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Considerations for a NATO Space Policy

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The Joint Air Power Competence Centre released the "NATO Space Operations Assessment" report in May 2008. One of the recommendations was the need to develop a NATO Space Policy that would form the foundation for Alliance, national and public investment in space to better provide for NATO security and to better enable coalition space operations. The Alliance requires strategic direction on the use and integration of space capabilities to ensure interoperability and reduce duplication of efforts on similar space systems. Policy and guidance help to define how existing capabilities will be used and to provide direction for the development of new capabilities. There is a need to plan for space systems and capabilities today due to long lead times and the great expense of space systems. The priorities for space today and in the future must be shared amongst the nations. Currently, space in NATO is fragmented into narrow functional areas. Until there is policy, strategy and high-level guidance, NATO will continue to work in an ad hoc way. A NATO Space Policy would be a first step and should be followed by the development of a strategy, doctrine and other guidance to ensure the Alliance makes best use of the advantages and capabilities offered by space. This paper provides suggested concepts to be included in the development of a NATO Space Policy.

Space is a Critical Enabler for Security and Defence

Space gives us the capabilities to address many challenges of the 21st Century. It is essential and urgent to make effective use of these capabilities in the implementation of a wide range of policies. Space-based systems provide improved weather forecasts, satellite broadcasting and advanced navigation services; they open up new opportunities in tele-education and tele-medicine. They are critical to key areas of the economy: communication systems, electrical power grids, and financial networks all rely on satellite timing for synchronization.

Space also contributes to the knowledge-based society, providing tools for understanding our planet, its origins, its environment, the Solar System and the Universe. Space can contribute to NATO cohesion and identity, reaching citizens across all nations. Space systems have become an integral part of our economies, politics, security and defence.

Militarily, there has been significant growth in the strategic importance of space, especially as NATO forces have become expeditionary. NATO increasingly relies on space systems for on-going operations. Recently, many member nations, the European Union (EU), European Defence Agency (EDA) and the European Space Agency (ESA) have also recognized the importance of and need for space capabilities for security and defence activities. Consequently, they have issued space policies and strategies and are rapidly moving to better utilize, develop and integrate space capabilities. The many political, security and defence challenges that NATO and the member nations are facing makes a NATO Space Policy a strategic necessity for the Alliance.

Nations and their armed forces have become reliant on satellite services such as telecommunications, earth observation, missile warning and global navigation and timing. Space systems enable global situational awareness and provide the intelligence and information relied upon by decision makers. As a critical enabler for security and defence operations, space systems are vital to the Alliance in both peacetime and crisis. A comprehensive approach to space operations is important for NATO to develop the overarching

framework to be able to deliver effects to its political leadership and military forces.

Land and maritime warfare evolved over many centuries. Since the invention of the airplane in the early part of the last century, it has been proven that control of the air is critical to military operations. Space is the next medium that must be addressed. As NATO transforms to an expeditionary Joint force, it is important to have a clear long term vision for how the Alliance should use space and provide guidance on priorities and capabilities. Space systems support the nations, the Alliance, the European Union (EU) and civilian and commercial entities.

Because many nations and organizations (such as the EU and the United Nations) have issued space policies, strategies and white papers on space, a NATO Space Policy is increasingly necessary to provide guidance for the Alliance use of space for security and defence. Lacking such guidance, NATO incurs risks that its space capability requirements may not be met. High level political support is required to establish a set of guiding principles and some foundational guidelines. Political commitment by the member nations is required to ensure that current and future space capabilities and services meet the needs of the Alliance. The following guiding principles, foundational guidelines and direction for international cooperation are offered for consideration in the development of a NATO Space Policy.

Guiding Principles

Space will be used for peaceful purposes. The Alliance is committed to the exploration and use of space by all nations for peaceful purposes. The Alliance will pursue peaceful uses of space, and preserve the right to protect national assets and capabilities. NATO seeks to cooperate with other nations and organizations in the peaceful use of space to extend the benefits of space and to protect and promote freedom and security. Peaceful purposes allow NATO security and defence related activities in pursuit of national and collective security.

Long-term strategic need for space. Successful NATO transformation to an expeditionary, network enabled, Joint and Coalition military force requires improvements in its space capabilities. Political and military activities depend on assured access to information and intelligence in support of crisis management and global security operations. Space capabilities enable the monitoring of the proliferation of weapons of mass destruction, verification of international treaties, the protection of national borders and critical infrastructure, and prevention, response and recovery activities for natural and man-made disasters. The Alliance must have a long-term strategy for securing and maintaining access to space capabilities.

