for the future. But we need to remain agile and adapt accordingly as we implement the transformation vision in a phased approach. This is another part of the complexity of our work.

Partnerships beyond the NATO family are also essential. Can you tell us why these partnerships are important to NATO?

Partnerships are an important condition to bringing more stability to our world, and NATO has a large global network of partners. Together, we work on the same values and we enhance our interoperability to ensure we can all stay engaged. Partnerships in the Mediterranean and Middle East are also



critical to fight terrorism. I am thinking of the recent NATO training mission in Iraq for example. Another key element in partnerships are the Individually Tailored Roadmaps. At the military level, these roadmaps simplify, optimize and synchronize the many initiatives that exist within Nations, based on a three- to four-year perspective.

And the federated approach is key again, because we need to be able to coordinate this with other international organizations or Nations that are already conducting bilateral activities with those partners. It is very ambitious, but I am convinced we can do this. It will really enhance our capacity to project stability.

How is the NCI Agency helping you implement this vision?

We need to share this future vision and it is very important for the Strategic Commands and the Agency to work closely together in doing so.

As we define the future operational concept, we need to understand the technological limitations and opportunities. Which is why partnerships with both traditional and non-traditional Industry is essential as well.

When I say non-traditional Industry, I refer to companies like Google and Amazon which are ahead of us in developing complex architectures and systems. I can't emphasize enough the close collaboration with the Agency, which is exciting as we are building something new which is consistent with our world today.

The value of our Alliance is looking at our 28, soon 29 Nations, if we associate all the competencies, including in our Industry, we are the most powerful Alliance in the world, if we all work together.

What message would you provide to the staff of NCI Agency and NATO-wide? How would you encourage them to be part of your transformation vision?

This is not just an ACT transformation vision, we work for the Alliance. What is essential for me is to share the objectives and continuously innovate, and the key word is to innovate 'together'.

The implementation of short-term actions is absolutely essential, but we need to project them in order to anticipate the future. ACT has developed a campaign plan to ensure that we are not working in isolation, but understand how we are contributing to NATO's strategic objectives and share this information within and outside our headquarters.

For example, when someone in ACT is working on FMN, he knows that he has to contact people in Allied Command Operations, in the NCI Agency and other NATO entities and ensure we all collaborate together.

I am more than happy to share this campaign plan with the Agency, because developing architectures is at the heart of this.

Together, we will move forward and shape the future. And I am happy if the members of NCI Agency question us, because we need to be questioned. Maybe we are wrong. This mindset is important. We cannot promote a network approach, if we do not work in a networked way all together.

What would you like your legacy to be at the end of your mandate?

My legacy is to work for an Alliance that is adaptable and implements innovation.

We need to implement the short-term in the broader perspective and think 10-15 years ahead. Improve today, shape tomorrow and bridge the two.

I will continue to promote this networked approach to work all together - with the Agencies, the Strategic Commands, Nations, partners, and with all our stakeholders. Because it is together that we are strong.

NATO is a wonderful organization for that and its capacity to adapt whilst operating is something that does not exist elsewhere. This is the value of the Alliance and together we can bring some bricks and build big walls and really make our Alliance stand up to any future challenge with the ultimate goal being peace and security.

*Interview by Nadja El Fertasi,
Chief Strategy Office*





From NCI Agency intern

**to Managing
Director**

In 2012, Coen Janssen landed an internship at the newly-formed NATO Communications and Information Agency.

Fast-forward five years, the Dutch national is now the Managing Director of a start-up company he co-founded with fellow whiz kid Maarten Engelen and satellite communications professional Ernst Peter Hovinga. And he's not even 30 years old yet. Here's what Coen had to say about his experience working for the NCI Agency and how it shaped his career choices.

Valuable, practical experience

As an aerospace engineering and entrepreneurship student, I was invited to speak at the 2012 NATO Network Enabled Capability Conference on nanosatellites and the future of military operations.

There, I had the opportunity to meet many senior executives in the technology and defense industry including Mr David Burton, former Chief Technology Officer of the NCI Agency, and the General Manager, Mr Koen Gijsbers, who happily accepted my application for an internship which was a mandatory part of my Master's programme.

During my internship, I had the privilege to look into innovation management and the organizational changes that were taking place at the time at the Agency. The amount of responsibility that was given to me from the start, and the help I received from colleagues and mentors such as Dr Paul Howland - the Agency's Chief of Command and Control Services - made a great impact on my professional career.

Although I've always made career choices based on my interests rather than thinking about building the perfect CV, NATO is a great name to be able to mention during interviews and business conversations. But the real impact came from the experience I obtained and the people I encountered during my time at the Agency.

