

U.S. Space Policy: Implications for Europe

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Independent public think-tank in space policy

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.

Yearbook and SPIT 2017



ESPI Springer Briefs



Studies: international



Studies in Space Policy



ESPI Executive Briefs



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Space, an integral component of U.S. policy

- **U.S. framework:** Space affairs integrated in U.S. policy at highest level
 - Alignment with administration orientations (colored space policy)
 - Incentive for decision-making with ambitious implications
 - Mix of continuity and discontinuity in U.S. space policy

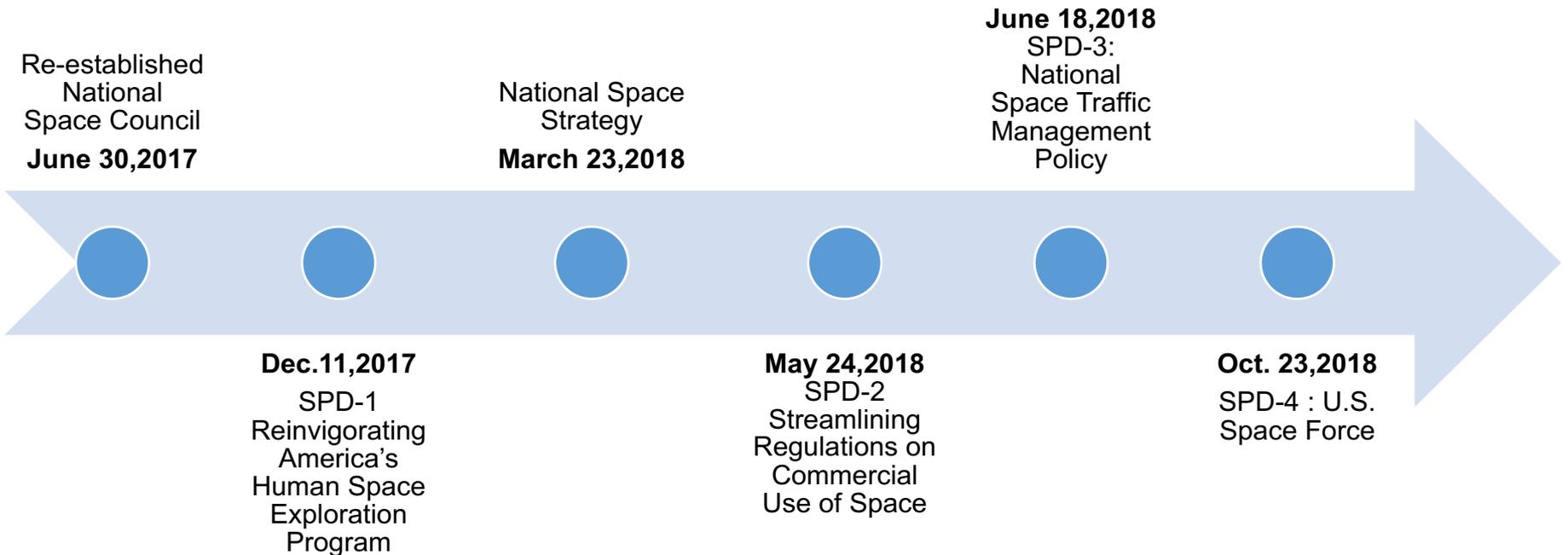
2009-2016: Barack Obama Leadership through cooperation



2001-2008: George W. Bush
Unilateral hegemony in space

2017- : Donald Trump
America first, not America alone
Peace through Strength

New President, New Framework



America First National Space Strategy

- **“America First” - Leadership & National Security:** “Whole-of-government approach to U.S. leadership in space, in close partnership with the private sector and allies.”
 - Leadership in space exploration and international endeavors (incl. ISS, diplomacy...)
 - Leadership in commercial space: fostering U.S. industry competitiveness and growth
 - Safeguard national security: shift in space defense posture – Peace through Strength

- **Four essential pillars:**
 1. **Mission Assurance:** Resilient space architectures (fragmented systems, IOS, hosted payloads)
 2. **Deterrence and Warfighting:** Space as a warfighting domain, deterrence of conflicts in space (diplomacy and counterspace capabilities)
 3. **Organizational Support:** Effective space operations (situational awareness capabilities, intelligence, and acquisition processes)
 4. **Conducive Domestic and International Environment:** Streamlining regulatory frameworks to support U.S. commercial industry, Bilateral and multilateral cooperation (space exploration, space security & defense...).

