GLOBAL STRATEGY AND TRENDS REPORT 2019

INSIGHTS ON NATIONAL SPACE POLICIES

The space domain is increasingly of vital importance to NATO's members and partners to retain an operational advantage against potential adversaries. Several nations have already published their own space policies and strategies ahead of NATO's releasing its own, and this report will explore a number of their key elements.

The Space Operations Summit, taking place from **28-30 May in London**, will gather senior decision-makers from a number of countries focused on designing space policy, doctrine and capability.

Defence iQ

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CZECH REPUBLIC

The Strategic Capabilities Development Section of the Czech MoD is responsible for space activities and is involved in the following tasks:

- Formulating strategic capability development defence priorities, and aligning them with strategic national, NATO and EU documents
- Asserting national interests in space in bodies such as NATO and the EU, and including agencies and organisations dealing with strategic capability development
- Formulating national standpoints on national, NATO and EU defence capability development
- Coordinating specific capability development priorities for the Czech Armed Forces
- Coordinating the implementation of initiatives adopted by NATO and the EU in support of strategic and specific capabilities related to the space domain
- Coordinating national participation in NATO and EU strategic projects in the development of strategic and specific capabilities related to the space domain

The nation wants a deep collaboration with NATO, as demonstrated by the creation of the National Satellite Centre. This is expected to be fully operational by the end of 2019 and will be operated by the Czech Military Intelligence, it will provide intelligence support to the nation's military units and NATO command structures.

AT SPACE OPERATIONS 2019

Dr Tomáš Kopečný, Director of Industrial Cooperation Department, Czech Ministry of Defence will speak on the Czech MOD's National Defence Strategy. He will outline the cooperation possibilities that exist for industry in the area of new ground, launch and space system programmes, the key spending priorities up to 2025 and how small satellite technology will benefit the defence community.

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FRANCE

Two main challenges have been identified by the MoD:

- **Traffic management**: at the moment 1,500 active satellites are operating above Earth. In the next ten years, it is estimated that 3,000 satellites weighing more than 50kg will be launched and an additional 7,000 small satellites will gravitate around Earth

- **Debris**: between 500,000 and 750,000 objects of more than one centimetre gravitate at low orbits and high speeds – up to 7km per second for some of them – creating a safety issue

Observing space from space

France is part of the EU Space Surveillance Tracking consortium to provide an anti-collision capability. The nation will also launch secondary payloads to observe the environment of existing military satellites (equivalent to surveillance cameras in space).

State investment in space capabilities

The Military Programming Law (LPM), covering the period 2019-2025 will provide more than EUR3.6 billion for investment and renewal of satellites. Alongside providing investment for the EU's space policy, the LPM will finance three projects:

- **The 2020 launch of three CERES electromagnetic listening capabilities** to detect enemy command centres and fleets

- **The 2022 launch into orbit of two Syracuse 4 communications satellites and the order of the third one in 2023**; these will monitor potential ballistic missile departures from space

- **The modernisation of the GRAVES radar by Arianegroup's GEOTRACKER project**, part of a goal for French Army to own a first-class operational capability to accurately monitor the situation in geostationary orbit. This will be achieved through other projects not aided by the LPM, such as the use of CNRS TAROT telescopes and investment in new sensors by Thales within the Space Alliance that will enable the cataloguing and identification of space objects

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FRANCE (c'td)

Commercial sector: providing new opportunities for innovation

Opportunities for innovation will come from industrial groups or new technologies that will take over an area that was until recently the prerogative of Nation States. New technologies are developed by private actors, and it will lead to:

- The research and creation of many assets
- Cost effectiveness
- Miniaturisation
- Reuse

All-state funding will no longer drive new projects, but commercial innovation will. The MoD will opt for a win-win mentality: military will continue to need their own satellites but will not hesitate to use trusted operators; they will also rely on manufacturers to make offers for the provision of capacities and services.

