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PRELIMINARY CONSIDERATIONS ON THE EUROPEAN PREPARATORY PROGRAMME ON SPACE SITUATIONAL AWARENESS

Mankind has increased its dependence on space assets over the last decades. Access as well as utilization of space plays a vital role in social relations, economic development and political power. The coming years will reinforce this trend thanks to an increasing use of outer space application programmes close to people interests, for telecommunication, for navigation and positioning, for global environment monitoring and for security. Improving collective security in space has now become a pre-requisite for encouraging the expansion of public and private activities, which requires increasing the general knowledge and expertise of the space weather and of the situations and risks in outer space.

So far, only a few States have developed facilities for a complete monitoring of near earth space and evaluation of orbital events. These facilities were initially developed for defence purposes. Space agencies and private operators now need to protect their assets with information systems to increase "Space Awareness". So the term Space Situational Awareness (SSA) refers to desired knowledge to fill the gap between space risks and information.

In Europe, space surveillance and monitoring activities have been conducted for several years in these domains. Initial concept studies have already shown that a first operational "Space Situational Awareness" (SSA) capability would be within the reach of Europe before the end of this decade.

In the European institutional landscape, the ESA Director General in 2008 has made a proposal addressed to the Member States to set up a development programme on Space Situational Awareness.

On this basis, ESA has established a Preparatory programme on SSA to carry out an assessment of a domains such as Space Debris, Space Weather and Near Earth Objects, along with technical and governance options to be addressed in detail during the first period of the programme from 2009 to 2012. A more detailed architectural view of the system with its main components will be generated from the SSA Programme to formulate proposals to European institutional decision makers so to provide Europe with an operational capability on SSA.

I. SETTING THE SCENE

Mankind has increased its dependence on space assets over the last decades. Access as well as utilization of space plays a vital role in social relations, economic development and political power. The coming years will reinforce this trend thanks to an increasing use of outer space application programmes close to people interests, for telecommunication and weather forecast, for timing, navigation and positioning, for monitoring the Earth's environment and for security. Improving collective security in space has now become a pre-requisite for encouraging the expansion of public and private activities.

Therefore, the protection of assets in outer space, which requires increasing the general knowledge and expertise of the space weather and of the situations and

risks in outer space has become a priority of the international space community.

The term Space Situational Awareness (SSA) generally refers to desired knowledge to fill the gap between space risks and information.

So far, only a small number of States have developed facilities for a complete monitoring of near Earth space and evaluation of orbital events. These facilities were initially developed for defence purposes. Given the diversification of activities and actors that we have witnessed in the last decade, space agencies and private operators now need to protect their assets with additional information systems. This is the first motivation to increase their "Space Situational Awareness".

The interests and operational advantages of gaining essential information on space assets make a case for a common interest in protecting space assets and operations for both the civil and defence communities. Therefore such capabilities show the potential of a shared effort for commonly defined requirements. In Europe, this case illustrates how Space Situational Awareness (SSA) might become the first European space initiative to consider dual use from the outset.

II. THE EUROPEAN SSA PREPARATORY PROGRAMME

II.1. The European historical and institutional background

In Europe, space surveillance and monitoring activities have been conducted for several years. On its side, the European Space Agency has largely contributed to the monitoring of the status of orbital debris and of the space environment for the safety of its own space missions as well as for the common interests of its Member States and of the international community.

Some ESA Member States have also developed technical facilities that are providing specific information about orbital objects, contributing to the setting up of a first cataloguing and knowledge base capability. Initial concept studies have already shown that a first operational "Space Situational Awareness" (SSA) capability would be within the reach of Europe before the end of this decade. Such a system would take full benefit from initial efforts made by the Member States complemented by additional facilities.

Recently ESA's ENVISAT large satellite, Germany's five SAR-Lupe radar reconnaissance satellites and France's Helios optical reconnaissance spacecraft faced many close encounters with orbital junk or other operating satellites. Some of them even required a collision-avoidance maneuver. The vulnerability of SAR-Lupe and the increasing necessity of space-traffic management prompted interest in the German army to create a space-surveillance unit. Germany and France carried out an initial series of coordination exercises called TIGRA using the existing German TIRA tracking radar and the French Graves surveillance radar. U.S. and European authorities have already begun to discuss how Europe's space-surveillance activities might be used along with the existing U.S. system.