I went on to work at XCOR, a commercial space company, Deutsche Bank, and after a quick stint at a strategic consultancy firm, I was approached by a venture capital advisory firm to consider investing in the new commercial aerospace market. Together with several professional investors, we founded a small investment firm and did several investments in the new space industry.

Eventually, we thought it was time to create our own company. And we saw a niche market in the area of satellite communications, without too much global competition so we decided to work out the initial business plan and build a team around it. Over a year later, we launched Magnitude Space. We now have over ten staff members and we have raised our first funds.

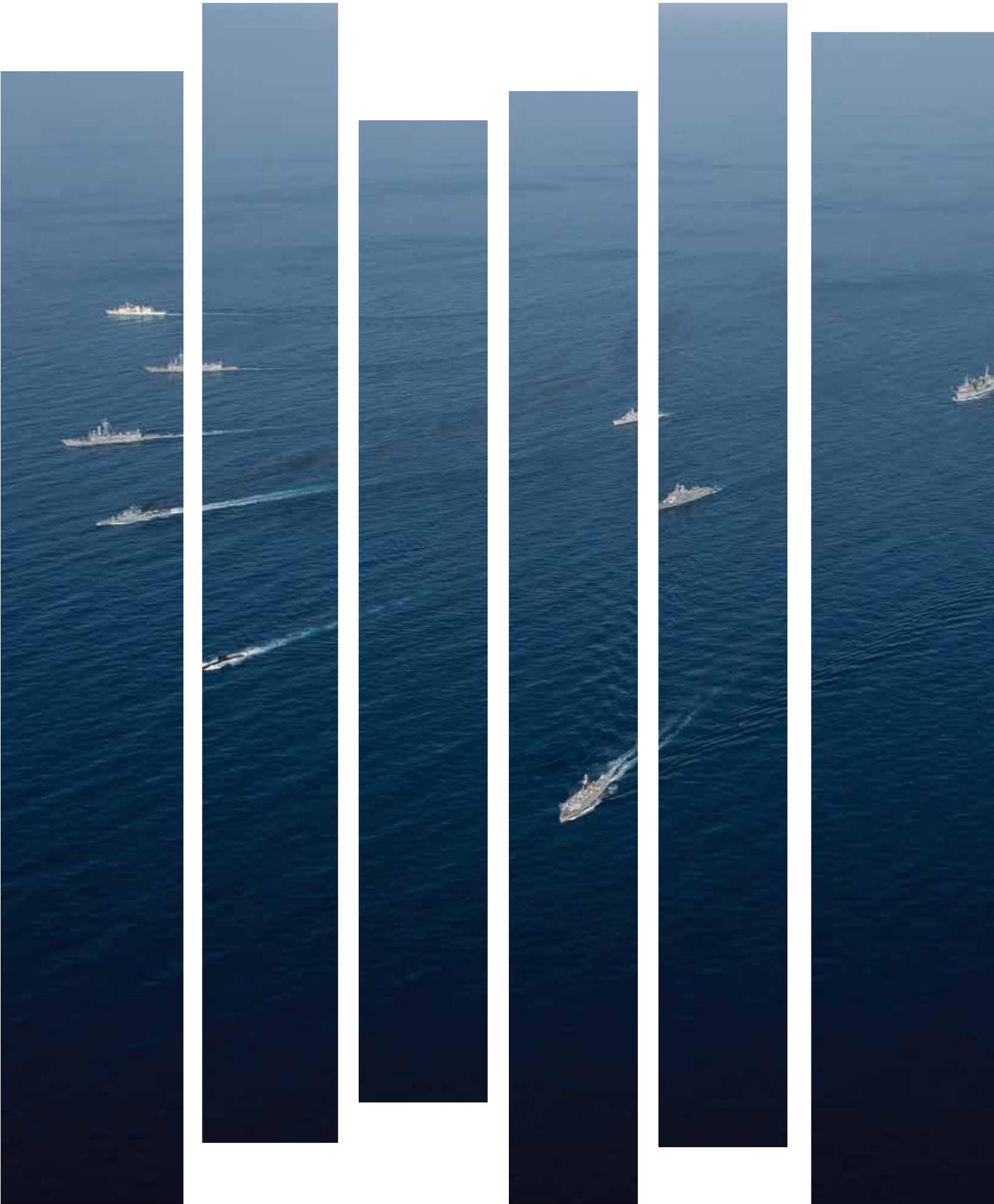
Innovating to open new markets

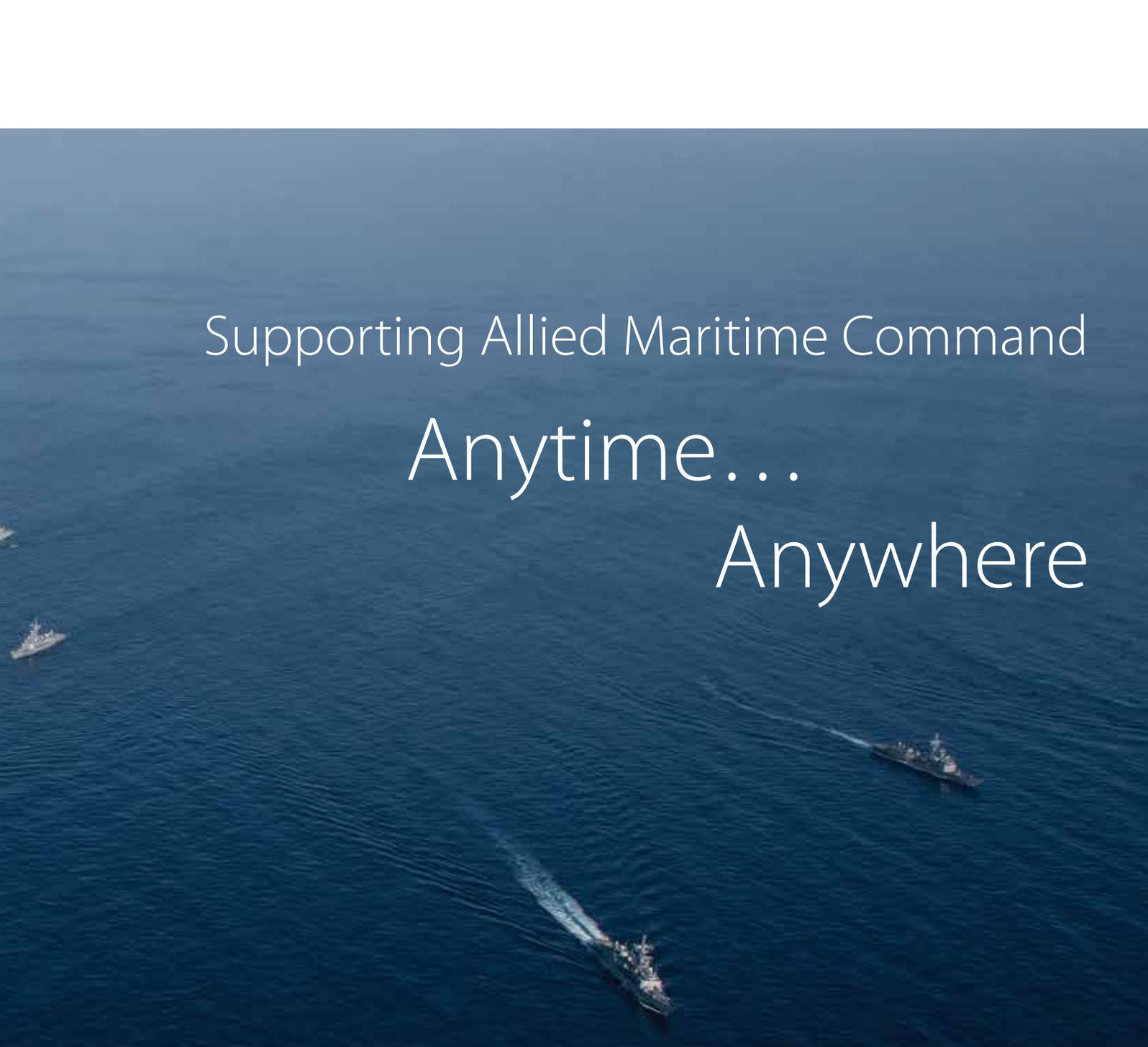
Magnitude Space is a start-up in the aerospace market. It is building a nano-satellite platform to provide low-cost global Internet of Things (IoT) connectivity for sensors. This IoT connectivity allows us to provide global insights at an affordable cost. We do this by gathering sensor data in rural areas and delivering it via our web portal to our customers. These sensors could eventually collect information on sea currents, pipelines, animals, containers, allowing users to track data at a low cost. They could also gather simple observational data such as velocity, temperature, humidity, the presence of carbon dioxide, or even security data. There is a multitude of fixed applications which are currently not served by either terrestrial nor satellite infrastructure such as flood and fire warning systems, perimeter security, global net monitoring in remote areas... That's what we want to change.

And in that respect, I think the vision of the Agency and Magnitude Space are pretty much aligned: we want to be seen as a trusted enabler of information and we also want to earn customers' confidence through agility, innovation and affordable solutions. Innovation management and organizational changes are key for a start-up, although many other challenges arise when building up an organization instead of changing it. We also always have to be at the cutting edge of technology. We're providing global insights at an unprecedented cost level, enabling tons of new markets and applications. We can only do this with newly-developed technology and by building our own space infrastructure.