Space Policy Directives

SPD-1

Reinvigorating America's Human Space Exploration Program

- Return to the Moon (Constellation programme): Lunar Orbital Platform-Gateway concept
- Impact on ISS funding: Federal budget 2019 proposal to cut direct funding after 2025

SPD-2

Streamlining Regulations on Commercial Use of Space

- Review of regulatory regimes for launch and re-entry activities (single license for commercial operations), commercial remote-sensing, radiofrequency and export control
- "one-stop shop" within the Department of Commerce for commercial space

SPD-3

National Space Traffic Management Policy

- National-led approach to security challenges (SSA data, STM best practices and norms)
- Reorganization of responsibilities across military and civil branches
- Reaction to slow and limited progress of multilateral endeavors in the field of space security

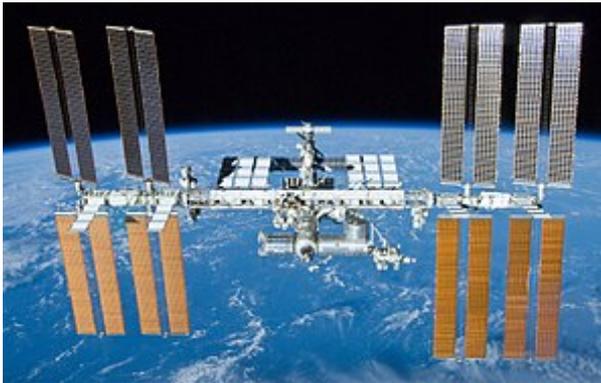
SPD-4

Space Force

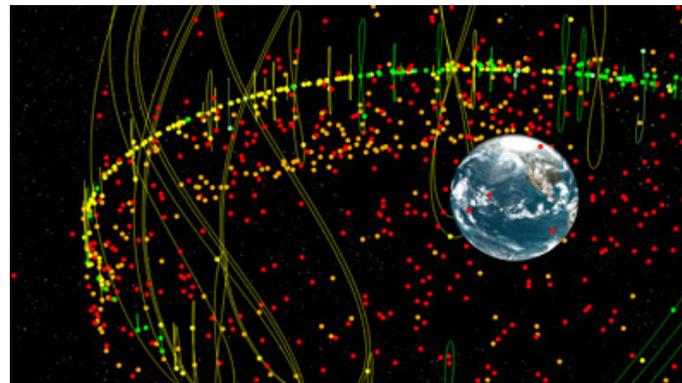
- Internal reorganization: 6th Branch of U.S. Army
- Congress approval required
- Symbol of a more open/aggressive posture on space arms race (space warfare doctrine)

Implications for Europe

- Space exploration: ISS programme and post-ISS preparation



- Space security: Towards Space Traffic Management



International cooperation in space exploration: ISS programme & post-ISS preparation

International cooperation in space exploration: Latest developments

U.S. scene

- **NASA's Transition Authorization Act**
- Redirection of SLS and Orion capsule with uncrewed launch followed by a crewed mission to the Moon
- Steers NASA away from the Asteroid Redirect Mission (ARM)

1st sem. 2017

International scene

- **Space Policy Directive 1**
- Objective to return to the Moon in cooperation with international and commercial partners
- Deep Space Gateway (DSG) concept

2nd sem. 2017

- NASA-Roscosmos sign joint statement on researching and exploring deep space
- ESA Call for Ideas to invite the European science community and industry to propose research projects to be performed on the DSG

- **Federal Budget FY2019**
- End of direct federal funding to the ISS by 2025
- Transfer of ISS operations to the private sector (\$150M)
- Lunar Orbital Platform-Gateway (LPO-G) concept