NATO must develop Space Power. The Alliance and its member nations will pursue the development of Space Power to strengthen its leadership position and ensure that space capabilities and technologies are available for national, Alliance, and global security and to support policy objectives. Therefore, the Alliance encourages civil exploration, scientific discovery and environmental monitoring activities such as EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites) and GMES (Global Monitoring for Environment and Security). NATO must deliver a foundational level of space support, no matter the operation, nation or location. The foundational level of support available to all forces will be telecommunications, missile warning and defence, remote sensing and navigation, positioning and timing, and protection of those space services. Strategy and plans must be developed to provide that support.

NATO will focus on space activities to support the warfighter. NATO and various stakeholders must focus on those activities to support and better enable the warfighter. The nations must make better use of existing national and multi-national space systems and foster increased integration and cooperation. In particular, nations have shared needs for telecommunications, remote sensing, and navigation and timing. NATO must develop a space architecture that allows for reachback and to coordinate in theatre with deployed forces.

NATO must have assured access to space. The Alliance considers space systems to have rights of free passage through space without interference. Purposeful interference with a nation's space system is considered an infringement of its rights. Furthermore, the entire space system (ground segment, space and command and control links) are vital to national and Alliance interests. The Alliance will preserve the rights, capabilities, and freedom of action in space; deter others from impeding those rights and take those actions necessary

to protect its space capabilities. If necessary, the Alliance may deny adversaries use of space capabilities hostile to Alliance interests. Furthermore, NATO will not develop launch systems, but may be a user of these systems. As such, member nations, civil and commercial entities should provide assured access to space.

NATO must build space expertise. While delivering space systems to provide capabilities and effects to the warfighter and decision makers is paramount, the Alliance must also develop space professionals to acquire and operate these systems. NATO requires space expertise at all levels and should have personnel assigned to Tactical, Operational, and Strategic level headquarters. Additionally, because NATO does not currently operate space systems, extraordinary efforts are required to develop NATO space professionals. Space personnel should be developed to be able to plan and integrate space capabilities and effects.

Space system acquisition has unique requirements. Space systems are extremely expensive and complex. The life cycle costs of space systems are different from other types of systems and typically only a small number of "units" will be purchased. Consequently, there is often not a chance to correct deficiencies in future blocks or upgrades. It is vital when planning and developing space systems and capabilities, that acquisition and programme managers have expertise on space programmes. Expertise is needed for programme management and to follow a systems engineering approach to development. Oversight and active management of space programmes is required. Feedback and lessons learned from operations, exercises and the components are critical for shaping future space capability requirements.

A healthy space industrial base is important. It is vital to enable and develop a robust and dynamic, globally competitive commercial space sector. This is necessary to promote innovation, strengthen Alliance leadership, ensure economic prosperity and security, and to protect national interests. Space is mutually beneficial to all nations and the Alliance encourages international cooperation with other nations and entities.

Foundational Guidelines

The Alliance is currently reliant upon the capabilities and systems provided by its member nations and obtained from commercial sources. NATO must have a space architecture that allows integration of common funded and national space systems. Future NATO and national systems must be interoperable. Furthermore, NATO should ensure commercially procured services are interoperable with Alliance systems.

Military forces must ensure space capabilities are used for maximum effect. The Alliance and its nations will pursue space technologies, to include research, development, testing, and operation of space systems. The Alliance encourages and may facilitate commercial and scientific exploration and advances in technology. As technologies advance, the Alliance should make use small satellite capabilities. Treaty monitoring and transparency and security-building measures should be incorporated into space activities.

The primary focus of Alliance space activities is the development and use of force enhancement capabilities. Force enhancement capabilities provide telecommunications, intelligence, weather, missile warning, navigation, and other space services to the warfighter. National and Alliance funding must be put towards delivering those capabilities that can most benefit the warfighter and decision makers.

Telecommunications are required for expeditionary operations, for command and control, and for information and intelligence exchange. It is vital that the Alliance develop robust secure satellite communication systems and radios. The Alliance must balance the use of dedicated and protected satellite communication systems with unprotected commercial services. Furthermore, satellite communication systems should use common standards be designed to be interoperable and provide for cost reductions by sharing of capability.

Earth observation and remote sensing are important for security and defence. The Alliance requires assured access to robust optical, infrared, multi-spectral and radar observations systems. Significant effort should be made to utilize and integrate commercial satellite capabilities and services. Future systems should be designed to be interoperable, to share command and control networks and

ensure data and products can be easily exchanged.

Navigation, position and timing information from space will continue to be imperative for civilian and military applications. The Alliance will continue to use GPS as its standard space-based navigation and timing system but will evaluate the need to use the future Galileo system. There are increasing threats and vulnerabilities to space navigation systems and those risks must be mitigated.