The European Defence Agency, EDA, is also tackling space situational awareness: it is currently doing preparatory work on defence requirement and adopted a list of requirements for a military space-surveillance network which will seriously reduce the likelihood of a collision with a European military satellite in low Earth orbit. Furthermore, the fact that European defense authorities have become fully involved with the future space-surveillance system has made it easier to develop a trans-Atlantic dialogue on a possible cooperation.

As part of its mandate to define capabilities for a secure Europe[1], EDA has been preparing a definition of a new European concept as "Situation Awareness", not limited to outer space. It is presently taken as an agreed understanding to mean: *"Perception of environmental elements within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future."*[2]

Discussions on effective synergies and the governance of SSA highlighted the importance of national assets already existing in Europe, as essential components of any European Space System responding to security objectives. These national assets could be complemented by European capabilities when needed, while avoiding unnecessary duplication.

The European Space Policy adopted at the occasion of the Space Council of 2007[3] underlined the legitimacy of dual purposes in space programmes recognizing the need for the European Union, ESA and their Member States to increase synergies between their security and defence space activities and programmes. This European Policy act highlighted the need to increase and expand this coordination. It also suggested the setting up of an appropriate coordination platform with Member States owning relevant assets. The EU, together with potential SSA contributors, will have to

[1] EU Council Joint Action 2004/551/CFSP of 12 July 2004, Article 2.

[2] Of course "Situation Awareness" should be seen in relation to the environment in which it is applied (*land, maritime, air, outer space, urban cyber*) and in particular, the outer space as the predominant operational environment is excluded at this stage, so that *Space Situational Awareness* is considered on its own as a concept and as requirement justifying the existence also of a dedicated space programme.

[3] Space Council resolution on European Space Policy adopted on 22 May 2007, Section III.B8.

define the governance model and the related data policy for an operational European SSA system.

In such a dynamic European institutional landscape, the ESA Director General in 2008 made a proposal addressed to the Member States to set up a development programme on Space Situational Awareness.

During 2009 some debate developed in space policy circles on the opportunity and timeliness of international concerted efforts to advance the awareness of space and on programmes and tools.

A set of recommendations addresses among others the possibility to set up international cooperation among space faring nations in this area. A report was produced by IFRI [4] in which it is recommended that "there should be a concerted effort to establish an international Space Situational Awareness (SSA) architecture in order to reduce the risk of accidental collisions in space".

In the last two years we witnessed the preparation of an EU draft Code of Conduct for outer space activities. This policy exercise has focussed on the possible formation of a widely accepted set of best practices aimed at ensuring security in outer space and to become a useful complement to international space law. Specifically regarding the areas to be covered by SSA systems, the text contains some references inviting subscribing States to share "information on national space policies and procedures to prevent and minimise the possibility of accidents, collisions or other forms of harmful interference and to minimise the creation of space debris."[5]

The European SSA preparatory programme

On this basis, ESA Member States have established a Preparatory programme on SSA by defining and subscribing to the Programme Declaration.[6] The main objectives are to carry out an assessment of domains such as Space Debris, Space Weather and Near Earth Objects, along with technical and governance options to be addressed in detail during the first period of the programme from 2009 to 2012. In the framework of its SSA preparatory programme, ESA has been mandated to gather civilian SSA user requirements and design the technical architecture of what could become a European capacity. A detailed architectural view of the system with its main components will be generated from the SSA Programme to formulate proposals to European institutional decision makers so to provide Europe with an operational capability on SSA.

The Space Situational Awareness Preparatory Programme (SSA-PP) was authorised at the November 2008 ESA Ministerial Council and formally launched 1 January 2009 for an initial period to last until 2012 with full operational services to become available in 2012-19. A project team at ESA has been working intensively on the SSA Preparatory Programme — one of the Agency's newest and most critical European-level initiatives.

SSA will be contributing to the protection of European space systems and ground infrastructure against space debris, harmful space weather and potential impacts by providing the capability to track, observe, analyse and warn. This will help guarantee the availability of economically vital navigation, telecommunication, meteorological, scientific and other services by providing timely and accurate information on the space environment and on artificial and natural threats.