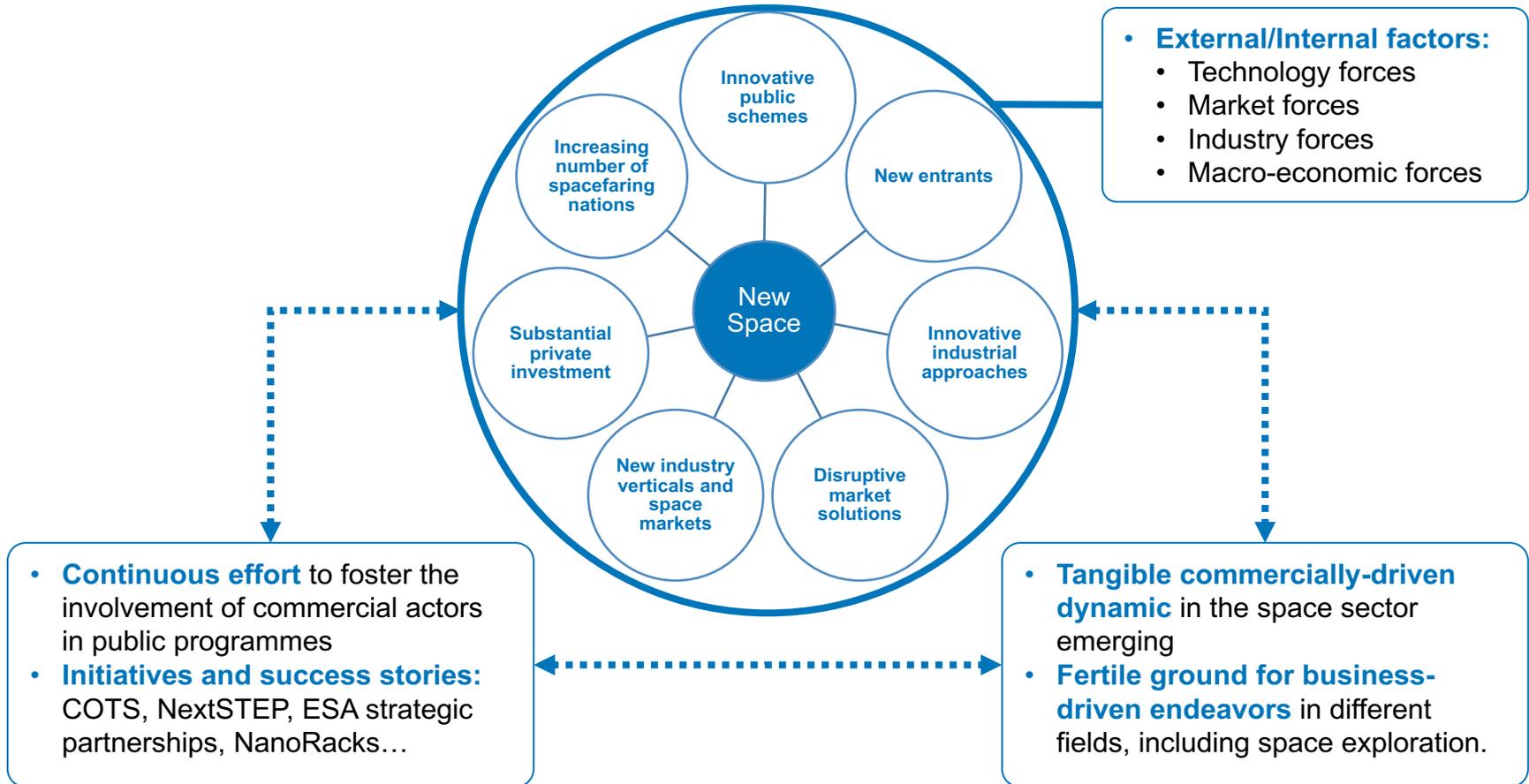
2018

- NASA-JAXA sign joint statement on space exploration
- ISECG introduces the DSG/LPO-G concept in its global exploration roadmap
- ISEF participants affirm that “extending exploration [...] from LEO through the Moon to Mars and beyond is a goal widely shared by the international community”

International cooperation in space exploration: State of Affairs

- **State of affairs:**
 - Acceleration of discussions both on U.S. and international scene
 - Fertile environment for international partners to contemplate a financially and technically conceivable contribution to the programme
- **Stakes at play:**
 - International cooperation required to achieve ambitious goals, share burden, secure long-term stability for the programme
 - Definition of a technical and programmatic architecture meeting the objectives of diverse partners
 - Release of appropriate funds, agreement on arrangements (programmatic framework, contributions, commitments...)
- **Options under consideration:**
 - ISS programme: transfer of operations to the private sector (U.S.)
 - Post-ISS: convergence on the LPO-G concept

