

## *Chapter 7*

### **European Union: Response to Threats**

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This paper will provide a view of the European Union (EU) approach (and response) to the possible development of threats on the security of space activities. Two main approaches have been considered by the EU: one betting on an enhanced and more visible diplomatic activity to promote a greater transparency for a better collective security on the international scene; the other one aiming at fostering the development of European space situational awareness (SSA) capabilities. The text will first show how the EU has chosen to address the new topics of space security at a time when China has proceeded with its first anti-satellite (ASAT) intercept test. This event, which has triggered a world-wide reprobation, has given the opportunity to the EU to test its own diplomatic abilities by proposing a new way of addressing the threat of a possible arms race in space. While the debates on this issue had remained blocked for years at the United Nations Disarmament Conference in Geneva, a proposal was made by the EU to foster an International Code of Conduct for Outer Space Activities (ICoC) as a transparency regime,<sup>1</sup> thus giving the EU a high-profile on the international scene. The paper will describe the main steps for promoting the text as well as current difficulties that make its large adoption questionable. The paper will also provide a view of the current effort to organize an EU SSA capability based on a consortium of key States in order to rely on existing capabilities for a future European architecture. Classical challenges for such a project will be underlined.

#### **A relatively recent issue for Europe**

A quick historical analysis shows that the European Union has paid attention only relatively recently to the possible existence of threats in relation with space systems. Only a few reports have been generated by the EU since the middle of the years 2000. The notions of “aggression”, “debris”, “Near-Earth Objects” or “space weather” are first mentioned in 2005 in a expert group report about

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<sup>1</sup> The latest version of the text of the proposal, dates 31 March 2014 can be found at the following web address:  
[http://www.eeas.europa.eu/non-proliferation-and-disarmament/pdf/space\\_code\\_conduct\\_draft\\_vers\\_31-march-2014\\_en.pdf](http://www.eeas.europa.eu/non-proliferation-and-disarmament/pdf/space_code_conduct_draft_vers_31-march-2014_en.pdf).

“Space and Security” produced for the Council of the European Union.<sup>2</sup> In 2006, an official note from the *Committee for Civil Crisis Management* (CCCM) from the Council referred to the notion of space surveillance by indicating that “although Space surveillance might be seen mainly as a civilian activity for scientific and civil protection operations, it could also have military utility (...)”, showing further the possible services that such a system might offer to the European defense community.<sup>3</sup> Also in 2006, a report produced by the technical and Aerospace Commission of the Assembly of the Western European Union directly focused on the “deployment of weapons in space”. It highlighted the need for the European Union to proceed with the development of a space situation and surveillance system in order to answer both civilian and military requirements.<sup>4</sup>

However, if such documents were available to provide some level of awareness to the European Union political community, their real impact remained limited to the community of specialists. It is fair to say that the Chinese ASAT test performed in January 2007 has acted as the real wake-up call for the whole EU space and diplomatic personnel. This event alone has basically triggered two EU-level kinds of answers: one at the diplomatic level with the EU-led Space Code of conduct initiative; another one with the initiative taken by the European Commission to promote the development of an EU “Space Surveillance and Tracking” (SST) system.

### **The EU diplomatic approach as a first response to new threats in space: The promotion of an « International Code of Conduct »**

In the aftermath of the Chinese ASAT test of January 2007, the European Union has chosen to appear in the front line by proposing, firstly in the context of the PAROS discussions (*Prevention of Arms Race in Outer Space*) held inside the U.N. Disarmament Conference in Geneva, preliminary reflections about a possible space so-called “Code of Conduct” that would aim at increasing the transparency around the space activities and that would attempt

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<sup>2</sup> *Report of the Panel of experts on Space and Security*, European Union, Brussels, 1st March 2005, p. 58.

<sup>3</sup> *Generic Space Systems Needs for Military Operations*, Secretariat of the Council of the European Union, ESDP/PESD, COSDP 138, P.16. See [http://www.europarl.europa.eu/meetdocs/2004\\_2009/documents/dv/st6920/\\_st6920\\_en.pdf](http://www.europarl.europa.eu/meetdocs/2004_2009/documents/dv/st6920/_st6920_en.pdf) (Accessed November 2016).

