

# U.S. Space Policy: Implications for Europe

SIRIUS Talks  
Toulouse, 23rd October 2018

# 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



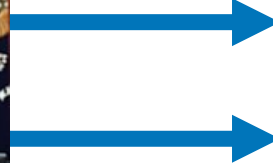
## Conference proceedings



# 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

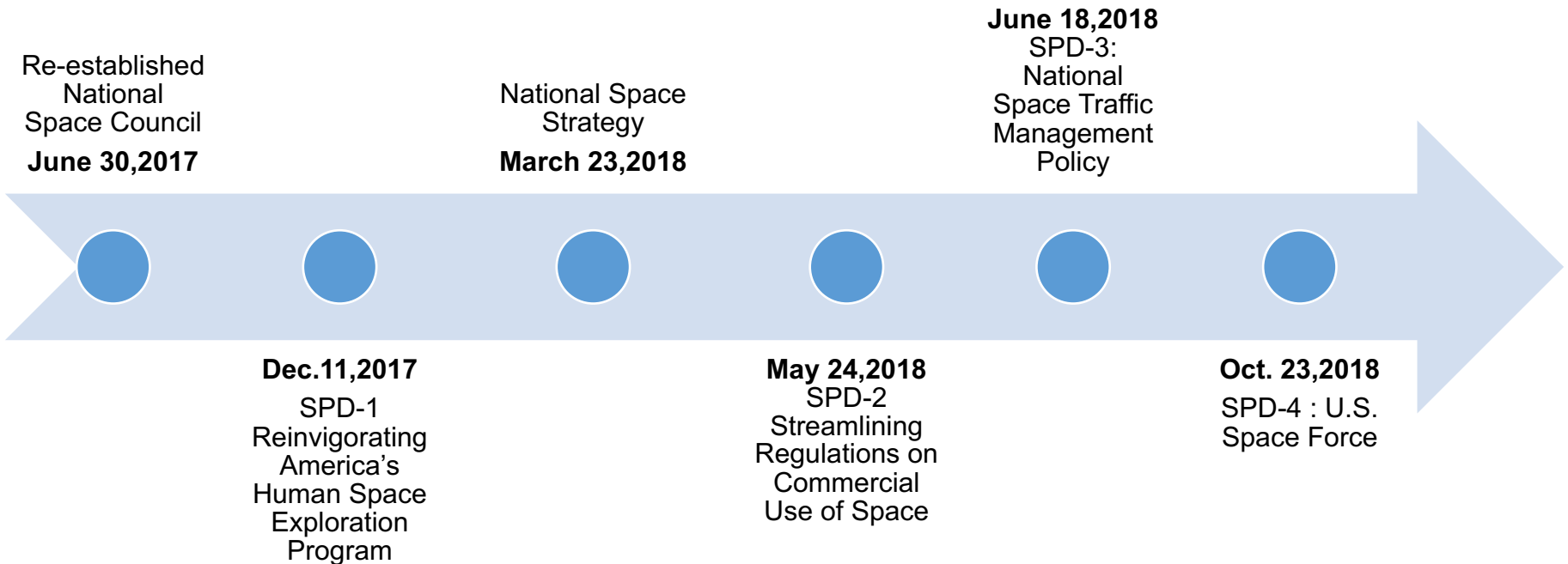
## 2009-2016: Barack Obama Leadership through cooperation



**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

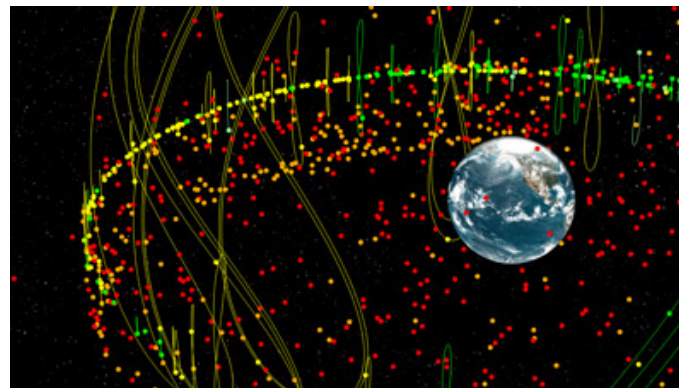
- Internal reorganization: 6<sup>th</sup> Branch of U.S. Army
- Congress approval required
- Symbol of a more open/aggressive posture on space arms race (space warfare doctrine)