Transfer of ISS operations to the private sector: A new ecosystem



Transfer of ISS operations to the private sector: Challenges

- Involvement of commercial actors has long been considered (various initiatives):
 - Maximisation of socio-economic benefits of the ISS programme
 - Cost-savings options and involvement of supposedly more cost-effective economic agents
- Despite success stories, this objective materialized only partially:
 - Commercial activities remain, first and foremost, valuable complementary contributions
 - Cost-effectiveness achieved for specific large, long-term contracts (e.g. COTS)
 - Public support (e.g. loans and subsidies, R&D funding, public demand, partnership), remains essential to ensure a profitable and sustainable business model
 - Do not fit, so far, the objective to release fund
- Key challenges for the private sector (profitability, sustainability):
 - Acquisition of customers (outside space agencies)
 - Cost of access to the ISS (launch, safety requirements)
 - Long-term exploitation (maintenance costs)
 - End of life management
- U.S. confident that, with the right approach, a progressive transfer of ISS operations to the private sector can be successful
- Lessons learnt will prove essential to pave the way towards ambitious public-private partnerships embedded in the Lunar Orbital Platform-Gateway programme

Transfer of ISS operations to the private sector: Implications for Europe

- **State of affairs:**
 - Europe (ESA, national agencies) is proactive to foster commercial use of the ISS (e.g. TTP, strategic partnerships - ICECubes, Bartolomeo)
 - Comparable return on experience: success stories but hardly sufficient to cover European contributions to the programme (incl. running costs)
 - U.S. policy would have profound implications for Europe: new (not chosen) partners, ISS resources management, modules' operations (incl. accessibility)...

- **Stakes at play:**
 - **Evaluation of implications for Europe:** In-depth investigations of potential implications (programmatic, technical, legal, financial)) and identify possible options for Europe
 - **Discussions with international partners:** Transparent and substantive discussions (i.e. with the U.S. and other ISS partners) to understand how respective objectives can be conciliated
 - **Preparation of European industry participation:**
 - Assessment of European industry's interest (i.e. as user/customer or as operation partner)
 - Examination of European industry participation conditions (competition or, more likely, industry-to-industry cooperation)
 - Roadmapping of necessary activities (e.g. R&D, demonstration, qualification) to support the emergence of European champions

Post-ISS: What role for Europe?

- **State of affairs:**
 - ESA space exploration strategy considers different options (destinations, missions, objectives)
 - Europe is engaged in technical discussions with NASA and other partners and organised various consultations
 - ESA director general advocates for the Moon Village concept as “A vision for global cooperation and Space 4.0”
- **Stakes at play:**
 - **Secure an active participation** in the definition of a technical and programmatic architecture
 - **Ensure Europe’s capacity to react timely to upcoming decisions:**
 - **Converge on a European position** endorsed by Member States at the highest political level
 - **Set European ambitions** taking into account that the role of Europe will be framed by the resources it is ready to commit
 - **Outline possible European contributions:**
 - Springboard for Europe to implement, at least partially, the Moon Village vision (e.g. European-led component)
 - Development/Validation of key capabilities for future missions (e.g. ISRU, robot-human coop., base assembly)
 - **Prepare programmatic arrangements: Multilateral agreement (e.g. ISS IGA) not privileged** (multiple bilateral agreements): Challenge for Europe to ensure consistency/coordination of its contributions and to weigh on the decision processes.

Preparing the way forward

- **The Post-ISS era must build on a positive outcome of the ISS programme:** need to converge, soon, on conditions for continuation or termination.
- **Future still uncertain BUT options are on the table** and actively discussed (far-reaching implications)
- **Next steps will require collective decisions:** for Europe, this calls for 1) an open dialogue to anticipate future developments and 2) a joint European position to secure a capacity to react timely and weigh on upcoming decisions.
- **First step:** Agree on indisputable guiding principles (mandatory in such uncertain and intricate context)
 - Put at the agenda of the next ESA Council meeting at Ministerial level / MS representatives granted the appropriate mandate to negotiate (far-reaching and long term issues)
 - Alternative: direct negotiation between heads of states (add weight to Europe's position, same as other countries)

Space security: Towards Space Traffic Management

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.