The SSA-PP Programme encompasses three major segments: Space Surveillance & Tracking (SST), Space Weather Effects (SWE) and Near-Earth Objects (NEO). It includes designing the overall structure, defining the data and governance policy, establishing data centres and management systems and, in parallel, launching precursor services based on existing European assets. SSA-PP is also developing a test prototype of a future European space surveillance radar.

Thirteen ESA Member States are participating in SSA-PP[7]. All contribute to the Core Element (SSA architecture, governance, data policy, security, SST Segment), while the Space Weather Element (including NEO activities), the Radar Element (Prototype development) and the Pilot Data Centres Element are optional. The EU has been granted the status of observer.

During the initial 2009- 2012 period, the SST, SWE and NEO Segments aim to launch precursor test services based on federated European assets. Furthermore, the system's top-level architecture will be confirmed, pilot data centres are to be established and the future operational tracking capability will be designed and evaluated. This early experience will allow a better overall definition of a European SSA system, to be then considered for decision on an operational programme at the time of the next ESA Ministerial Council presently planned for 2012.

[4] Assessing the Current Dynamics of Space Security a SWF-Ifri workshop and report, June 18-19 2009, Ifri Paris. "The larger space faring States have instituted SSA programs. In addition, the communication satellite industry and at least one non-governmental research entity collect and aggregate orbital data on satellites and debris. The growing number of SSA resources will soon make it possible to create better coverage than now exists. The community of interested States and commercial entities should consider developing an international civil SSA System of Systems, in analogy to the Global Earth Observation System of Systems (GEOSS). "

[5] Article 8.2 of the version of the EU's draft Code of Conduct, Spanish EU presidency, March 2010.

[6] with last reference ESA/C/SSA-PP/VII/Dec.1, rev.2 (Final)

[7] Austria, Belgium, Finland, France, Germany, Greece, Italy, Luxembourg, Norway, Portugal, Spain, Switzerland and the UK.

To date, ESA's SSA activities have attracted intense interest from across the spectrum of potential contributors and customers, including satellite operators, space and astrophysical/geophysical science centres, regional and national governments, the EDA, civil protection and response authorities, weather services, ministries of defence (MoDs) and national ministries of science, technology and interior.

II.2. The European SSA precursor services

The core of the SSA system will be a catalogue composed of a record of objects detected in orbit from the lowest debris or satellite to the geostationary 'graveyard' orbit at around 38 000 km. To generate this record, telescopes that are considered to be used such as ESA Optical Ground Station in Tenerife, to be complemented by a 'survey radar', dedicated to scan the sky to detect satellites and debris.

Currently, only a few systems exist in Europe that are able to perform that function. In France there is a system called GRAVES, for "Grand Réseau Adapté à la Veille Spatiale", which performs this for the French military. In the UK, there is another system at RAF Fylingdales. Since these systems are military, they often have missions or protocols that have a priority over civilian purposes.

As part of the SSA preparatory Programme, ESA is developing some precursor services to offer an initial level of SST data to test:

- Critical collision avoidance services for European satellite operators
- Routine conjunction analysis and warning
- Tracking campaigns, both routine and on-demand in case of identified collision risk
- Prediction and warning of uncontrolled re-entry events.

This early SSA capability will be able to warn satellite operators about risks to their satellites from other orbiting bodies — be they other satellites or debris. It will also be able to detect in-orbit events, such as explosions[8] or break-ups.

In addition, it will be able to provide valuable information to assist missions in case of anomalies, such as losing contact with the satellite. Apart from helping on failures, the availability of an accurate and timely catalogue will provide assistance in other cases such as the unfurling of solar panels or the controlled separation of two objects. Furthermore, the possibility of assistance to small payloads without a dedicated tracking infrastructure renders the access to outer space more affordable for many programmes and entrants.

The catalogue will be used to predict when satellites can be expected to re-enter Earth's atmosphere. In such cases, the catalogue, surveillance radar and tracking radar can get very accurate position data and also information on the shape of the object, in order to precisely predict the expected impact point. Ultimately, a European infrastructure will help to increase the knowledge and management of outer space and inform authorities and decision makers of any potential danger.