<sup>4</sup> See “Le déploiement d’armes dans l’espace,” Report of the WEU Assembly, Document A/1932, 21 June 2006.

to dissuade nations to proceed to destructions of space objects they may feel threatening. Besides the idea of making space a safer and more open environment, the intent was also to decrease the risk of lethal debris resulting from such tests, or even from possible hostile destructive actions.

In this case, as usually in Europe, the initiative can be seen as the result of a long-term assessment that space can help federate a European voice (via the EU institutions) in the politically constrained field of security. At the base of this implication lies a large recognition in Europe that space applications have gained in importance and have appeared as key elements to master if the EU wants to become a first-rank player in the “information age” (or rather in the “knowledge society” as it has often been called in Europe). The large investments devoted to space applications by the United-States, as well as the sustained efforts of China or even Russia in this field, are non-ambiguous signs of the role space can play in power politics. This view has clearly been acknowledged by the EU. Even if some financial difficulties have regularly to be solved, investing in space, and thus in its secure use, remains perceived as helping Europe create its own identity by investing in a key strategic asset. Additionally, by promoting a collective approach of the issue, the EU also demonstrates its expertise for collective efforts that may involve some sovereignty-related aspects.

One of the EU political engines has regularly been the fundamental agreement between member States that large R&D and science projects (such as the ones existing in the nuclear physics with the CERN or EURATOM) would both benefit from a European cooperation as well as it would help Europe to consolidate its unique identity. Taking political initiatives, and appearing *in-fine* as the spearhead of a world-wide effort in the field of space security does indeed pose no real legitimacy issues. Indeed, the EU declared itself ready to push for a multilateral initiative even if it may have surprised most of its partners as such a political will expressed by the EU institutions remains rather unusual.

The proposed idea has no trouble finding its way in the absence of any large-scale international regulation for space security. The basic idea consisted in:

- reinforcing the UN ruling framework
- establishing collective rules and principles to help prevent accidents in orbit;
- limiting the expansion of space debris;

- setting up new rules for sharing information leading to a better collective knowledge of the space situation.

As soon as 2008, during the French chairmanship of the EU, several informal consultations<sup>5</sup> were organized with key space countries (China, Russia and the United–States) as well as with other space countries. The European Union has also clearly benefitted from a reconsideration of the U.S. space diplomacy by the then incumbent Obama presidency. The new administration was indeed willing to be active on the issue while adopting a more multilateral approach than the previous administration. Last but not least, the EU initiative was also giving a possibility for an original approach at a time when a parallel proposal for a Treaty on the Prevention of Placement of Weapons in Outer Space” was made both by China and by Russia. For the U.S., supporting the ICoC approach and the associated idea of “transparency and confidence building measures” demonstrated the importance of the issue for the US without embarking on a treaty project that was perceived as non-verifiable and barely relevant after the Chinese ASAT test in 2007. Consultations organized during 2009 by the Czech presidency of the EU (and by the following Swedish presidency) have aimed at better defining the nature of the ICoC by taking into account the first consultations.

### **An expected consolidation of the EU diplomatic posture: The long-term sustainability of the space activities initiative**

In parallel to these developments, France took the initiative to hold an informal international conference in Paris for introducing the new concept of “the long-term sustainability of space activities”. The initiative has stemmed from a proposal made in June 2007 at the occasion of the 50th plenary session of the U.N. COPUOS (Committee of the Peaceful Uses of Outer Space) by Gérard Brachet, then Chairman of the COPUOS. <sup>6</sup>

The objective was to support the production of a U.N. document that would serve as a reference and that shall help the U.N. embracing the issue of collective security in space.

This activity has now developed inside the COPUOS and a document is being prepared for 2016 under the chairmanship of Peter Martinez (South

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<sup>5</sup> And more official ones after the endorsement of the initiative in December 2008 by the Council of the European Union.

