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Registration of geostationary satellites by the United Nations

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ABSTRACT

The geostationary satellites should be registered by the United Nations according to the Convention on Registration of Objects Launched into Outer Space. Based on the registration documentation from the United Nations Office for Outer Space Affairs and other sources, effectiveness of this process is evaluated for all geostationary satellites launched by the end of 2007. It is concluded that about 15% of geostationary satellites is not registered – mainly those belonging to States non-party of the Convention and to commercial operators. Improvement of the situation might be expected from the new UN General Assembly resolution 62/101 on enhancing the practice of States and international intergovernmental organizations in registering space objects.

The registration of artificial objects launched into outer space is governed by the United Nations Convention on Registration of Objects Launched into Outer Space. It was adopted by the UN General Assembly on 12 November 1974, opened for signature on 14 January 1975 in New York and entered into force on 15 September 1976. The depository of the Convention is the Secretary-General of the United Nations and practical issues are dealt with by the UN Office for Outer Space Affairs (OOSA), currently located at

Vienna, Austria. Of course, the geostationary satellite is a special case of artificial satellite – it is moving on the unique geostationary orbit (GSO), so that for terrestrial observer it appears motionless. In this paper, only aspects of the Convention important for GSO satellites will be discussed.

As of 1 January 2008, there were 51 ratifications and 4 signatures of the Convention¹.

In addition, two international organizations have declared their acceptance of rights and obligations provided for in the Convention². Hence, the Convention is ratified by the majority of main space players, but in spite of the continuous efforts of the United Nations Committee on the Peaceful Uses of

¹ Algeria, Antigua and Barbuda, Argentina, Australia, Austria, Belarus, Belgium, Brazil, Bulgaria, Burundi (Signature only), Canada, Chile, China, Cuba, Cyprus, Czech Republic, Denmark, France, Germany, Greece, Hungary, India, Indonesia, Iran (S), Italy, Japan, Kazakhstan, Lebanon, Liechtenstein, Mexico, Mongolia, Montenegro, Netherlands, Nicaragua (S), Niger, Norway, Pakistan, Peru, Poland, Republic of Korea, Russian Federation, Saint Vincent and the Grenadines, Serbia, Seychelles, Singapore (S), Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uruguay

² European Space Agency (ESA) and European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)

Outer Space (COPUOS), not all of its members participate in it. The full text of the Registration Convention can be found at³, or at OOSA webpage⁴.

The Registration Convention requires that the launching State should furnish to the United Nations, as soon as practicable, the following information concerning each space object:

- Name of launching State or States;
- An appropriate designator of the space object or its registration number;
- Date and territory or location of launch;
- Basic orbital parameters, including:
 - Nodal period (for GSO it should be around 1436 minutes);
 - Inclination (inclination of the orbit – for equatorial orbit it is 0 degrees);
 - Apogee (highest altitude above the Earth’s surface – for GSO 35,850 km);
 - Perigee (lowest altitude above the Earth’s surface – for GSO 35,850 km);
- General function of the space object.

The fundamental weakness of the Convention is the formulation “as soon as practicable” which is open to different interpretations, because there is no given deadline. Also the selected set of “basic orbital parameters” is not complete – it does not provide enough information for computation of the satellite orbit in space. This is particularly true for satellite on GSO, since no clue is provided about the geographic longitude of the sub-satellite point at the equator, above which the satellite is stationed. The parameters requested, such as inclination, nodal period,

³ United Nations, *Treaty Series*, vol.. 1023, No. 15020

⁴

http://www.unoosa.org/oosa/SpaceLaw/gares/html/gares_16_1721.html

perigee and apogee, are almost the same for every GSO satellite.

As requested by the Registration Convention, the official United Nations Register of objects launched into outer space has been established at OOSA on behalf of the Secretary General. The first document ST/SG/SER.E/1 was issued on 14 April 1977 and it contains information on space objects launched by the United States of America as of 31 December 1976. As of 31 July 2008, OOSA has issued 540 documents containing registration data on 7245 space objects (including non-functional). In addition, the Office continues to maintain registration information furnished by member States under the previous resolution 1721 B (XVI) of 20 December 1961 and on a voluntary basis. Such information appears in document series A/AC.105/INF.1-416 and covers 5185 objects (most of them were launched before the Registration Convention went into force). A voluntary registration information was provided by Egypt, Israel, Luxembourg, Malaysia and Philippines and also by some states which later acceded to the Convention (Algeria, Brazil and Italy).

In order to provide quick and unlimited access to the information contained in the Register, OOSA has developed an electronic on-line searchable Index to the Register⁵. It contains information received from member States and also complementary information collected from external sources on all functional objects launched into outer space since 1957 (space debris and non-functional objects are not included). The search could be performed using different parameters (name, international identification, State of registry, date of launch, orbital status, etc.). In addition, it provides links between space objects and their relevant documents of registration. This way, every user can

⁵ <http://www.unoosa.org/oosa/osoindex.html>

download and print any registration document. At the same time, additional unofficial information is clearly marked as such.