III. PRELIMINARY LEGAL CONSIDERATIONS

This part will try to analyse how the proposed SSA activities can become fully part of legitimate international space activities, placing States in the position to contribute to the collective security in space and on earth. The States and international organisations that participate in the establishment and use of SSA capabilities are subject to obligations under public international law.

The fundamental legal principles governing all space activities, including SSA activities, are described in Articles I and II of the Outer Space Treaty (OST)[9] of 1967. Article I states that "there shall be freedom of scientific investigation in outer space, [...] and States shall facilitate and encourage international cooperation in such investigation". The boundaries to this general and wide-ranging freedom that are most important in the context of SSA activities and therefore most relevant to this study, find there foundation mainly in Article III of the OST, which disposes that "States Parties to the Treaty shall carry on activities in outer space, [...] in accordance with international law, in the interest of maintaining international peace and security and promoting international cooperation [...]". This barrier to the general freedom to use outer space can take on different forms, the most important ones with regard to SSA activities can be arranged into the following categories to each of which a special subsection of this paper will be dedicated: international cooperation and data policy, liability and registration issues, disarmament questions and the protection of the outer space environment.

[8] Spent rocket bodies do sometimes explode without warning, although this is decreasing with better mitigation measures by the manufacturers.

[9] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies entered into force in October 1967 and was ratified by all EU member States except Estonia, Latvia, Lithuania, Malta and Slovenia.

III.1. International Cooperation and data policy

Article I, 1 of the OST, declares the exploration and use of outer space to be the 'province of all mankind' that shall be carried out for the benefit and in the interest of all countries. This formulation, encompasses among other points the postulate to implement space activities by means of co-operation wherever possible. Article X of the OST implements this further by stipulating that "In order to promote international co-operation (...), the States Parties to the Treaty shall consider on a basis of equality any requests by other States Parties to the Treaty to be afforded an opportunity to observe the flight of space objects launched by those States. The nature of such an opportunity for observation and the conditions under which it could be afforded shall be determined by agreement between the States concerned."

In particular, Article X of the OST explicitly evokes the "**opportunity to observe the flight of space objects**" opened to other State Parties to the Treaty. This article promotes international co-operation in the exploration and the use of outer space in dealing with request by other States Parties for observation facilities. So, this is a specific right to access to information, to the effect that an SSA system should ensure access to data without discrimination to the States which make a request and use the information in accordance with international law. There is no mention concerning the legal purposes which could justify such a request, but the areas for potential international cooperation in the above mentioned field may be various.

The nature and the conditions of such an opportunity for observation shall be determined by agreement between the States concerned. This conceptual feature is confirmed by the Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, taking into Particular Account the Needs of Developing Countries[10], which underlines in its second paragraph the freedom of States to cooperate and to determine all aspects of such cooperation as well as the requirement to organise cooperation in an equitable manner and emphasises in its third paragraph that international cooperation shall take place on a basis that is acceptable for all Parties concerned.

Today, several arrangements to give access to data are in place, although there is no public information available on agreements to use data of TIRA, GRAVES and NORAD facilities for this type of observation requested by a State.

As a matter of fact, the development of the SSA system by Europe will contribute to the general reinforcement of the international cooperation. The European SSA system is a tool to identify more and strongest areas of bilateral and multilateral collaboration. Cooperation with the US Space Surveillance Network will continue to be an important aspect of SSA. To date, European's rely on the US SSN for debris tracking and conjunction warning data, showing the scope for Europe's commitment to a development of a European system like SSA. In future, the two systems will be able to cooperate, thereby enhancing the accuracy and usefulness of both.

One central aspect every cooperation has to tackle in the field of SSA activities is defining the appropriate data policy. [11]

The free access to essential data can be considered as a corollary of the general principle set forth by Article I of the OST, providing for the right to launch satellites and the right to acquire imagery, without discrimination, on a basis of equality and in accordance with international law. International law (both customary law and international treaties) provides in a number of general principles to the effect that States are free to explore outer space, and to launch satellites and gather data.