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FRANCE (c'td)

New potential investment areas in innovative solutions

One potential investment area for France is commercial constellations of small observation satellites and steps have already been taken: for example, equity fund DefInvest will support SME Unseen Labs for its intelligence systems on nanosatellites.

This technology will allow the military to significantly reduce the time between two observations and provide resilience and continuity of operations in the face of increasing aggression capabilities. It will also help the mobility of future weapon systems such as air combat system of the future (SCAF) or land combat (renewed through SCORPION programme).

Moreover, big data and AI will become priorities for the collection and use of ISR data. Other areas will include miniaturisation, electric propulsion, robotics, and on-orbit rendez-vous techniques, allowing the development of on-orbit servicing. A few examples highlight advancements in this last area: the SpaceTug project developed by Airbus, creating a satellite-servicing vehicle capable of refuelling, repairing and monitoring the health of spacecraft orbiting Earth; Orbital ATK's first Mission Extension Vehicle will launch next year on an ILS Proton rocket; Space Systems Loral's satellite servicer will leverage work with DARPA; Effective Space Solutions is building a servicer spacecraft based on small satellites.

AT SPACE OPERATIONS 2019

General (Ret) Philippe Steininger, Military Advisor to the President, French Space Agency will give a presentation on French space policy and the ca[abi;ities that need to be developed to overcome key challenges.

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JAPAN

Realising the vital importance of maintaining an advantage in the space domain for national security, Japan is expanding its space capabilities rapidly. By Japanese fiscal year 2022, a space domain mission unit will be established to ensure superiority in the use of the domain whether in peacetime or conflict. The nation wants to monitor situations over space at all times and develop capabilities to disrupt the adversaries' command and control of information communications.

Working with Allies

Japan is currently cooperating in SSA with the US, Europe and Australia and sees no need to build its own space system. If that decision did change, Defence Minister Takeshi Iwaya emphasised that such a system would not serve Japan's defensive needs alone; the nation would be in a position to offer its own systems to its partners to ensure the strategic ability of the alliance to remain resilient in the event of attack.

He also emphasised during a speech in January 2019 that he wants to secure a strong and close relationship with the yet-to-be-created U.S. Space Command.

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NORWAY

Norway aims to become a leading space nation over the High North and Arctic especially – NATO's northern flank – and chaired NORDEFCO in 2018. In order to achieve this, the MoD wants to support national space programmes, the space industry and the development of national R&D capability; the Government will fund projects and enhance cross sector coordination between R&D and industry. In terms of international cooperation, Norway wants to collaborate with allies through bilateral agreements, capability development, and equal value sharing of national capabilities.

It was also announced in September 2018 that the Norwegian Defence Research Establishment (Forsvaret forskningsinstitutt: FFI) is developing low-light satellite technology with the US Navy's Space and Naval Warfare Systems Center Pacific. They are adapting a camera that will be installed on the NorSat-4, a maritime surveillance satellite that belongs to the Norwegian Space Centre; the technology will be important for Norway to conduct surveillance in the Arctic.

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SWEDEN

As of 2015, the Swedish government is spending 1.7 billion SEK (£143 million) on space activities per year.

The FMV's strategic goals for the military sector are as follows:

- Supporting existing defence capabilities
- Assured access to space services
- Ensuring resiliency
- Monitor developments in space
- R&D for a national competence base
- Military SSA

The FMV allows access for the military to use space-derived services for ISR, PNT, SATCOM and SSA purposes. The organisation is in charge of procuring equipment and services, fostering international collaboration and undergoing space-related R&D.

Partnerships

FMV aims to collaborate with a range of organisations, both national and international.