## 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)

1<sup>st</sup> 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

2<sup>nd</sup> 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

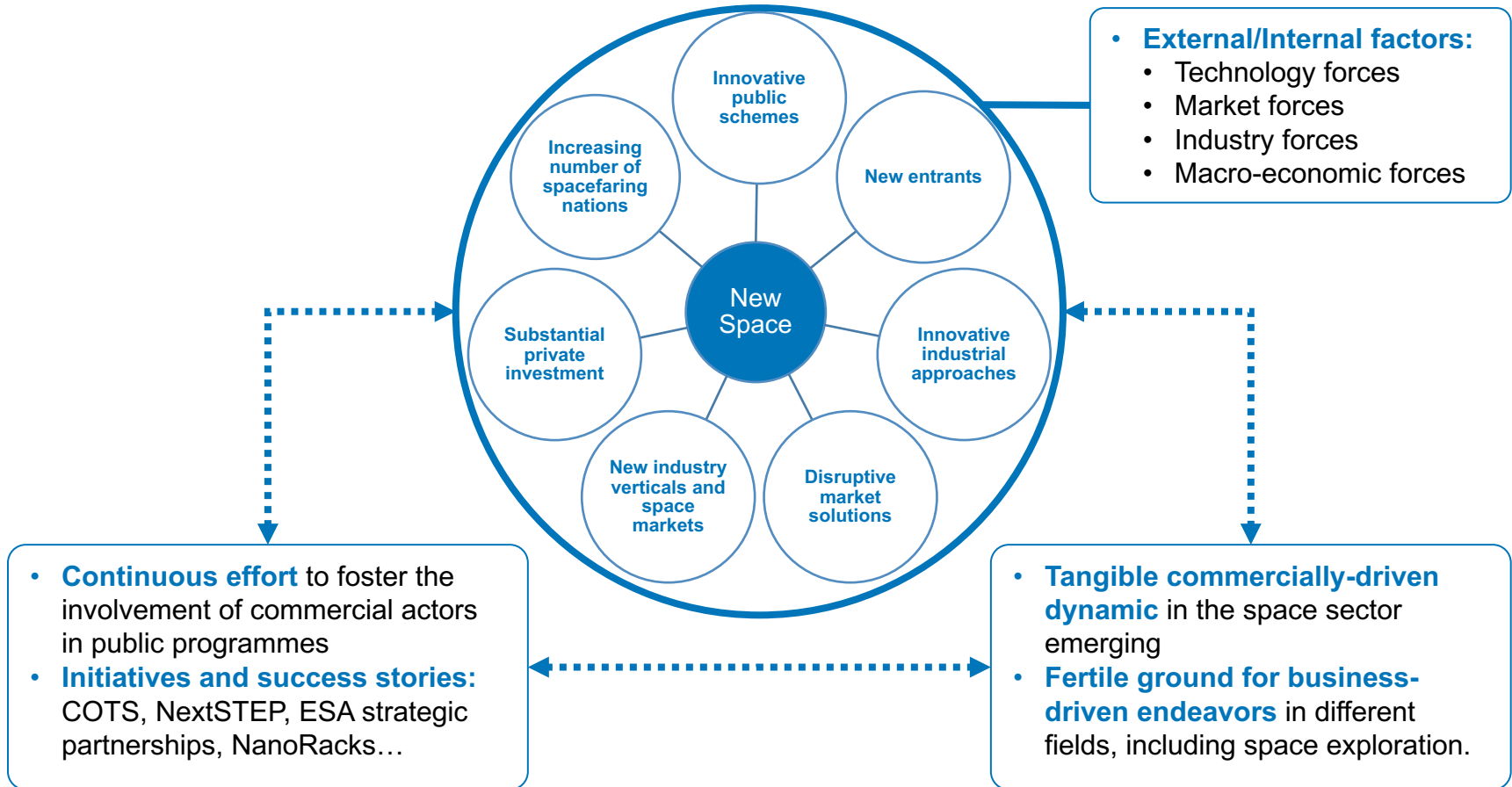
2018

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

