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.
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

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

2009-2016: Barack Obama
Leadership through cooperation

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

- Re-established National Space Council: June 30, 2017
- National Space Strategy: March 23, 2018
- SPD-1: Reinvigorating America’s Human Space Exploration Program: Dec. 11, 2017
- SPD-2: Streamlining Regulations on Commercial Use of Space: May 24, 2018
- SPD-3: National Space Traffic Management Policy: June 18, 2018
- SPD-4: U.S. Space Force: Oct. 23, 2018

© ESPI 2018
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)

**International scene**

- **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

**1st sem. 2017**

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

- **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”**

**2nd sem. 2017**

- **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

- **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”**

**2018**

- **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)
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

- **Continuous effort** to foster the involvement of commercial actors in public programmes
- **Initiatives and success stories**: COTS, NextSTEP, ESA strategic partnerships, NanoRacks…

- **External/Internal factors**:
  - Technology forces
  - Market forces
  - Industry forces
  - Macro-economic forces

- **Tangible commercially-driven dynamic** in the space sector emerging
- **Fertile ground for business-driven endeavors** in different fields, including space exploration.
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:
      o Springboard for Europe to implement, at least partially, the Moon Village vision (e.g. European-led component)
      o 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

<table>
<thead>
<tr>
<th>Policy drivers</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• National security (vulnerability, Space Pearl Harbor…)</td>
<td>• Sharing of responsibilities between DoD and DoC (SSA/STM); Top down approach to military/civil domains</td>
</tr>
<tr>
<td>• Military superiority in space (Ultimate high-ground)</td>
<td>• Other national institutions on case-by-case (NASA, NOAA, FCC, FAA)</td>
</tr>
<tr>
<td>• Promotion of commercial market</td>
<td>• Intricate relations between the different actors</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Europe

<table>
<thead>
<tr>
<th>Policy drivers</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Protection of investment and of socio-economic return</td>
<td>• Multiple actors loosely coordinated</td>
</tr>
<tr>
<td>• Meeting security requirements of service-driven policy</td>
<td>• European countries (dual approach, reluctance to transfer sovereignty, European cooperation challenged)</td>
</tr>
<tr>
<td>• Achieve autonomy</td>
<td>• EU and its agencies (crossroad of space and security policies, evolving role under consideration)</td>
</tr>
<tr>
<td></td>
<td>• ESA (capability-building)</td>
</tr>
</tbody>
</table>

## Major developments

<table>
<thead>
<tr>
<th>United States</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• New national space security strategy</td>
<td>• New regulation (SSA component)</td>
</tr>
<tr>
<td>• National STM policy</td>
<td>• New Defence Space Strategies (UK &amp; France);</td>
</tr>
<tr>
<td>• Establishment of a Space Force within the DoD</td>
<td>• Rising awareness in policy debate (capabilities, coordination, cooperation with partners)</td>
</tr>
</tbody>
</table>

## SSA capabilities

<table>
<thead>
<tr>
<th>United States</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Self-sufficient (unmatched SSA capabilities, precision to be improved, coverage to be complemented)</td>
<td>• Strong reliance on U.S. SSA data sharing agreements;</td>
</tr>
<tr>
<td>• Enhancement: Space Fence, SSA data “crowdsourcing”</td>
<td>• Improvement of SSA capabilities expected in coming years</td>
</tr>
</tbody>
</table>

## Involvement of private actors

<table>
<thead>
<tr>
<th>United States</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Policy intends to foster commercial activities (SSA data, contribution to STM…);</td>
<td>• Mostly contractors (R&amp;D projects, development and manufacturing);</td>
</tr>
<tr>
<td>• Developing commercial activity in SSA data and related services</td>
<td>• Repeated calls for more industry-led initiatives but no policy decision</td>
</tr>
</tbody>
</table>
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

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.