National:

- Ministry of Defence
- Ministry of Education and Research
- Ministry of Justice
- Space & Defence Industry

International:

- European Space Agency
- NATO S&T Organisation
- European Defence Agency
- Nordic Defence Cooperation
- Alllies through bilateral relations

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SWEDEN (c'td)

Emerging capabilities and trends

As space is recognised as contested, congested and competitive, with increasing commercialisation and an overload of data, Sweden wants to ensure that:

- Space architectures are resilient
- Space domain awareness is effective
- There is a responsive access to space capabilities
- There is constant digital connectivity

FMV recognises the folllowing emerging capabilities:

- Pseudo satellites
- Quantum technology
- Miniaturization
- Hypersonic space transport vehicles
- Pulsar navigation
- Optical communication
- Adaptive/cognitive/intelligent radio
- Additive manufacturing
- Triple A: Automation, Augmentation and AI

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UNITED KINGDOM

The vision of the UK space policy is to secure freedom of action in space, fully exploiting its military and civil potential.

Two services share responsibilities of space capabilities:

- Joint Forces Command oversees Satellite Communications and Intelligence, and Surveillance and Reconnaissance capabilities

- Air Command is responsible for Command and Control of the UK military space operations such as SSA and Space Control capabilities. Its main tasks are to lead the development of a cadre of qualified and experience space personnel, and to engage internationally in support of these responsibilities

The mission of the UK Space Policy is to ensure that its defence sector has the capabilities, skills and operational plans to protect and defend its space assets and interests, in an increasingly contested environment. The MoD is aiming to work closely with the rest of Government, international partners and the private sector in order to enhance the overall coherence and co-ordination of activity across the Defence space enterprise.

The UK Space Policy has three main strategic objectives, that will focus on people and skills, promoting cross-government collaboration, broadening and deepening multinational co-operation and driving innovation and exploiting technological opportunities.

Enhancing space resilience and operational effectiveness

International cooperation will be central due to the nature of the threats and the space domain itself, to enable the UK to protect and defend its space interests. This will be achieved by:

- Strengthening governance to ensure effective space operations
- Identifying and attributing threats to space assets and systems

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UNITED KINGDOM (c'td)

- Developing space capabilities to deliver effective operational outcomes
- Responding to hostile activities in a proportionate and coordinated manner

Optimising Space support to the front line

The UK wants to ensure the integration of space issues into operational planning, doctrine, capability development and training so the armed forces can take full advantage of space-based technology. They should also invest in space capabilities while taking into account both increased threats and new opportunities and this will be achieved by:

- Integrating space into all relevant aspects of Defence business
- Developing a skilled and sustainable space workforce
- Producing coherent space policies, plans and capabilities

Supporting wider Government activities

The UK Space agency aims to launch small satellites – enabling industrial growth in this area – and lead the UK's international collaboration on civil space programmes. The Defence sector will actively partner with it by providing capabilities, infrastructure and personnel. In order to foster the collaboration with the civil sector, the military will:

- Support the private sector and Government to enhance resilience of space services
- Support the Government's aspiration for growth of the UK space sector
- Support international efforts to make space a safe and secure environment
- Jointly scope a civilian-military National Space Operations Capability (NSpOC) with the UK Space agency

AT SPACE OPERATIONS 2019

Dr Michael O'Callaghan, Space Programme Manager, Dstl will share insights on the 2022 vision for Project Argus, the Dstl Space Programme. He will outline the Space S&T programme timeline, the objectives of Project Argus and will present the National Space ISR capabilities for situational awareness.

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UNITED STATES

SPACE FORCE

Vice President Mike Pence unveiled in August 2018 the Pentagon's plan to create a Space Force which could be in effect from 2020. It encompasses the creation of an independent unified combatant command called the U.S. Space Command led by a four-star general, and the creation of the U.S. Space Force branch in the military. Four actions need to be taken to make the Space Force a reality.

Create U.S. Space Command as a new unified combatant command
This new organisation will be led by a four-star general and will create the space warfighting doctrine, tactics, techniques and procedure.

Build an elite group of space officers called Space Operations Force
They will include all of the services to create a community similar to special operators, and will support the combatant command by providing space expertise in time of crisis and conflicts.

Develop the Space Development Agency, a new joint procurement arm for space products
The Agency will leverage prototyping and experimentation to achieve technology breakthroughs.