Parallel routes towards common objectives

	United States	Europe
Policy drivers	<ul style="list-style-type: none"> National security (vulnerability, Space Pearl Harbor...) Military superiority in space (Ultimate high-ground) Promotion of commercial market 	<ul style="list-style-type: none"> Protection of investment and of socio-economic return Meeting security requirements of service-driven policy Achieve autonomy
Organisation	<ul style="list-style-type: none"> Sharing of responsibilities between DoD and DoC (SSA/STM); Top down approach to military/civil domains Other national institutions on case-by-case (NASA, NOAA, FCC, FAA) Intricate relations between the different actors 	<ul style="list-style-type: none"> Multiple actors loosely coordinated European countries (dual approach, reluctance to transfer sovereignty, European cooperation challenged) EU and its agencies (crossroad of space and security policies, evolving role under consideration) ESA (capability-building)
Major developments	<ul style="list-style-type: none"> New national space security strategy National STM policy Establishment of a Space Force within the DoD 	<ul style="list-style-type: none"> New regulation (SSA component) New Defence Space Strategies (UK & France); Rising awareness in policy debate (capabilities, coordination, cooperation with partners)
SSA capabilities	<ul style="list-style-type: none"> Self-sufficient (unmatched SSA capabilities, precision to be improved, coverage to be complemented) Enhancement: Space Fence, SSA data “crowdsourcing” 	<ul style="list-style-type: none"> Strong reliance on U.S. SSA data sharing agreements; Improvement of SSA capabilities expected in coming years
Involvement of private actors	<ul style="list-style-type: none"> Policy intends to foster commercial activities (SSA data, contribution to STM...); Developing commercial activity in SSA data and related services 	<ul style="list-style-type: none"> Mostly contractors (R&D projects, development and manufacturing); Repeated calls for more industry-led initiatives but no policy decision

Transatlantic relations in space security

- **Transatlantic relations encompass a complex mix of frameworks and 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:
- **No formal and inclusive framework at political level established yet** (cooperation on a case-by-case-basis)
- **Recent deterioration of relations, implications in space unclear** (usually unaffected by ups and downs)

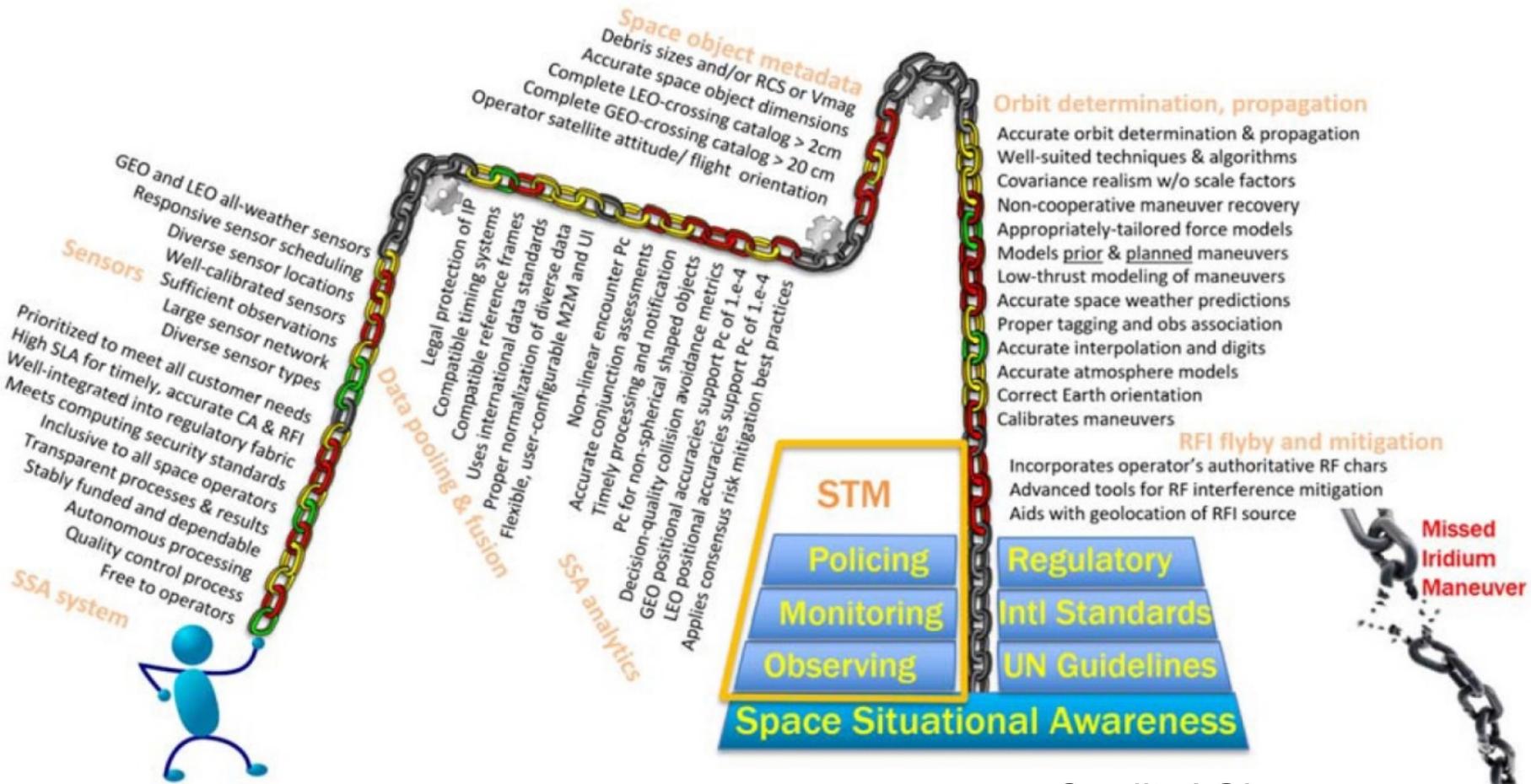
SPD-3: National Space Traffic Management Policy