<sup>6</sup> Document A/AC.105/L.268.

Africa), the Head of the Long-term sustainability working group. Again the following topics were on the agenda:

- The proliferation of space debris;
- The security of the space operations on the different, LEO, MEO and Geo orbits;
- The management of the electro-magnetic spectrum;
- The natural events interfering with the space systems (space weather-related events, solar flares, micro-meteorites, etc.)

This approach has appeared as being very complementary to the EU ICoC initiative. It might even take the form of technical recommendations that shall translate in technical terms the principles that may be contained in the Code of Conduct if it exists.

### **A first diplomatic answer that has not convinced the international community yet**

However, the ICoC project has not succeeded in gaining a wide support yet. Until now, only national postures have materialized for enhancing space security, especially in the military domain, to the detriment of more collective and more civilian frameworks. The European Union has chosen to favor a posture that was more focused on an international diplomatic-like approach, also due to its intrinsic institutional limitations when it comes to security and defense. However, despite three rounds of so-called “Multilateral Open-End Consultations” involving some 95 different countries over two years, the effort by the EU to rally support has not reached the expected results.

From 27<sup>th</sup> to 31<sup>st</sup> July 2015, a one-week multilateral conference was held under the auspices of the United Nations in New York to negotiate the Code, with hopes for some decisive steps on the way to secure future signatures. The few days of consultations and debates have clearly demonstrated that this initiative was not widely accepted, whether in its form or in its content. The EU origin of the text as well as a perceived lack of willingness to make it a UN exercise from the start has clearly weakened the text in the eyes of many participating countries. In addition, a number of principles expressed in the text (such as the right of self-defence) as well as possible missing parts (such as incentives for making sure participating countries will not be prevented from developing their own space programmes) have stalled this diplomatic effort. While the approach can certainly be supported as one of the most workable options for introducing collective principles for space security, a long way

remains before this first approach suggested by the EU can be universalized and widely accepted both by all the key space countries and by the emerging ones.

However, in any case, one can argue that the simple fact that the EU ICoC project has managed to become an issue on the agenda of the UN, giving it the possibility to be exposed widely and to be made the subject of debates and political postures, has signed some level of success for a diplomatic effort that shall not be fully discarded in the future international debates.

### **A European Space Surveillance and Tracking (SST) system as a possible technical response?**

Besides this attempt to build an international consensus about the need for more collective security in space, the European Union has also chosen to answer the problem through the setting up of a programme and an organization that shall be able to create a first European-wide space surveillance system. This programme, called SST for Space, Surveillance and Tracking was proposed by the European Commission and adopted in April 2014 by the European Parliament and the Council.<sup>7</sup>

SST was not born from a vacuum. As it has been the case for the European initiative for a Code of Conduct, the first notable interest for a space surveillance system was clearly related to the global perception of an increased threat after the Chinese anti-satellite test of 2007. As soon as in 2008, a first “Resolution on Space and Security” from the European Parliament focused on the issue of space security in an unprecedented manner. Several articles of this text can be considered as having paved the way of the current EU effort to set up a space surveillance and tracking system:

In its 10 July 2008 resolution, the European Parliament was indeed already adopting the following positions:

- [The EU Parliament] *“Notes the importance of the space dimension to the security of the European Union and the need for a common approach necessary for defending European interests in space (...)*
- (...) *Encourages the Member States of the European Union, the European Space Agency and the various stakeholders to make greater and better use of the existing national and multinational space systems*

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<sup>7</sup> European Parliament and the Council (2014) decision N° 541/2014/EU establishing

- and to foster their complementarity (...)*
- (...) *Supports the creation of a European space surveillance system leading to space situational awareness (including, for example, GRAVES and TIRA) to monitor the space infrastructure, space debris and, possibly, other threats(...);*
  - (...) *Supports the possibility of funding the future European space situational awareness system from the EU budget”.*<sup>8</sup>