Name a civilian to the post of assistant secretary of defense for space
They will be in charge of overseeing the service's expansion and will report to the Secretary of Defence.

UNITED STATES (c'td)

JOINT FORCES COMMAND

The focus of space capabilities has changed: while previous space operations integration efforts focused on providing capability from space to support forces on Earth, emphasis is now on assuring and defending these capabilities against adversary space activities.

The joint force must be able to integrate and synchronise space capabilities into joint operations, planning, CONOPS, operation plans and operation orders to increase the chance of success. Synergy throughout the operating environment is crucial for effective joint operations as space capabitilies provide PNT, SSA, ISR and SATCOM to joint forces.

In order for this to be possible, the US should be able to conduct unified action across its collective resources and diplomatic, informational, military and economic options in both the public and private space sectors. Commanders should understand how other parts of the government departments and agencies, partners, international organisations, nongovernmental organisations and adversaries use space capabilities for their own actions.

Moreover, as cyberspace provide satellite control and spacecraft data transport and SATCOM payloads are seen as a communications transport medium by the DoD Information Network, connections must be addressed during all phases of military planning and operations; this will ensure concerns on the cyberspace are met.

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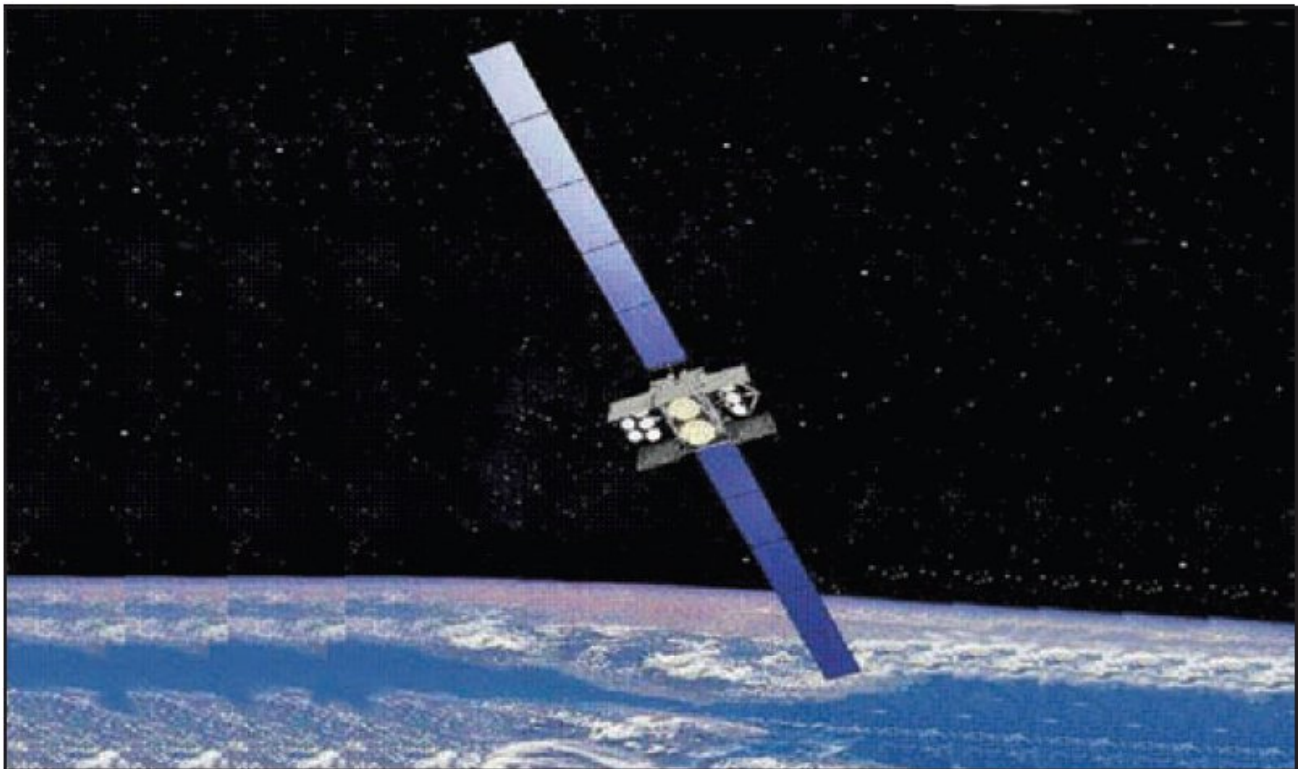
UNITED STATES (c'td)