The Alliance will maintain the capabilities to provide ballistic missile warning and defence. Through data sharing and integrated defence systems, the Alliance intends to deter aggression from a position of strength by ensuring information superiority and the ability to defend its nation's interests. The Alliance must have space capabilities to provide continuous, strategic and tactical warning and be part of a multi-layered integrated missile defence system.

Space surveillance is a need to ensure space flight safety and to provide space situational awareness. Increased cooperation and information exchange is required. International efforts to establish a robust global space surveillance network and integrating sensors into the US space surveillance network should be pursued to more effectively monitor space systems, debris and other potential threats.

The Alliance requires access to imaging, signals and electronic intelligence satellite capabilities, as these are vital to decision superiority.

The protection of space systems and assured access to space capabilities should be a top priority for the Alliance. Space systems must be protected from land, sea and air attacks as well as from jamming and interference. The information systems must be protected from intrusion and network attacks. Protective measures and techniques should be designed into the ground and space segments. The Alliance must develop capabilities, plans and options to ensure freedom of action of space capabilities, and if necessary to deny such freedom of action to its adversaries.

A great challenge is the sharing of space based intelligence information. The nations have experience in exchanging intelligence provided by air platforms, but due to the strategic nature of satellite systems and classification issues, the nations have less expertise in space-based intelligence. Some intelligence will always be kept at the national level, but significant effort must be made to exchange information and intelligence. In light of the current security threats and an era of increased trust and cooperation, nations must review what information and products can be exchanged in the framework of the Alliance. The emphasis must be on moving from a "need to know" to a "need to share." The Alliance must develop an intelligence architecture to collect, manage, store, analyze and disseminate space-based products. Education and training of personnel on available space capabilities and products and the request and collection management process must be a top priority that will immediately benefit our warfighters.

Core to developing a viable capability and to ensure standards and interoperability is developing space professionals. This small core of personnel highly trained and educated on space can be leveraged by the Alliance. The nations must incorporate space into military education at all levels. While NATO can provide standards and objectives for training, it is not solely a NATO responsibility. It is expected that all the nations will begin to develop a core of space specialists. Furthermore, when filling NATO posts, care must be taken to man them with the right people with the appropriate training and experience.

Exercises and training events must incorporate space activities. Commanders must be challenged to solve problems that include employment and loss of space capabilities during exercises. Space capabilities and activities must be incorporated and integrated into existing boards and processes. Space capabilities support Joint forces and all of the components must have space expertise. To foster increased cooperation and provide reachback capability, the Alliance should develop a NATO Space Operations Coordination Centre to fuse national and Alliance space capabilities and to better provide support to decision makers and the Joint warfighter.

Spectrum and Orbital Management

As more nations and entities operate space systems, the increased strain on spectrum and orbital management requires the most efficient use of limited frequencies and orbital assignments. There must be increased cooperation to better manage these limitations.

Orbital debris must be mitigated. Risk of collisions from orbital debris poses a significant risk to all nations operating satellites. NATO nations will seek to minimize creation of orbital debris by government and non-government operations in order to preserve the space environment. Nations will continue to follow international efforts to ensure flight safety, mitigate risk, and share space surveillance information as is required to maintain situational awareness. To this end, nations are encouraged to increase cooperation and sharing of sensor data, standardization of surveillance data and orbital parameters and the development of a robust global space surveillance network.

International Cooperation

Many nations will continue to pursue their own national space programmes. The security challenges facing today's nations are great and resources are increasingly scarce. Nations with limited funding for space programmes should seek increased opportunities for partnerships and cooperation in the interest of Alliance security. Many space systems are dual-use, for both civilian and defence applications. In order to reduce duplication of capabilities and to best leverage the limited funding for space capabilities, the member nations should pursue increased international cooperation and transparency, partnerships, and participation in dual-use systems.

NATO must engage with the European Union, the European Defence Agency, European Space Agency and national agencies and departments to strengthen space policy, strategy and information exchange. There must be greater cooperation and closer partnerships in order to develop Space Power for the Alliance. NATO must leverage the space expertise and experience of other organizations until an appropriate level of space expertise is developed in the Alliance staff.

Security Classification. The research, technology, development, operations and products of space activities shall be classified as necessary to protect sensitive information. However, in the interest of trust building and collective security, nations will ensure systems and procedures are developed to safeguard classified information in order to more widely share intelligence and information. Confidence building measures, verification and standardization are required to operate in today's collaborative environment. Information assurance and security must remain a top priority.

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