The widely acknowledged damage to the space environment brought about by the 2007 Chinese test<sup>9</sup> has given the European Union a legitimate opportunity to approach the issue. The creation of debris was de facto becoming a fair issue of concern at a time when the EU was becoming itself a space operator with the first satellite launches associated with its two “Flagship” programmes, Corpenicus and Galileo. It is also useful to analyze this decision in the context of the European Union institutional reorganization as started by the Lisbon Treaty in 2009 with a new role given to the European Commission to chart the course of the future “European Space Policy”. This marked a symbolic step for the European Commission that was then in position to take the lead in an increasing number of fields: from Earth Observation and Navigation/Positioning, to launchers. Quite logically, the range of the space activities to be managed by the European Commission called for an independent system to monitor and protect European space assets from risks: essentially debris, but also near Earth objects, and space weather. By adding SST to its list of high-technology projects, the European Commission has hoped to gain political weight in the European institutional setup, in particular by demonstrating its central role as a coordinating and as political organization. In this meantime, the European Commission has also been trying to define its relationship with the European Space Agency (which is not an EU agency) at a time when ESA was also attempting to frame the future European activity in the field of Space Situational Awareness.

Additionally, it was quickly perceived that space surveillance activities may benefit from capacities spread among the Member States territories and make as such the European Union territory a unique possibility for each

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a Framework for Space Surveillance and Tracking Support.

<sup>8</sup> European Parliament, 2008, “Resolution on space and security” (INI/2008/2030).

<sup>9</sup> Which is said to have created more than 3000 long-live pieces of debris in orbit.

Member States to understand the value of a collective effort. Then, from a longer-term perspective, SST may be expected as reinforcing the “added-value” of the European Union for efforts that will need in any case further cooperation between Member States. The fact that a SST EU programme would not address military activities per se but would still have a strong “security” flavor, has finally positioned this programme as an investment of choice for highlighting the first steps of the “European space policy” as demanded in the Lisbon treaty. Using the STT for dealing with collision avoidance or debris risk management, as well as for consolidating EU investments in space and support the industrial activity on a longer term has completed the picture of a strategic posture for Europe.

### **The main goals of the SST**

The current SST programme engaged by the European Union has not been first in line in Europe. The European Space Agency has launched an effort in this field a few years before with its own *Space Situational Awareness* (SSA) programme. This activity, supported by the ESA Member States was envisioning four types of functions and services: space object tracking and cataloguing; Space Object imaging for identification and knowledge; space weather analysis and early warning relative to Near-Earth Objects, i.e. asteroids that may impact or cruise very close to the Earth.

Out of this four areas, only three have made their ways across successive budgetary reductions. Specifically, the most sensitive domains such as space object imaging and space tracking have been put in question by the ESA Member States and it has been asked to ESA to clearly focus on the space weather and the NEO domains, while SST functions would be studied as well. Space imaging functions will finally not be part of an ESA SSA system. Today the ESA SSA programme is being supported by 14 Member States at a relatively modest scale (46.5 million Euros over the period 2013-2016) with the SST part being mainly focused on preliminary conceptual studies with the additional financing of two test (monostatic and bi-static) radars.

On the side of the European Union, the objectives of the SST programme has been to provide both the EU and its member States with alerting capabilities regarding collisions or space weather anomalies as well as with information about fragmentations or uncontrolled reentries in the atmosphere. It can be noted that, based on the previous ESA experience, the range of functions of the

SST has been reduced in comparison with the initial ESA SSA version. However, in a sense, in adopting the SST approach, the European Union seems to have endorsed some of the SSA *services* that ESA had to give up in practice. But it must also be noted that the EU is more inclined to support the development of services possibly exploiting existing national programs rather than developing EU proprietary equipment.

### **The organizational challenge for a European Union-led SST system**

Indeed, the EU SST programme is mainly destined to create an architecture that federates nationally-owned assets and help member States and the EU institutions to benefit from an EU internal technical and organizational cooperation.