# 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)

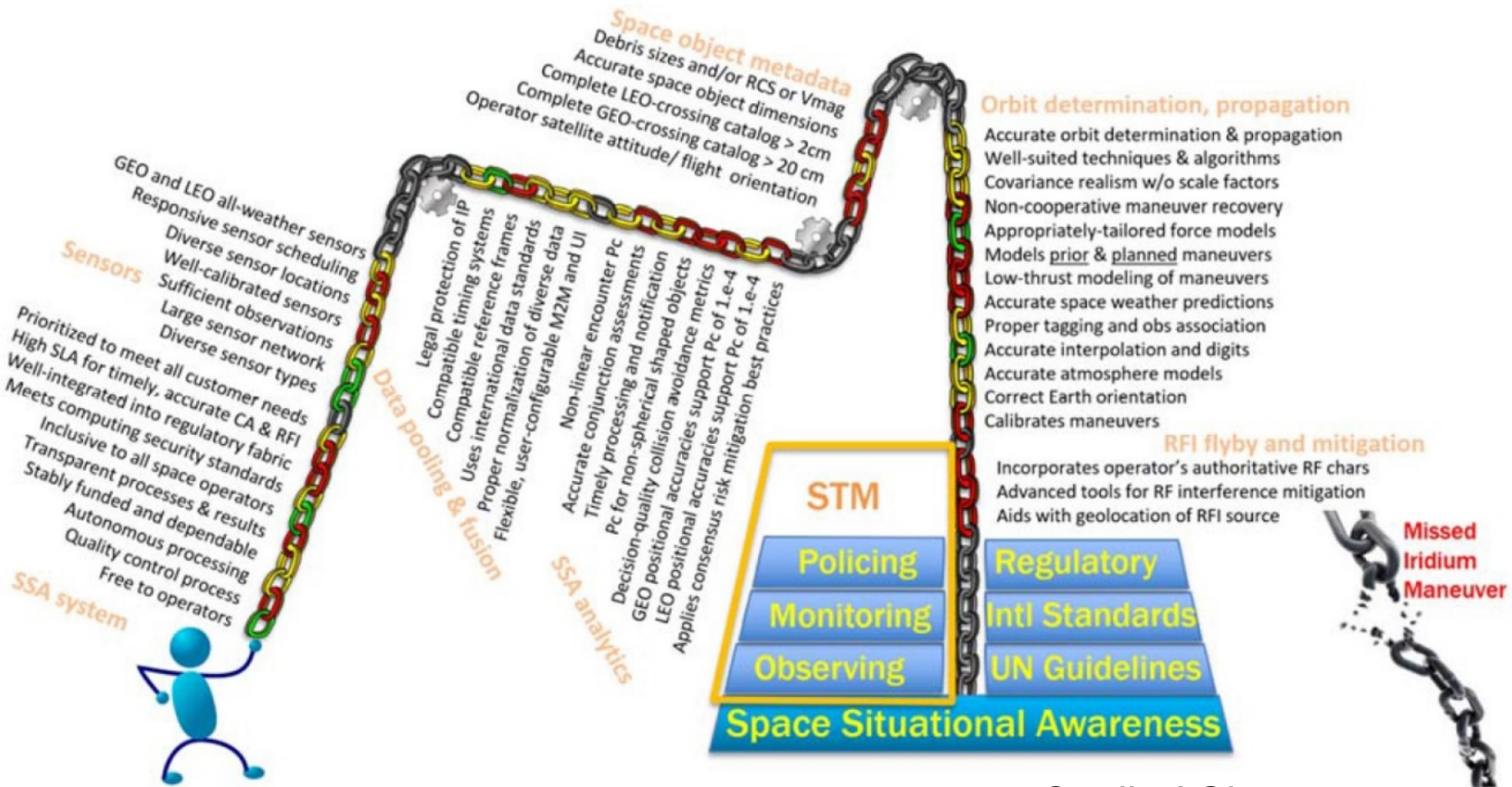
# SPD-3: National Space Traffic Management Policy

- **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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