I think it's really interesting to see that the Agency's General Manager Mr Gijsbers has made innovation a priority within the organization, and that there is a renewed focus on partnerships with Small and Medium Enterprises (SMEs). Governmental and inter-governmental organizations usually have long 'sale cycles' and therefore are -somewhat challenging as first customers for SMEs. The decision-making processes in place are bureaucratic and slow, whereas start-ups and SMEs are usually more agile, quick to decide and adapt to new situations and innovations. But it's very positive to see that there is talk about streamlining these processes to make this sort of partnerships more likely.

Compiled by Adelina Campos-DeCavalho, Creative Media Centre





Supporting Allied Maritime Command Anytime... Anywhere

Chock-a-block schedule

Life at the NCI Agency's CIS Support Unit (CSU) Northwood is seldom dull and often choppy as our experts must be ready to deploy within a moment's notice regardless of limited resources.

The key responsibility of this CSU unit, based in the United Kingdom, is to support NATO Allied Maritime Command (MARCOM). In 2016, this support included 28 missions to NATO flagships, 79 individual deployments to the ships, and 311 full working days of on-site support across 19 different locations.

Of the many ships from the Allied Navies that conduct operations and exercises across NATO's Area of Responsibility, the four flagships groups – the Standing NATO Maritime Group One (SNMG1), SNMG2, Standing NATO Mine Countermeasures Group One (SNMCMG1) and SNMCMG2 – generate the greatest workload for the CSU.

These groups provide NATO with a continuous maritime capability in periods of crisis as well as peacetime, and CIS is a key enabler in support of their mission. Much of the groups' recent activities involved monitoring Russia's Admiral Kuznetsov battle group. Admiral



Kuznetsov, Russia's sole aircraft-carrying heavy cruiser set sail for the Mediterranean in October 2016 accompanied by nuclear-powered battlecruiser Pyotr Velikiy, anti-submarine destroyers Severomorsk and Vice Admiral Kulakov and other support ships. The Admiral Kuznetsov battle group travelled as far as Syria and was eventually ordered back to base to get refitted early this year.

This monitoring activity would not be possible without the CSU's support as it configures the equipment required for NATO Standing Naval Force flagships to share their maritime situational awareness and connect to one another. The CSU also provides remote support to NATO CIS services during the ships' tour of duty so that they can be in constant contact with the headquarters, through secure networks.

Come hell or high water

2017 picked up where 2016 left off, but with renewed intensity as CSU Northwood juggled simultaneous handovers for two of the Standing Naval Force (SNF) flagships. The efficient unit was also tasked to install a full suite of NATO CIS tools on Spain's frigate Almirante Juan de Borbón for her continued assignment to SNMG2.



Conducting three simultaneous missions had a major impact on resources in Northwood and could have affected the CSU's support to Allied Maritime Command.

After careful consideration, the Assistant Chief of Staff for Communications and Information Systems and the MARCOM Command Group accepted the risk to local services delivery during this intense period. Fortunately, the Agency was able to maintain its services, and this busy period passed without any incident.

The year also kicked off with new partnerships for the CSU as it worked for the first time with the Estonian Navy during a transfer of CIS tools.

The transfer was the culmination of an earlier site survey and many months of dialogue to ensure pre-installation work was carried out. Support from the Agency's Network Services and IT Infrastructure Service Line is critical at the installation phase and once again close co-operation with the team ensured connectivity requirements were met.

Closer to home was the installation of a SNF CIS suite on the Polish ship ORP Kontradmiral Xawery Czernicki during a port visit to Portsmouth, United Kingdom. This CIS system was de-installed and recovered from Greece in December and delivered to Northwood with days to spare. This illustrates the close cooperation between CSU Northwood and other stakeholders to meet tight deadlines.