Indeed, until now, only national capabilities exist that can provide necessary SSA type information:

- France, Germany and the United Kingdom are the main potential contributors to a future EU SST system. France is routinely using three main capabilities for the monitoring of LEO objects: the main dedicated sensor is the GRAVES<sup>10</sup> radar which is a bi-static radar able to detect medium sized objects in LEO. This is a “catch-all” type of capability, as any space object with a 1square meter radar cross section and orbiting above the French Territory under an altitude of some 1000 km is detected and catalogued. This capability has been declared operational in 2005 and is managed by the French Air Force. It is completed with contributing military sensors (i.e. sensors with SSA monitoring as a secondary mission) such as Air defense SATAM radars (3 radars) and the Missile range instrumentation ship “*Monge*”. Additional optical means developed by the French space agency (CNES) and by the French Air Force must also be mentioned for the GEO belt monitoring.
- Germany is another key player in this field with a dedicated Radar (TIRA<sup>11</sup>) operating in L and Ku bands. Due to its frequency domain, this radar is used for precision imaging of space objects or debris. In this sense, TIRA appears as a perfect complementary means when used in association with the French system GRAVES. TIRA is run partly by the University and by the German Ministry of Defense.

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<sup>10</sup> In French, **Grand Réseau Adapté à la VEille Spatiale**.

- The United Kingdom has been using mainly the Fylingdales Early Warning Radar as a secondary sensor for space monitoring. The information produced by this BMEWS radar contributes directly to the U.S. space surveillance network. Additionally, the UK has also operated an optical sensor, Starbrook, located in Cyprus and operated by the UK space agency for GEO orbit cataloguing.

Additional systems in Italy and Spain may also be evoked, even if they may not be fully tailored to an operational SSA mission.

It is thus not by chance that a Consortium composed by the 5 EU member States quoted above has been set up in June of this year<sup>12</sup> to be in charge of the practical development of the EU SST capability.

Obviously, as just described, while the capabilities exist, their nature and their “chain of command” differ widely and making them to work in a cooperative mode may not be the least of the challenges. It must be reminded that the tracking of space objects remains very much of military relevance, as, since such space surveillance networks exist, they have mainly been used as tools to identify and get precise data about space systems and about their orbits rather than about space debris per se. Historically, most of the operational systems are military in their nature, both for the historical space powers but also for more recent space countries such as France for example. Today, data produced by the French main sensors as described above are classified by nature and any data exchange on a bilateral or on a multilateral bases shall require specific agreements to be signed. Obviously, whenever such agreement is signed, it reinforces in a sense this notion of data protection, as national classified data can be combined with classified data from another origin.

This does not mean that it is intrinsically impossible to envision a European wide system that might rely on a federation of national systems. On their side, the European institutions have insisted on the fact that SST services shall not answer purely military needs, and would be civilian in nature or for dual use purposes. One of the main challenges for the consortium of countries will be to find a proper data policy that allows exchanging data without prejudicing the classified nature of some other data that national military-owned systems may

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<sup>11</sup> English acronym for **T**racking and **I**maging **R**Adar.

<sup>12</sup> The announcement was made during the Paris Air Show. See [https://presse.cnes.fr/sites/default/files/drupal/201506/default/cp105-2015\\_-\\_sst\\_va.pdf](https://presse.cnes.fr/sites/default/files/drupal/201506/default/cp105-2015_-_sst_va.pdf).

produce.

### **A role for the European Union Satellite Centre?**

Creating a “Front-desk” for a future European SST architecture will be obviously key to the success of this common undertaking. Finding a European Union institution that both would possess the skills regarding the processing of multiple data and the credentials for handling sensitive information is not an easy task. A consensus seems to have formed about attributing such a role to the European Union Satellite Centre (EU SATCEN) under the responsibility of the External Action Service of the Council of the European Union. This Satellite Centre was created in 1991 by the Western European Union to provide The member States with shared intelligence based on satellite imagery. In 2002, the Centre has become an EU agency and is regularly supervised by a board composed by the 28 member States. It is fair to say the SATCEN is one of the few EU institutions that has had the experience of handling protected data. Indeed, the SATCEN has regularly access to classified imagery (along with non-classified imagery it can also buy from commercial operators) that allows building intelligence reports for the member States.