- **Step forward** in recognising the severity of issues at stake and the urgency of setting up a framework to prevent and mitigate space security threats:
 - “The future space operating environment will be shaped by a significant increase in the volume and diversity of commercial activity in space”
 - “As the number of space objects increases, [the current] limited traffic management activity and architecture will become inadequate.”
- **Objective** to “develop a new approach to space traffic management that addresses current and future operational risks.”
- **Clear political willingness to accelerate** activities through national-led engagements:
 - Reaction to limited progress at international level (recurring difficulty of making actors converge on necessarily constraining international measures)
 - The policy does not necessarily challenge the relevance of multilateral efforts in space security

SPD-3: National Space Traffic Management Policy

- **Space Policy Directive 3 calls for:**
 - **Reorganization of responsibilities across military and civil branches:** top-down approach to SSA data sharing
 - **SSA data enhancement** to reach the appropriate accuracy required to safely plan, coordinate, and synchronize in-orbit activities and mitigate collision risks;
 - **SSA data policy** to set up appropriate information management structures (collection, fusion, distribution) safeguarding data integrity, reliance and confidentiality;
 - **Specification of STM best practices and norms** to enhance the safety, stability, and sustainability of operations in the space environment across different stakeholders (military, civil, commercial);

STM: an ambitious objective



Credit: AGI

Challenges ahead

- **SSA data enhancement and data policy:**
 - **Enhancing SSA data coverage and precision implies relying on multiple data sources (crowdsourcing):** 1) new U.S. sensors, 2) SSA data sharing, 3) purchase of SSA data and services.
 - **New challenges to ensure data availability, reliability, integrity and confidentiality.**
 - **Revisit of data sharing agreements** with international and private partners and integration of commercial data and services
- **Specification of STM best practices and norms:**
 - **From informative to normative STM:** specification of norms of behavior encompassing preventive, operative, and curative measures across the lifecycle of space systems (best practices, standards, regulations)
 - **Coordination at international level** of multiple, possibly divergent, regional/national approaches to STM.

Implications for Europe

- **Preparing a European approach to Space Traffic Management:** Setting up a dedicated forum to coordinate the views, needs and possible contributions of European stakeholders
- **SSA data enhancement and data policy:**
 - **Improve Europe's bargaining power:** close capability gap in SST/SSA (balanced cooperation), balance between autonomy and cooperation (complementarity, resilience, interoperability)
 - **Consolidate European approach** around a clear leadership (intergovernmental and supranational) and SSA data policy (military/civil)
 - **Foster the emergence of European commercial actors** able to compete/cooperate in an open transatlantic SSA market;

Concluding remarks

- **Significant progress of U.S. space policy in key areas...**
 - **National Space Council** provides an effective structure for high-level decision-making in space policy (long-term vision)
 - **Capacity to implement these policies to be demonstrated** (Administration/Congress, complex operational level)
- **...complexity of space policy decision-making in Europe**
 - **Scattered framework (vertically and horizontally):** multiple actors, shared responsibilities, lack of integration in policy debate
 - **Key challenge for Europe:** capacity to translate different stakeholders views into policy decisions with long-term implications

Thank you

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