The 1986 UN Principles Relating to Remote Sensing of the Earth from Outer Space might be an interesting precedent of an international[12] legal instrument to consider when and how to develop specific rules. For example, one could construct the need to balance the interests of the sensed and sensing State as a parallel to the need to balance the interest of the State whose space object gathers the information and the State on whose space objects the information is gathered. There are, however, some flaws in such an analogy: For example by defining the term "remote sensing" as the sensing of the Earth [...] "for the purpose of improving natural resources management, land use and the protection of the environment" the 1986 principles were not conceived to apply to systems with a primarily defence purpose, while the European SSA system will probably be based on a combination of military and civilian facilities and uses.

In general, the basic principle is the free access to data and information. This should apply to SSA system as long as it is justified by general public interest. Such public interest may namely be represented by the need to avoid dangers to activities on Earth or in outer space.

[10] Adopted by the UN General Assembly on 13 December 1996, UN Doc. A/RES/51/122, available at: http://www.oosa.unvienna.org/SpaceLaw/gares/index.html.

[11] Study on suitable governance and Data Policy models for a European Space Situational Awareness (SSA) System, Fondation pour la Recherche Stratégique, Final report Paris, June 2008 N° 288/FRS/SSA.

[12] Adopted by UN General Assembly on 3 December 1986 (Resolution 41/65).

The principle of free access to data may be limited by States via legislation or own policies. As each State controlling an element of an SSA system can assert jurisdiction on the data that it inserts in the system, it can set the principles and access conditions on the data, so that it can decide not to restrict access to all or to some data that it owns.

Space Objects Surveillance services have more user-oriented purposes and include missions that may interfere with sovereignty rights. In this case, access to data may be limited because of public security and national defence; protection of intellectual property rights or confidentiality of personal data or of commercial and industrial information. However, except the above mentioned general principle of free access to data, there are no data policy rules defined yet at international level to apply directly to space situational awareness systems.

III.2. Liability and registration issues

SSA systems may also be examined with respect to specific provisions of other United Nations outer space treaties. Two main international space law issues that have a direct impact on space situational awareness systems are the issues of liability and registration.

Today's space operations have developed into a mature market for controlling and optimising the use of space assets, producing value added services that are offered on commercial terms. In this business, specific contractual conditions are introduced regulating contractual liability (i.e., the liability which arises from a contract or a bilateral agreement) and product liability (i.e., the legal liability of manufacturers and sellers to compensate buyers, users and even bystanders, for damages or injuries suffered because of defects in goods purchased).

One of the most valuable contributions which SSA will bring to the advancement of legal certainty to investors, will be the help to establish facts and evidences for the assumption of responsibility and liability (e.g. as launching State, owner, or operator), and support the refinement of confidence building measures with the identification of owner and operator of space systems. The progressive general use of information originated from SSA systems will develop more accurate risk management (on-orbit and during re-entry) and liability assessment in general.

Furthermore, operational information from SSA systems will also help in the application of the Registration Convention[13], which imposes in its Article II on the launching State the obligation to register the space objects in an appropriate registry. In addition, article VI of the Registration Convention provides that "Where the application of the provisions of this Convention has not enabled a State Party to identify a space object which has caused damage to it or to any of its natural or juridical persons, or which may be of a hazardous or deleterious nature, other States Parties, including in particular **States possessing space monitoring and tracking facilities**, shall respond (...) to a request by that State Party, or transmitted through the Secretary-General on its behalf, for assistance under equitable and reasonable conditions in the identification of the object."

Therefore, a State Party to the Convention which has suffered damage following the launching of an object into outer space by another State, has the right to request and obtain assistance in the identification of that object. States Parties are obliged to fulfil a request for support in identification of the space object that has caused damage, by the State party which has suffered damage. All States parties are required to fulfil such a request, but in particular those with space monitoring and tracking facilities. In its turn, the State having suffered such damage is obliged to furnish as exact information as possible. So, States setting up an SSA system should take due note of this particular duty for assistance, under equitable and reasonable conditions, in the identification of the object. From the moment that both States, the requesting one and the State with space monitoring facilities, agree as to the identification and assistance, the matter may become a bilateral one: arrangements under such assistance shall be made between the parties concerned.

