



Security in Outer Space: Perspectives on Transatlantic Relations

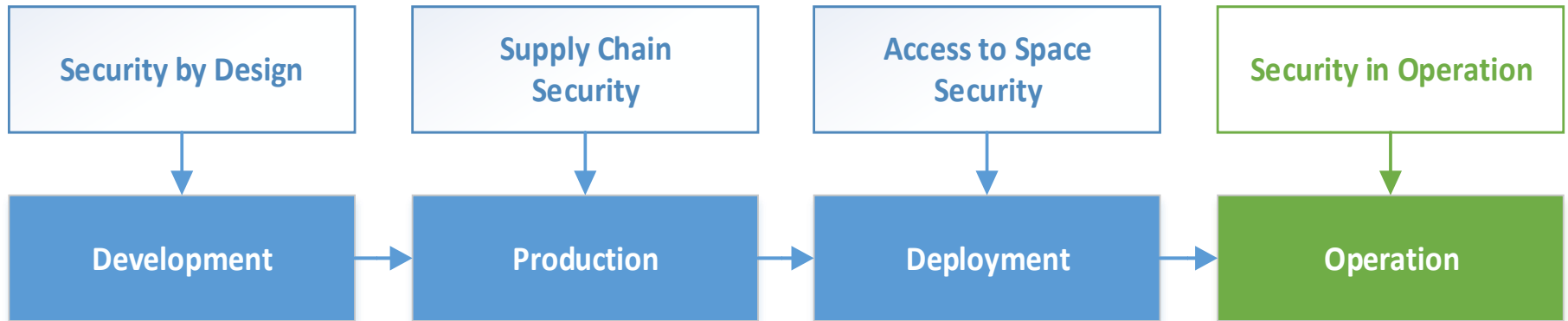
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Space security: a multidimensional concept

Security in Outer Space	Outer Space for Security	Security from Outer Space
The protection of the space infrastructure against natural and man-made threats or risks, ensuring the safety and sustainability of space activities.	The use of space systems for security and defence purposes.	The protection of human life and the Earth environment against natural threats and risks coming from space.

- **Space Situational Awareness (SSA):** Current and predictive knowledge and understanding of the outer space environment including space weather and location of natural and manmade objects in orbit around the Earth;
- **Space Environment Protection and Preservation (SEPP):** Preventive and curative mitigation of negative effects of human activity in outer space on the safety and sustainability of the outer space environment;
- **Space Infrastructure Security (SIS):** Assurance of the infrastructure ability to deliver a service that can justifiably be trusted despite a hazardous environment.

Security throughout system lifecycle



Rising challenges to space infrastructure security

- Challenges to space infrastructure security:
 - **Unintentional hazards:** space debris, accidental interferences...
 - **Intentional threats:** ASAT, malicious interferences, cyberattacks...
 - **Space weather hazards:** geomagnetic storms, solar storms...
- Space is an increasingly congested and contested resource:
 - **Multiple and diverse:** different mitigation and protection measures;
 - **Interrelated and interdependent:** holistic approach, interdependence between actors;
 - **Ubiquitous and inclusive:** all systems affected, different degrees of exposition/vulnerability;
 - **Intensifying:** various trends (e.g. increasing space activity, new concepts, connected space, strategic target, 'space control' capabilities);
- Growing dependence on space: risks for society and economy at large.

Policy areas and activities: ESPI Matrix

	Capacity-building programmes	Legal and regulatory regimes	Diplomacy and cooperation
Space Situational Awareness	<ul style="list-style-type: none"> • SST capabilities development • Space weather models development • SSA services delivery 	<ul style="list-style-type: none"> • Space objects registration obligations and procedures • SSA data policy 	<ul style="list-style-type: none"> • SSA data sharing agreements • TCBMs
Space Environment Protection and Preservation	<ul style="list-style-type: none"> • CleanSpace technologies development (e.g. active debris removal solutions) 	<ul style="list-style-type: none"> • Space law (e.g. end-of-life obligations) • Standards for space environment-friendly design (e.g. passivation devices) 	<ul style="list-style-type: none"> • Space Debris Mitigation Guidelines • Long-term sustainability guidelines • International Code of Conduct proposal
Space Infrastructure Security	<ul style="list-style-type: none"> • Security enhancing technologies development (e.g. secure links, materials) • Resilient system architectures (e.g. fragmented systems) 	<ul style="list-style-type: none"> • Space programme security rules and procedures • Security and safety standards • Supply chain control processes (e.g. import, qualification) 	<ul style="list-style-type: none"> • Collision avoidance procedures and coordination • Deterrence through hosted payloads on allies' satellites