Table 1: UN registration of geostationary satellites launched by 31.12.2007
(R – ratification, S – signature, A – Acceptance, N – non-party)

| State of registry | Registration treaty status | Registered GSO objects | Non-registered GSO objects |
|------------------------|----------------------------|------------------------|----------------------------|
| Arabsat | - | | 6 |
| Arabsat (to India) | - | | 1 |
| Argentina | R | 1 | |
| Australia | R | 7 | 1 |
| Brazil | R | 5 | 3 |
| Canada | R | 13 | |
| Canada (to Argentina) | R | 1 | |
| Canada (to Brazil) | R | 1 | |
| Canada and USA | R | 2 | |
| China | R | 19 | 8 |
| China (from UK) | R | 4 | |
| ESA | A | 5 | |
| ESA (for Eumetsat) | A | 2 | |
| ESA (for Eutelsat) | A | 2 | |
| ESA (for Inmarsat) | A | 2 | |
| Egypt | N | | 2 |
| Eumetsat | A | 3 | 1 |
| Eutelsat | - | | 4 |
| France | R | 11 | 1 |
| France (for ESA) | R | 3 | |
| France (for Eutelsat) | R | 20 | |
| Germany | R | 5 | |
| Germany and France | R | 2 | |
| Greece and Cyprus | R | 1 | |
| India | R | 19 | |
| India and USA | R | 2 | |
| Indonesia | R | | 9 |
| Inmarsat | - | | 9 |
| Intelsat | - | | 34 |
| Intersputnik | - | | 1 |
| Israel | N | | 2 |
| Italy | R | 3 | 1 |
| Japan | R | 45 | 3 |
| Kazakhstan | R | 1 | |
| Korea, Republic of | R | 4 | |
| Luxembourg (for Astra) | N | 15 | |
| Malaysia | N | 3 | |

| | | | |
|--------------------------------------|---|-----|-----|
| Mexico | R | 2 | 4 |
| Netherlands (for SES New Skies Sat.) | R | | 6 |
| Nigeria | N | | 1 |
| Norway | R | | 2 |
| Philippines | N | 1 | |
| Russia | R | 139 | |
| Russia (to Rimsat) | R | 3 | |
| Singapore and Taiwan | S | | 1 |
| Spain | R | 3 | 3 |
| Sweden | R | 4 | |
| Sweden (from UK) | R | 1 | |
| Thailand | N | | 5 |
| Turkey | R | 3 | |
| UK | R | 13 | 1 |
| USA | R | 260 | 12 |
| USA (for Canada) | R | 2 | |
| USA (for Indonesia) | R | 3 | |
| USA (for Inmarsat) | R | 3 | |
| USA (for Intelsat etc.) | R | 27 | |
| USA (for NATO) | R | 5 | 2 |
| USA (to Australia) | R | 1 | |
| United Arab Emirates | R | 2 | |
| TOTAL | | 673 | 123 |

This on-line Index had been used to obtain statistical information on registration of functional objects in GSO, launched by the end of 2007. The results are given in Table 1. From the total number of 796 relevant satellites, 123 (15%) is not registered by the United Nations. In general, States which participate in the Convention are doing well in fulfilling their obligations. More important are problems with international organizations – some of them (e.g. Eutelsat and Inmarsat) register their objects through other States or entities, but not always. Sometimes, the satellite was registered by two States procuring the launch, even though only one should be the State of registry. In addition, some satellites have changed the ownership/operators during their operational period, but their UN registration have not changed.

At its 75th plenary meeting on 17 December 2007, the GA adopted resolution 62/101⁶ prepared by COPUOS on “Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects”. Some of the recommendations would be very beneficial particularly for registration of satellites in GSO. Further studies should verify whether substantial improvements occur in the future.

⁶ Document A/RES/62/101, 10 January 2008

In paragraph 2, the Resolution deals with recommendations to provide important information on geostationary satellite location and any changes of this location, particularly in case of moving a space object to a disposal orbit:

Also recommends, with regard to the harmonization of practices, that:

- 2 (b) *Consideration should be given to the furnishing of additional appropriate information to the Secretary-General on the following areas:*
- (i) The geostationary orbit location, where appropriate;*
 - (ii) Any change of status in operations (inter alia, when a space object is no longer functional);*
 - (iii) The approximate date of decay or re-entry, if States are capable of verifying that information;*
 - (iv) The date and physical conditions of moving a space object to a disposal orbit;*
 - (v) Web links to official information on space objects.*

Finally, in Paragraph 4, the Resolution proposes submission of information regarding the change of ownership/supervision of a space object which in the past had not been requested at all:

4. *Recommends that, following the change in supervision of a space object in orbit:*
- (a) The State of registry, in cooperation with the appropriate State according to article VI of the Outer Space Treaty, could furnish to the Secretary-General additional information, such as:*
 - (i) The date of change in supervision;*
 - (ii) The identification of the new owner or operator;*
 - (iii) Any change of orbital position;*
 - (iv) Any change of function of the space object.*

CONCLUSIONS

- Registration of geostationary satellites is a special case of the UN registration. Till the end of 2007, 673 GSO objects was registered (84.5% of existing);
- There is usually a long delay in registrations;
- Non-registered satellites belong mainly to States or organizations which are not parties of the Convention;
- Only 3 States (China, Sweden and UK) have officially registered a change of ownership; Changes of orbital position or transfer to disposal orbit are generally not registered (good examples: France, Luxembourg, Sweden).
- New recommendations in Resolution 62/101 are expected to improve the efficiency of the registration process.