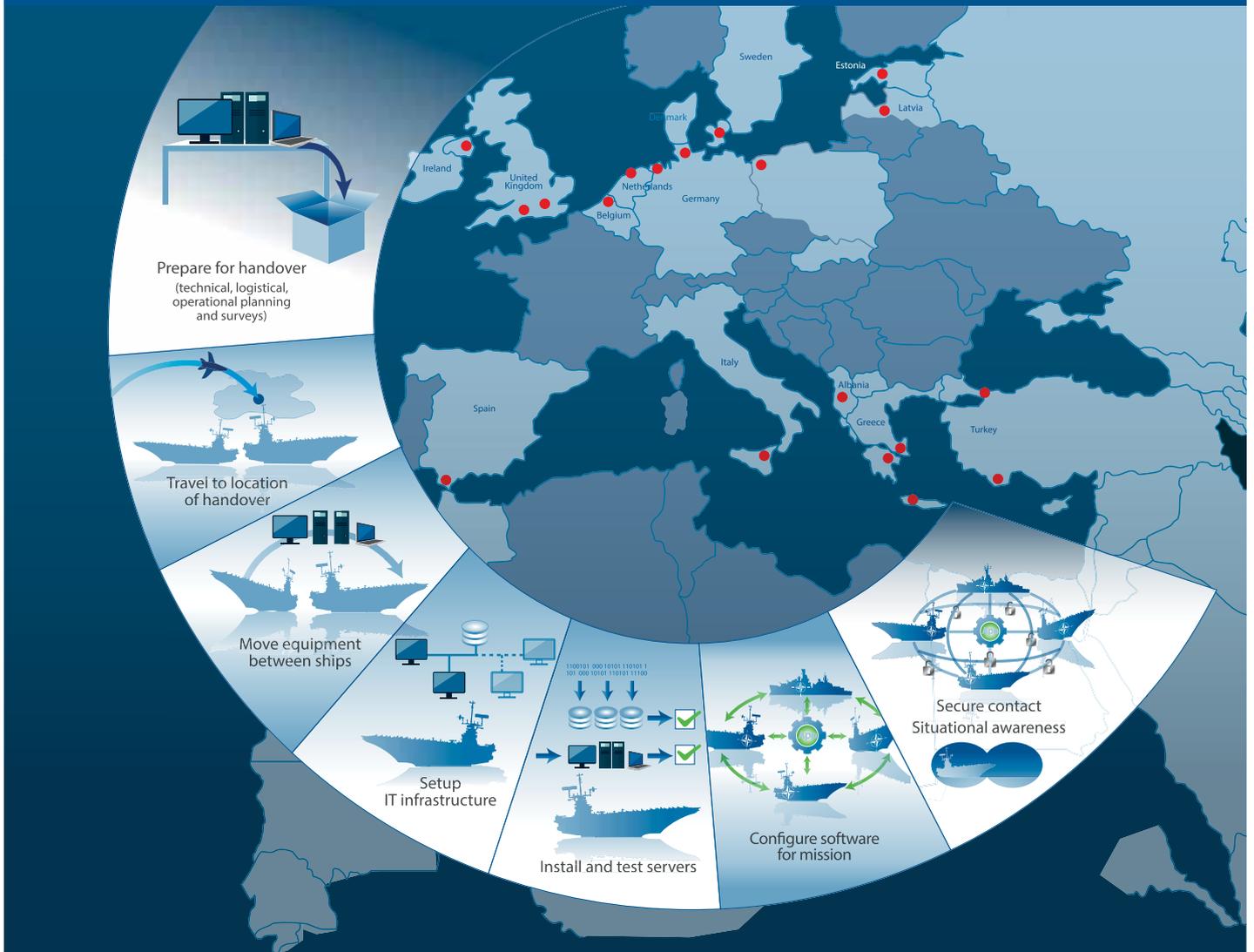
The Kontradmiral Xawery Czernicki is the new flagship commanding a multinational integrated force that projects a constant and visible reminder of NATO's solidarity and cohesion in the Mediterranean and Black Sea.

The surge of SNF work in the first quarter of 2017 was completed successfully but further taskings are expected to be assigned as months go by. Another four missions relating to surveys and discrete support activities are being planned for execution for the first half of the year and as always, it's all hands on deck at CSU Northwood.

By CSU Northwood

Security at Sea 2016

Keeping the fleet connected



Tasks in 2016

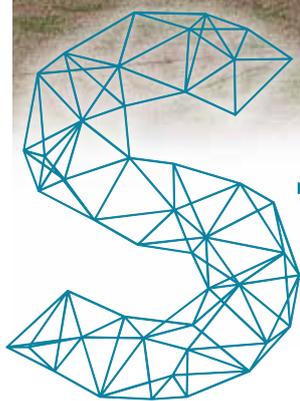
311
Days deployed

79 Individual deployments

11
Standing Naval Force (SNF) flagship operational handovers

21
Different ships supported by NCI Agency | CSU Northwood, UK

3
Major technology upgrades



tate-of-the-art

training among the fjords of Norway

NATO's Joint Warfare Centre (JWC) offers modern training facilities, equipped with advanced technological solutions, in an unparalleled location - the woods of picturesque Norway, looking over the Dale fjords, secluded from the busy city of Stavanger.

Simulation in a real arena

JWC is one of NATO's leading collective training and exercise facilities at the strategic and operational level, falling under the command of the Supreme Allied Commander Transformation. Its 'old' wing was built in 2003, and a new complex has recently been added to the facility to fulfil the requirements of the operational training given to the highest ranking officials of NATO and Partner Nations.

JWC plays a key role in NATO's most complex exercises, like the TRIDENT Juncture/Jaguar/Javelin series, the largest Command Post Exercises (CPXs) in NATO's history. Such exercises have immense personnel, logistics, infrastructure, and IT requirements, and JWC has to be prepared to model all possible operational scenarios and train commanders in all of the above fields. Thanks to the facility's all-round approach to simulation and problem-solving, combined with its state-of-the-art equipment, JWC is the place where this can happen down to the last detail.