Besides the most evident provisions of the international space treaties which seem of direct application to the SSA activities, it is interesting to also have a look at other aspects of the international space law which might give to the SSA systems an innovative role in the field of development and application of international law, such as the mastering of space environment and control of arms in outer space, such as the law related to the protection of the outer space environment as well as the law concerning the disarmament of outer space.

III.3. Protection of the outer space environment

The development and future operations of a European SSA system aim at minimizing debris and preserving the space environment for the responsible, peaceful, and safe use by all users.

[13] Convention on Registration of Objects Launched into Outer Space entered into force in 1976 and was ratified by all EU member States except Estonia, Latvia, Lithuania, Finland, Ireland, Luxembourg, Malta, Portugal, Romania and Slovenia.

The capacity and accuracy of current space monitoring systems is not sufficient to cover small objects or to provide for orbital avoidance service for all space assets. Information on space weather is important for the operation of space objects, but also for the prediction of the debris environment. The constant monitoring and information on space weather, which European SSA aims to ensure, will be a useful tool in designing and operating modern techniques for space traffic management.

There is also a need for a constantly updated catalogue of space debris in order to have a complete understanding of all space debris and diminish the risk of collision in outer space. The voluntary Space Debris Mitigation Guidelines that were adopted by the United Nations Committee on the Peaceful Uses of Outer Space by consensus (A/62/20) and endorsed by the General Assembly Resolution 62/217 outline space debris mitigation measures for the mission planning, design, manufacture and operational (launch, mission and disposal) phases of spacecraft and launch vehicle orbital stages. These Guidelines have been implemented by many space-faring nations. ESA implemented them through its Administrative Instruction on Space Debris Mitigation for Agency Projects, which translates the Guidelines into applicable ESA Requirements, i.e. ESA applicable standard for all procurements of space systems, such as new launchers, satellites and inhabited objects, and of launch services for ESA programmes.

The SSA activities, providing valuable information, could contribute to the emergence of a set of good common practices followed by the international space community, which will in turn favour the emergence of wise behaviours or definite obligations or codes of conduct concerning space debris.

Recently, the US National Space Policy released on 28th of June 2010, pledged U.S. cooperation with other nations on monitoring debris. The document states that " United States shall: develop, maintain, and use SSA information from commercial, civil, and national security sources to detect, identify, and attribute actions in space that are contrary to responsible use and the long-term sustainability of the space environment and continue to follow the US Orbital Debris Mitigation Standard Practices". Secondly, the Space Policy adds that the US shall also "pursue research and development of technologies and techniques, through the Administrator of the NASA and the Secretary of Defense, to mitigate and remove on-orbit debris, reduce hazards, and increase understanding of the current and future debris environment".

Finally, in order to foster the development of Space Collision Warning Measures, "the Secretary of Defense, in consultation with the Director of National Intelligence, the Administrator of NASA, and other departments and agencies, may collaborate with industry and foreign nations to: maintain and improve space object databases; pursue common international data standards and data integrity measures; and provide services and disseminate orbital tracking information to commercial and international entities, including predictions of space object conjunction."

The growing importance of the space debris issues reinforces the interest to develop a complete SSA system also in Europe which will deliver services in the area of space surveillance covering the detection and tracking of objects, their cataloguing, the issuing of collision warning alerts, the recommendation of avoidance manoeuvres, as well as detection of in-orbit explosions. In fact, the European SSA system will be particularly useful because it will concentrate its tracking priorities on those orbital regions that are densely populated and which are of a high economic, scientific, or technological value.

In addition, SSA activities in Europe can serve to assess the human impact on the space environment and interferences, namely in the field of radioactive contamination of space.

In furtherance of the general principles of cooperation and mutual assistance in outer space, principle 7 of the 1992 Nuclear Power Sources Principles[14] entitled "Assistance to States " stipulates that " upon the notification of an expected re-entry into the Earth's atmosphere of a space object containing a nuclear power source on board and its components, **all States possessing space monitoring and tracking facilities**, in the spirit of international cooperation, shall communicate the relevant information that they may have available on the malfunctioning space object with a nuclear power source on board to the Secretary-General of the United Nations (...)".