Partnerships with allies and partners

The complexity and scale of an operation might cause military planners to get additional support with non-DOD civil, commercial and foreign organisations. The DoD has recognised that taking advantage of capabilities belonging to allies and partners will improve space operations while complicating adversaries' decision-making process. A common understanding of space operations will enable joint, interagency and multinational space operations to build partnership capacity with responsible nations, international organisations, NGOS and commercial owner/operators; this will also help with identifying the importance of capable space partners for current and future international operations. Space-related information that can be released at a large-scale should be communicated by the joint force to allies and international partners, as long as existing procedures for disclosure of intelligence and relevant information on US space systems and operations are followed.

The DoD recognises that using commercial space systems for military purposes is prone to risk, but they are becoming increasingly important to provide support to the joint force, such as SATCOM bandwidth lease and contracting for commercial imagery.



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UNITED STATES (c'td)

Future procurement

As of December 2018, the Air Force Space Command (AFSPC) commander is now assuming responsibility for the procurement of commercial satellite communications services for the DOD, which was previously the Director of the Defence Information Systems Agency. AFSPC will manage the procurement of nearly all commercial and military SATCOM for the DoD and will integrate the delivery of all SATCOM services for the joint force. The AFSPC should achieve full operational capability by October 2020.

AT SPACE OPERATIONS 2019

Dr Thomas W. Cooley, Chief Scientist, Space Vehicles, Air Force Research Laboratory, will give a presentation on the USAF S&T efforts for space vehicles and building a resilient and sustainable architecture. He will share insights on the emerging and future needs in space S&T, investment priorities in space vehicles and will present opportunities for industry.

Lieutenant General Brian Beaudreault, Deputy Commandant Plans, Policies, and Operations, U.S. Marine Corps will share insights on preparing to fight a war in and through a contested and degraded space environment. He will speak on the US Marine Corps Space Operations Working Group; Building and maintaining a cadre of space professionals in the Marines; and the integration of space operations into operational manoeuvre, and the employment of long range precision fires to operationalise Marine Corps operating concepts.

Scott Van Sant, Senior Analyst, Space Policy, USSTRATCOM will speak on USSPACECOM, a new command for a contested domain. He will elaborate on adapting organisations, policies, doctrine and capabilities to deter aggression and secure US interests and assuring their allies and partners.

SPACE OPERATIONS SUMMIT

28 – 30 MAY 2019

COPTHORNE TARA HOTEL
KENSINGTON,
LONDON, UNITED KINGDOM

An authoritative joint defence space forum designed for NATO and its partners to build mutual understanding and awareness of the evolving space landscape

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- **Major General E.G. Whyte**, Chief, **Nigerian Defence Space Administration**
- **Air Commodore Philip Lester**, Head Doctrine, **Air Space and Cyber, DCDC**
- **Brigadier General Eliot Benavidez Gonzalez**, Chief of Aeronautical Education, **Colombian Air Force**
- **Lieutenant Colonel Giovanni Sembenini**, Chief, NATO and non-European Countries R&T Programs, **Italian Secretariat General of Defence and National Armaments Directorate**
- **Major Geoffroy Beaudot**, LUX Space Policy, Directorate of Defense, **Luxembourg Ministry of Foreign and European Affairs**
- **Dr Christian Anrig**, Chief of Doctrine, **Swiss Air Force**

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