When it comes to training military commanders, it is essential to provide them with realistic scenarios, which are at least as challenging as real life incidents might be. Therefore, the JWC provides training scenarios which take into consideration the movements of troops, the reaction of adversaries and the media environment. All these elements rely on a robust Communications and Information Systems (CIS) infrastructure to be effective, requiring continuous expert support.

Highest standards in Communications and Information Services

The NCI Agency's CIS Support Unit (CSU) Stavanger is responsible for delivering these CIS services to JWC. The Agency's role is two-fold in this special environment. On one hand, it provides the IT expertise needed for the day-to-day business of permanent JWC staff, while on the other hand, it manages dynamic and flexible event services,



such as setting up several new, customized IT infrastructures in support of exercises. Communications among personnel who are participating in the training need to be simulated as if they were real.

This means video conferences or telephone conversations need to be classified, when required, while networks and connection have to be just as mobilizable as they would be in operations.

Since the Alliance has officially recognized cyberspace as the fourth operational domain, beside air, land, and sea, Computer-Assisted Exercises (CAX) have become even more indispensable to NATO training and operation exercises than ever before. They are a cost-efficient and highly effective means of reducing risk and facilitating multinational participation from different locations.

During exercise Trident Juncture 2016, and more recently Trident Jaguar 2017, JWC was the primary enabler for computer-assisted exercises. CSU Stavanger provided Simulation Tools and the Command and Control Systems stimulation.

Simulation is an interactive tool used (among others) to model joint air, land and maritime environment and behaviour. It consists of several component programs, which are closely related and integrated into a system allowing CAX Teams to create the required scenario databases, simulate unit behaviour, and report the results given.

Apart from simulation, the Agency also provides JWC an entire arena of CIS solutions, ranging from simulated news broadcast distribution and re-routing to air traffic control simulation, in Stavanger and remotely, just as it would happen in real life. Essentially, a virtual world is built from scratch for a specific purpose, all accomplished

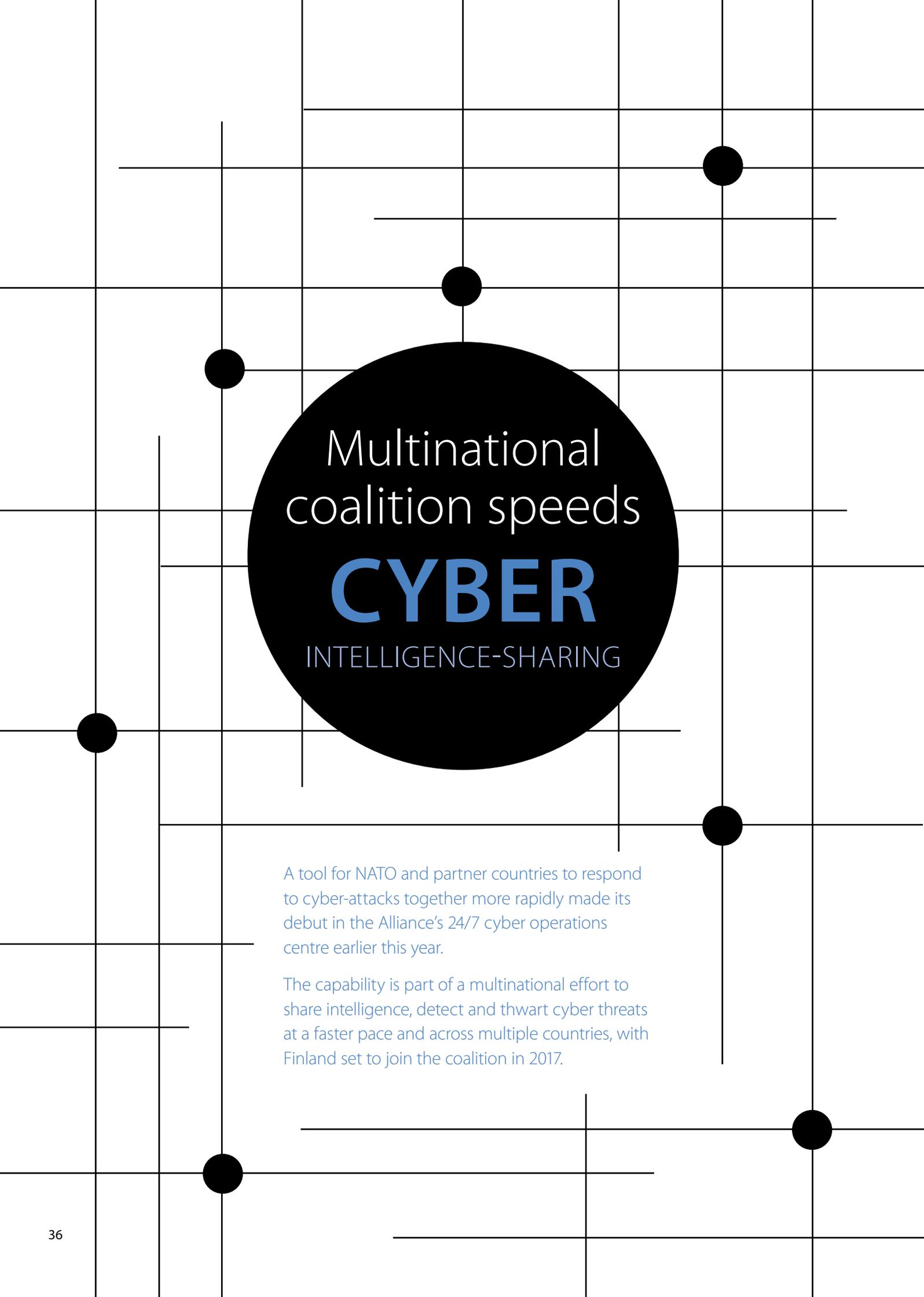
with computers. The Joint Forces Training Centre (JFTC) in Bydgoszcz, in Poland, supported by CSU Bydgoszcz, also conducts similar types of exercises, however on an operational and tactical level. Therefore, the two training centres fulfill together the overall requirements for staff training and preparation for future missions through advanced simulation and computer aided stimulation.