ESPI studies on “Security in Outer Space”

Rising Stakes for Europe



Published: August 2018

Perspectives on Transatlantic Relations



Upcoming: November 2018

Towards a European Space Traffic Management Policy



Planned: 2019

Security in Outer Space: Perspectives on Transatlantic Relations

Research objectives

- **Provide a comprehensive understanding of current U.S. and European approaches to space security** in view of revisited and reinforced cooperation in the field;
- **Provide insights and perspectives on the current state of play in transatlantic cooperation** and identify key areas for potential cooperation in view of recent and future foreseen developments;
- **Identify key areas of potential future transatlantic partnerships** in the field of security in outer space and assess their feasibility and political rationale;

European approach - Policy drivers

- **Secure the results of the continuous and substantial investment** made by public and private actors;
- **Protect the European economy and society** against risks related to its pervasive and sizeable dependence on the space infrastructure;
- **Contribute to a service oriented policy** by assuring the ability of the infrastructure to deliver a service that can be justifiably be trusted, in particular for users in defense and security;
- **Guarantee European autonomy and freedom of action** in the field of security in outer space with implications on the space domain at large (non-dependence).

European approach – Long term stakes

“Promote Europe’s position as a leader in space, increase its share on the world space markets, and seize the benefits and opportunities offered by space.”

- **Space security now holds a central position in space diplomacy:** Need to play a prominent role on the international scene, as a promoter of a clear, united and consistent “European way”.
- **Security plays an increasing role in commercial space markets:** Support the European industry competitiveness and stimulate the emergence of a commercial market.

European approach – Key elements

National governments: core actors of space security in Europe

- Space security policy **primarily addressed at national governmental level and driven by domestic security and defence strategies** with **some reluctance to transfer sovereignty**.
- **European cooperation progressing** but remains **mainly structured through bilateral and intergovernmental frameworks** (pan-European cooperation still faces hurdles).

European approach – Key elements

ESA: a key player of capability-building

- **ESA launched a number of initiatives** including an SSA programme (limited SST component on MS request), a Cybersecurity excellence centre, the CleanSpace initiative, IADC...
- **ESA made efforts to improve its capacity/legitimacy to handle security-related activities.**

European approach – Key elements

EU: consolidating its role in space and security & defence policies

- **Space security is of special importance for the EU**, at the crossroad of space and defence & security policies, two strategic areas of development of the EU.
- **EU awards an increasingly great importance to the security of its space programme** (e.g. security accreditation, security architecture, data security policy, synergies with defence...).
- **A number of activities are supported by/embedded in EU programmes** (e.g. EU SST support framework, H2020 R&D projects, international diplomacy initiatives).

U.S. approach - Strategy

- **Legacy of successive administrations policies in space security**, reflecting that space had become an important component of U.S. national security, military but also economy and society.
 - **2001-2008: George W. Bush – Unilateral hegemony in space**
 - **2009-2016: Barack Obama – Leadership through cooperation**
- **Since 2017: Donald Trump Administration – Peace through strength:**
 - Space as a warfighting domain: “prioritize investments in resilience, reconstitution, and operations to assure [the U.S.] space capabilities”;
 - A “whole-of-government approach to U.S. leadership in space”, in close partnership with the private sector and allies.
- **2018 Space Strategy includes 4 essential pillars, all related to Security & Defence:** 1) Mission Assurance, 2) Deterrence and Warfighting, 3) Organizational Support, 4) Conducive domestic and international environment

U.S. approach – Policy drivers

- **Assure military superiority in space and on the ground:** Space infrastructure is a critical component of warfare; Strengthening of deterrence in space and on the ground; Re-emergence of a space warfare doctrine and need for tactical response options in space.
- **Safeguard national security against space vulnerability:** Growing perception of vulnerability in space (i.e. concept of Space Pearl Harbor); Need to protect critical space assets against threats (e.g. ASAT, cybersecurity, jamming & spoofing).
- **Foster commercial space:** Give way to a potentially promising commercial market; Foster competitiveness from cost-effective economic agents; Avoid diverting valuable public assets from their strategic missions.
- **Reinforce global leadership in space:** Position the U.S. as leader in a domain of increasing strategic significance on the global scene; Promote space safety standards and norms across the international community.