The case is remarkable in the fact it describes a mechanism that allows a relatively large number (28) member States sharing some level of intelligence-related information that are usually exchanged on bilateral basis only. Of course, it is conceivable that only the less sensitive part of the information may be exchanged in such a scheme. The functioning of the SATCEN does certainly not imply that all bits and pieces of national intelligence may be shared. However, as often when one refers to EU mechanisms, it is useful to highlight the positive aspects of such a functioning rather than insist on its limitations, even if those remains numerous.

For a few years already, the SATCEN has promoted its ability to handle classified data on a day-to-day basis to reclaim a central role in a future European Union SST information architecture. Indeed, the SATCEN has led three main EU financed activities to study possible European SST architectures and assess its operational role.<sup>13</sup> But beyond these assessments, the most

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<sup>13</sup> As stated on the Satcen website (<https://www.satcen.europa.eu>, accessed in November 2015), the activities has been organized as follows:

- “The The Support to Precursor ssA services (SPA) project, an FP7 Support Action which started on the 1 March 2011 and lasted twenty months.
- The Support to the developmenT of a European SSA caPability (STEP) project, an

important decisions on the future organization will come from the member States themselves and especially the ones involved in the SST consortium, and from their readiness to accept such a role given to the SATCEN. And of course this future architecture and its governance will depend directly from the kind of data policy that will be implemented and that will put the classified nature of the information at the center of SST.

### **A step-by-step approach for an EU SST?**

The relationship between the main interested member States and the Commission's initiative raise the issue of the "Europeanization" (even if partial) of national assets. At times when defence budgets are scarce, any member State is willing to benefit from some level of European investment possibly helping upgrade the existing capabilities. It may also be viewed by some participating countries as an opportunity to develop analytical capabilities or even new systems. The European commission has pledged investing some 70 million euros over 7 years in modernizing these capabilities in the perspective of a more European system. Even if limited, the European investment is always an incentive for a more central and political role from the part of participating member States.

### **The European SST as a response to future threats?**

The current European effort is calling for an upgrade of national sensors and does not exclude military assets. This orientation is an obligation (most nationally-owned sensors are managed by the military) as well as a choice. The dual-use nature of the space objects makes it difficult to propose a credible policy based on a strict civilian-military separation. While not military per se, this effort willingly encompass all the classical services of a Space Situational Awareness system as initially envisioned by the European Space Agency. In

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FP7 Support Action which was launched on the 1 November 2012 and will lasted twenty-one months.

- The Preparation for the establishment of A European SST Service provision function (PASS) project, a Horizon 2020 Coordination and Support Action) which started on 1 September 2014 and will last twenty-four months.
- SPA, STEP and PASS focus on the SST segment and services of an SSA capability which, being sensitive and dual use (civil and military) in nature, address some of the greatest challenges from a governance and data policy development perspective. The SatCen is currently investigating its contribution to the implementation of the SST Support Framework."

doing so, the European Union intends to show its institutional stature and clearly wants to make use of such investments to consolidate its diplomatic posture in this field.

Indeed, as engaged, the EU SST programme may provide a robust basis for revitalizing a diplomatic effort started by the EU some 7 years ago. As a pillar of the European “space diplomacy”, the project of an international Code of Conduct on space activities has suffered from a difficult dialogue with space and non-space countries, with other international initiatives in competition and a lack of basic agreement on the nature and the scope of the Code.

While not discarded, the notion of a code may only be widely accepted when mutual trust is established. May be, as a first step, a European SST system that may create opportunities for pragmatic data exchanges with non-European countries would help the European Union to renew a global interest for transparency and confidence building measures.

It remains that European SST services will remain at the crossroads between European “dual use” ambitions and national military concerns. The quality of the relationships between the EU and its member States and the efficiency of the current process will be a decisive element for demonstrating the ability of the European Union to address the future threats in space.