By Livia Jusztin-Majercsik, Chief Strategy Office



Trident Juncture 16 driven by simulation

Trident Juncture 2016 involved many Nations with individuals from various backgrounds. Its success demonstrated the determination and drive of all personnel involved, including that of the Joint Warfare Centre, the Agency's CSU in Stavanger and the Education and Training Service Line staff who collaborated to ensure the provision of a simulation environment.



Multinational
coalition speeds

CYBER

INTELLIGENCE-SHARING

A tool for NATO and partner countries to respond to cyber-attacks together more rapidly made its debut in the Alliance's 24/7 cyber operations centre earlier this year.

The capability is part of a multinational effort to share intelligence, detect and thwart cyber threats at a faster pace and across multiple countries, with Finland set to join the coalition in 2017.

CIICS (Cyber Information and Incident Coordination System) pronounced “kicks”, was developed by the NATO Communications and Information (NCI) Agency, NATO’s IT and cyber arm, as part of the Multinational Defence Capability Development (MN CD2) project. CIICS is currently used by Canada, the Netherlands and Romania and will be deployed later this year to Norway, as well as Partner Nations Finland and Ireland, which have all already started trialling the tool. It is an example of how NATO Nations can work together to fast-track capability development.

Manisha Parmar, Senior Cyber Security Scientist at the NCI Agency, explained: *“CIICS not only alerts you about potential cyber-attacks but also allows you to respond to the attack with the help of other users. So for example, if I’m Romania and I have detected a cyber-attack which might be replicated against Norway or the Netherlands, I can share that information with these countries and they will get immediately alerted if a similar threat shows up. It allows them to thwart the cyber-attack before it can take place.”*



– soon six – and CIICS has been deployed on a trial basis to NCIRC TC (NATO Computer Incident Response Capability Technical Center) earlier this year... It’s a success story.”

Constantly evolving technology

Ms Parmar remarked that being able to develop state-of-the-art technology quickly is essential to maintain strong and resilient cyber defences.

“When we sat down with Canada, they told us that they were interested in information sharing but they also wanted a tool to manage cyber-attacks... That’s how the cyber incident management part of CIICS was born. Within the envelope of money we were given, we managed to provide them with both. And we’re constantly enhancing CIICS, speaking to our community of users, adapting to new requirements. Once the capability has been created, these Nations become torch carriers, they make the capability available to other Nations and encourage them to come on board.”

Safer together

MN CD2 was created in 2013 after five NATO Member countries – Canada, the Netherlands, Romania, Denmark and Norway - decided to join forces, leveraging on their respective expertise to improve their cyber defences.

“The principle of MN CD2 is that instead of Nations taking on the R&D [Research and Development] themselves, they share it with other Nations, so that they benefit from economies of scale,” Ms Parmar noted. It’s a much cheaper and quicker process for them.”

Three of the MN CD2 founding Nations approached the NCI Agency seeking to develop a cyber intelligence sharing platform.