This principle provides for an important obligation to all States possessing space monitoring and tracking facilities to communicate the relevant information as promptly as possible to allow States that might be affected to assess the situation and take any precautionary measures deemed necessary. This duty to inform is an interesting parallel with the obligation contained in the UN Principles of Remote Sensing (Principle XII) where the sensing States having the technology have to promptly inform the sensed Stated who are exposed to the risks of natural disasters.

Another initiative that is of interest in connection with the establishment of SSA capabilities is the subject of long-term sustainability of space activities which is gaining more and more momentum with the recent establishment of a working group of the Scientific and Technical Subcommittee of COPUOS. The information to be provided by SSA activities will help in this context

[14] The Principles Relevant to the Use of Nuclear Power Sources in Outer Space (Resolution 47/68 of 14 December 1992).

to assess the situation and enable decision-makers to take informed decisions.

The protection of a safe and sustainable use of outer space is essential for the economic and social cohesion. International and regional co-operation, namely in the field of space situational awareness can largely contribute to reaching these goals.

III.4. Disarmament questions

Lastly, the development of SSA systems could play a significant role in the area of international arms control in outer space. In the present and future international scenarios, SSA systems could prove to become valuable to both verify the compliance of the general principle of peaceful use of outer space and sustain the initiatives developing in this area.

Article IV of the OST states that "States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction (...) or station such weapons in outer space in any other manner."

However, it should be noted that at this stage the planned European SSA system is not designed to provide capabilities for either of the above mentioned problems, namely Ballistic Missile defence[15] or early warning capabilities, but only to complement existing ones and to fill current gaps in data availability, thus resulting in better coverage for users in Europe.

In fact, the sensors for space weather which are planned for the European SSA system will provide services related to monitoring of the radiation belts and the ionosphere for conditions that can affect space-borne and ground-base infrastructure or endanger human life. They could ensure, by monitoring and exchanging data and derived information, a scientific international cooperation in the preservation and peaceful utilisation of the space environment and sustain some recent initiatives in this area.

At international level, there are different UNGA Resolutions that aim to prevent an arms race in outer space. Also they are not legally binding, they still have a certain significance by either promoting a code of conduct[16] or reflecting a conviction of the present international community relating to these issues.

The European Union recently issued a draft Code of Conduct for outer space activities [17] that aims to address many delicate issues that have plagued prior international efforts to prevent an arms race in outer space. In fact, point 8.2. of the draft EU code of conduct evokes that "States may also consider providing timely information on space environmental conditions and forecasts to other Subscribing States or private entities through their national space situational awareness capabilities".

IV. CONCLUSION

The development of an SSA system by Europe, aimed at full operational functions in many parameters, will become of particular importance for the evolution of a stronger international cooperation in many key areas concerning outer space such as space debris, liability and registration. The development of an autonomous SSA capability serves no aggressive function and will provide Europe with the opportunity to play a positive role in support of the peaceful uses of outer space.

In the general legal and policy practice, the SSA activities may become instrumental to the emergence of new rules concerning space traffic management and sustain the ITU policy of management of the orbital position and frequencies. The future European SSA system, likewise other comparable systems becoming available, might become significant instruments of evidence for the States to respect their legal obligations provided by United Nations treaties. Their establishment will further develop the attention of the international community on the importance of security in space and in particular of the development of more practice and information available to progress the better understanding and application of international laws of outer space.

The European SSA programme was considered technically challenging and politically important when it was first conceived. Recent evolutions and public policy assessments show how vital it is to enhance the current safeguards for Europe's space-based assets. As Europeans, we depend on our 'space segment' for many things in our daily lives that we take for granted, as much as we depend on a safe and balanced use of outer space.

As a general conclusion, the foreseen SSA activities, as carried out under principles of international law, can be considered legitimate international space activities, placing States in the position to actively contribute to the collective security in space as well as on earth.

[15] See the Hague Code of Conduct against Ballistic Missile Proliferation established on 25 November 2002.

[16] For example see the Model Code of Conduct for Responsible Space-Faring Nations (Proposed by the Stimson Centre) 2007.

[17] EU Draft Code of Conduct for Outer Space Activities Brussels, EU Council, CODUN, Belgian Presidency 2010.