U.S. approach – Key elements

- **Unmatched SSA capabilities** thanks to massive investments from defense budgets; expected to be further improved (Space Fence programme)
- **Promotion of deterrence- and resilience-oriented architectures:**
 - Fragmented systems (e.g. constellations, miniaturized systems)
 - Hosted payloads (e.g. hosted DoD payload on Norwegian satellite)
- **Space Policy Directive 3:**
 - Reorganization across military and civil/commercial branches
 - Encourage and facilitate U.S. commercial leadership
 - Improve SSA data interoperability and enable greater SSA data sharing
 - Develop STM standards and best practices
- **Space Force:**
 - Congress approval required;
 - Symbolizes new U.S. posture, reactions expected on international scene

Transatlantic relations

- **Strong roots of value-based partnership in various sectors** (economy, security, space...)
- **Recent deterioration of relations, implications in space unclear** (usually unaffected by ups and downs)
- **Transatlantic relations in space security are organized through different channels:**
 - **Bilateral government-to-government channels:** SSA data sharing agreements / Operational liaison and exercises (military field)
 - **Europe-wide to U.S. channels:** Regular EU – U.S. Space Dialogues; Case-by-case cooperation between U.S. / European organisations
 - **Multilateral channels:** NATO, UN COPUOS, Conference on Disarmament, IADC, ITU... (different stakeholders represented)
 - **Government-to-Industry, Industry-to-Industry cooperation:** Satellite operators relying on governmental and commercial data and services; Space Data Association cooperation:

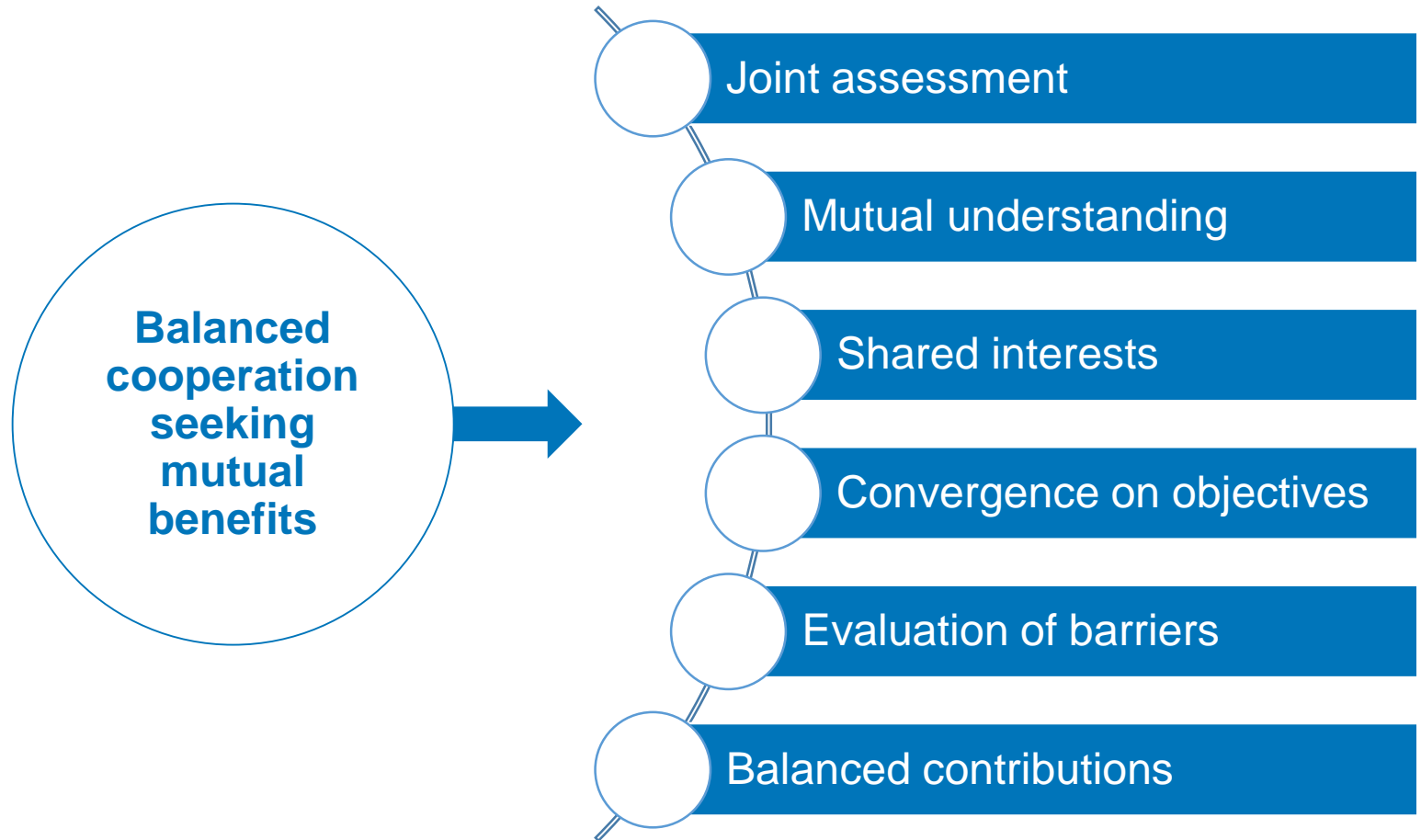
Key findings and takeaways

- **Space security is a priority** of respective Space and Security/Defense strategies;
- **Comparable assessment of security challenges based on different policy drivers:**
 - **In the U.S.:** Perception of a national security vulnerability in the space domain (i.e. Space Pearl Harbor) driving the protection of space assets against threats and preparation of tactical response;
 - **In Europe:** Stakeholders ready to consider multiple challenges (with different priorities) but difficulties to translate it into operational cooperative decisions;
- **Similar activities (SSA, SEPP, SIS) but lopsided state of affairs (policy, resources, capabilities).**

Key findings and takeaways

- **Transatlantic relations encompass a complex mix of frameworks and channels**, institutional framework at European political level not yet established - cooperation on a case-by-case-basis.
- **Recent and foreseen developments create a fertile ground to revisit and reinforce transatlantic relations:**
 - **In the U.S.:** Reorganization across military and civil/commercial branches (SPD-3) may have consequences for international partners; New opportunities for cooperation (e.g. Space Traffic Management).
 - **In Europe:** Consolidation and reinforcement of the European approach will imply considerations for cooperation with third countries (in particular the U.S.).

Revisiting / reinforcing cooperation: conditions



Potential areas of reinforced cooperation

Space Situational Awareness: implications of developments on transatlantic cooperation

- Changes in U.S. organization: impact on SSA data sharing agreements (channels, data, confidentiality, fees...)
- Considerations for transatlantic cooperation in European SSA developments and autonomy policy (complementarity/redundancy of capabilities, data sharing)
- Cooperation at EU level: mandate in specific areas including international relations

Potential areas of reinforced cooperation

Space Traffic Management: fostering compatibility and convergence of frameworks

- Triggering effect of U.S. announcement on national/regional approaches (India, Japan, Russia, China, Europe)
- Considerations for transatlantic cooperation in the development of respective frameworks:
 - Alignment of policy: convergence on objectives, development of common requirements
 - Coordinated implementation: future step

Potential areas of reinforced cooperation

Commercial policy: benefits and conditions for an open market

- U.S. and Europe share vision on commercial space at large but are at different level of maturity in the integration of such involvement in space security policy
- Conditions for an open market (shared delineation of commercial areas, common standards, compatible security requirements)

Thank you

The European Space Policy Institute (ESPI) provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities. In this context, ESPI acts as an independent platform for developing positions and strategies.