“Canada, the Netherlands and Romania quickly found that they shared common interests. So we spoke to the Nations, and established what they wanted or needed to develop a single tool that would suit them all, that’s how CIICS came about. The Nations came to the Agency because of our technical skills and our access to expertise from 28 Member Nations. So it’s not just the financial benefit of the partnership, it’s also about collaborating, sharing knowledge and best practices. The

advantage of approaching a project this way is that we get a mature tool much quicker. Within months of gathering information on each Nation’s requirements, we deployed a first work package.

Nearly four years on, we’re on our fifth work package, we have a mature tool, three countries are using CIICS



Expanding the cyber defence coalition

MN CD2 is open to all NATO Nations, while partner Nations must receive approval from the project’s board to join. So far, other Nations such as Poland, Germany, the United Kingdom and Switzerland have expressed an interest in CIICS, but no formal agreements are in place yet.



Sarah Brown, CIICS Technical Lead at the NCI Agency, remarked: *“CIICS proved its value when it was used by Nations in Cyber Coalition, one of the world’s largest cyber defence exercise, as it enabled them to operate as a coalition, defending networks together. This showed that CIICS can be of great benefit to the Alliance, helping forces communicate, train and operate better together in a Federated Mission Networking (FMN) environment.”*

Mr Arnold Colijn, Senior Innovation Project Manager at the Dutch Ministry of Defence, noted that the tool has been extremely beneficial to the Netherlands.

“The CIICS project is a meaningful project to our Nation, because it shows that capability-development with a few contributing NATO Nations can lead to an affordable capability. CIICS as a system is designed to support (inter-)national coordination on cyber incidents and on cyber information sharing and thereby leverages the possibility that Nations will really work together on cyber defence. We hope that the introduction of CIICS leads to a system that is used by all NATO Nations, supported at the NATO Secret level and used as one of the data sources for creating overall Cyber Defense Situational Awareness.”

By Adelina Campos de Carvalho, Creative Media Centre

Afghanistan

Marking 14 years of Agency support

The NCI Agency has been contributing to operations in Afghanistan since 2003, when NATO took the lead of the United Nations-mandated International Security Assistance Force (ISAF). While Afghan forces have now taken over responsibility for security from NATO, and the ISAF mission ended in 2014, the Agency continues to deploy personnel to the central Asian country to this day. It now provides operational analysis, cyber security and some CIS services to NATO's follow-on Resolute Support (RS) mission which aims to further train and assist Afghan security forces and institutions. *"Although Resolute Support is a 'non-combat' mission, it remains challenging,"* commented Erick Lesbaupin from the NCI Agency's Operations and Exercises Service Line.

Challenging mission

The transition of the ISAF Mission to Resolute Support, not only reduced the number of sites supported by the Agency from more than 70 to just nine, it also affected resources. *"The completion of the ISAF Mission generated a reduction - of around 20% - in the number of contractors, field technicians providing local support on site,"* Mr Lesbaupin explained.

"This reduction mainly impacted the provision of outsourced CIS services". In 2005, NATO decided to outsource the provision of CIS services (voice and data) to Industry *"due to significant shortages of manpower in the NATO Signal Battalions and the fact that most of the NATO Satellite Communications ground segment was not yet available".* This 'outsourced' capability has been in place since 2007 and has proved to be very effective. Broadcast radio services across Afghanistan were also subsequently outsourced.

Meanwhile, the coalition's requirements for greater synergy also brought about the implementation of the Afghan Mission Network, which led to the creation of NATO's Federated Mission Network (FMN) concept.

Expert support

Today, around 10 Agency staff members are deployed to Afghanistan to contribute to the RS Crisis Establishment (CE) operation covering areas such as Operational Analysis, Cyber Security, or contributing to the Signal Support Group. The Resolute Support Signal Support Group (RS SSG) was created in recent years to provide critical CIS services to forces in operational theatre and their partners.

The group is thus responsible for CIS support and the delivery of Command and Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) services. This team of experts, which is currently on its fifth rotation, was predominantly manned by members of the NATO CIS Group (NCISG) initially, but the support of embedded NCI Agency Experts was requested. And now, the incumbents of the posts of RS SSG Commander and Deputy Commander alternate between the NCISG and the Agency.

Evolving role

Mr Lesbaupin added: *"Within the RS SSG, Agency personnel lead the Afghan Mission Network Operation Centre (AMNOC), coordinate the use and maintenance of all Functional Area Services (FAS), supervise CIS depot activities and support projects on site, including interfacing continuously with the outsourced CIS provider. So, although security responsibilities have been transferred to the Afghanistan National Security Forces (ANSF), the mission continues to evolve and remains challenging."*

The Warsaw Summit committed NATO Support to Afghanistan until at least 2020. This means that in coming years, the NCI Agency will have opportunity to continue to improve its staff's experience and knowledge through the support it provides to RS, and by deploying personnel to Afghanistan."

By Operations and Exercises Service Line



