Security in Outer space : Rising Stakes for Civilian Space Programs

ESPI Autumn conference 2018

Rethinking transatlantic collaboration : towards STM

DEFENCE AND SPACE

Didier ALARY, Head of Advanced Systems

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AIRBUS

Our Roots are in Europe, **the World is Our Home**

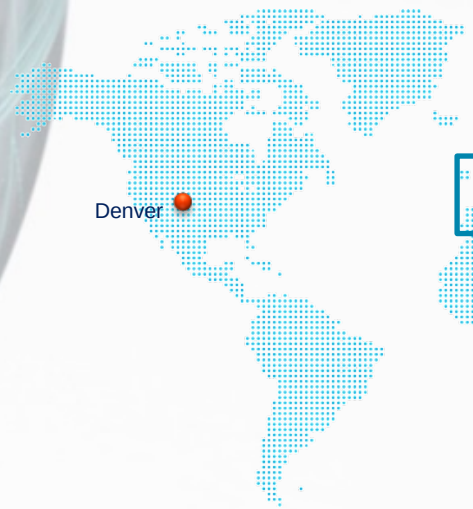
Figures from 01/2017

Only supplier **trusted by the top seven** commercial telecom operators Worldwide

#1 Supplier of Earth Observation Systems on the **international** market: 13 satellites for ten countries around the Globe

First-ever non-US supplier of a **mission-critical element for a NASA** human spaceflight mission

9,500 people with more than 50 different nationalities work **at 16 sites** across seven countries…



… and numerous joint ventures, subsidiaries and sales offices around the Globe.

AIRBUS

- *Airbus Space Systems is the No. 1 space industrial player in Europe, thanks to our world-class teams and their strong engagement.*

- *Our portfolio is truly inspirational: We help our partners go to Moon and Mars;*
- *around the World our satellites keep people connected and protected; our explorations to the far ends of our solar system help us understand the origins of life.*

- *We are always ready to challenge the status quo: Whether it is changing the way launchers are made, self-financing the next generation of very-high-resolution satellites or developing manufacturing concepts to produce hundreds of satellites a year.*

Through all our endeavours, we strive for the highest performance and competitiveness, with our sights set on becoming the World leader in space solutions.

NICOLAS CHAMUSSY

Executive Vice President,
Head of Space Systems

AIRBUS

Airbus views on Long Term Sustainability of Outer Space

We need to prepare the future. We are working on an universal space capability to perform In Orbit Services (**SpaceTug**), we try and test options for debris removal with the current **RemoveDebris** FP7 project currently in space, we are thinking about an « **ADR ready** » standard to be applied now on every spacecraft, etc.

About the necessary code of conduct and guidelines:

– Nothing inappropriate today, Airbus complies to these rules with no difficulties.
  But guidelines should be applied strictly. This strict application is the only way to make space activities sustainable on the long term, minimize the risk on population and ecosystem, and preserve the competitiveness of European Industries.

Seen from a space system manufacturer or a space operator point of view, the devil is in the variety of guidelines.

One example:

– LEO satellites falling on earth should not induce human casualty on ground above 10^{-4} (over all human population).
  This could impose a complex and expensive controlled re-entry, high thrust, only used for this phase, 15’ at the end of the life.

How could we fait a competition with these different regulations ?

Relax national ones and align on the weakest,
or generalize at the international level and a high expectation ?

In fact the current set of regulations are lacking many points to ensure an effective and sustainable management of the future space traffic

Examples:

- **Safety** & security. No one is currently responsible for the knowledge and for the safety of activities in space
- Since this is primarily each nation responsibility, multiple laws, guidelines and recommendations can **diverge** easily.
- Every **emerging space fairing nation** want their own “space bureau” able to deliver licenses to fly without clear and recognized technical expertise to manage the dossiers. There are also difficulties for new comers to accept restrictive rules imposed by established players.
- The existing **UN registry** is used a posteriori, after the national ones. We could change the order (get the license first, before flying) and associate this with a registration fee depending of the quality of the design or the cleanliness, as for cars.
- Scattered space situational awareness (SSA). USA is providing **free services** (2lines, collisions warnings), as a part of their soft leadership, but this basic free service could evolve, enhanced paying services will be made available. And see the emergence of **private actors** for space asset tracking, without any legal rules or guidelines.
- **Sharing** the data (positions, missions…) is not obvious, space is still considered by some nations as a strategic domain, whereas some private operators are ready to share.
- Many **massive constellations** are popping up and will need a special care, because of the number, of the orbit raising/falling, the overall impact and at the same time this new class of operators may lead the change, or even request more regulative rules such as a compulsory debris removal.
- Future **In Orbit Servicing** missions (debris removal, life extension, re-orbitation, refueling, repair) will need new guidelines and legal framework. Future **In Space Manufacturing**, **in Space Assembly** of spacecrafts including the repurposing and recycling of existing spacecrafts or rocket bodies will need new legal framework to handle multiple source, multiple use. As is, many current legal frameworks do not authorize these missions.

An international organization between the Treaties and the National laws ?

There is not a common, accepted, set of rules.
We could need a more efficient international STM governance body, that would manage:

- Technical requirements, guidelines, standards, interfaces
- Licenses, records, registers,
- Then legal aspects, case laws
- Then, maybe, compliance control, traffic control
- …

Several options are possible: a new treaty ? assigning STM to an inter-agency group (IADC 2.0…) or even an International Space Agency ? Or the instantiation of existing international organization dealing with similar problems traffic in common domains (Maritime/IMO, Aerial/ICAO, Frequency/ITU…).

Could we imagine an **International Civil Space Organization** that could manage the Civilian Space Traffic, **in the middle legal layer**, between every existing National law and regulation and the international treaties ?
And this being necessarily an hybrid semi-political, semi-public ?
Yes, this is very difficult.

Some ideas are in the air…

ICSO : a building of five connected and interdependent levels

Level 4: Sanctions & Enforceability

Level 3: Traffic awareness, control

Level 2: Access fees

Level 1: Registrations & licenses

Level 0: Technical & Standards

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TOWARD AN INTERNATIONAL ORGANIZATION TO HANDLE A SUSTAINABLE SPACE TRAFFIC MANAGEMENT

Authors:
Mr. Didier ALARY, head of Advanced Systems
Airbus Defense and Space, France, didier.alary@airbus.com

Mr Lucien RAPP, Professor University of Toulouse I (UT1), Scientific director SIRIUS,
France, lucien.rapp@ut-capitole.fr

Mr. Sebastien MORANTA, Study coordinator
European Space Policy Institute (ESPI), Austria, sebastien.moranta@espi.or.at

Mr. Philippe CLERC, Chief Compliance & Ethics Officer
Centre National d'Etudes Spatiales (CNES), France, philippe.clerc@cnes.fr

ABSTRACT

Since two decades, the UN-COPUOS and IADC have set the current standards for Space Traffic Management, the registration rules, the debris mitigation guidelines. Recent initiatives have been launched to tackle this issue (CONFERS, UN Sustainability in Space Index…) Many states are bound by the existing international treaties and some of them have even adopted and implemented national laws and regulations.

Space usual business is now getting accelerated: private massive constellations, in-orbit tugging (change of orbit of a registered object), in-orbit servicing (change in life of a registered object), in-orbit manufacturing and assembly (several

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Second part will detail what could be the scope of such a Space Civil International Organization (ICSO), as a five level structure:

The views presented in this paper are those of the authors and do not necessarily represent the views of the organizations they belong to.

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