

**IISL-ECSL Symposium**  
**REVIEW OF THE STATUS OF THE OUTER SPACE TREATIES**  
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## The 1976 Registration Convention

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### **A. Introduction**

The concept of registering objects launched into outer space arose from the need to know what objects are in outer space. This need was perceived as early as 1961 when the UN General Assembly adopted Resolution 1721 (XVI) calling upon launching States to furnish relevant information promptly to the UN COPUOS through the Secretary-General. The Resolution further requested the Secretary General to maintain a public registry of such information. The registry consists of issues of governmental announcements of objects launched into outer space appearing in the series of UN documents A/AC.105/INF. The first two announcements were made by the USA and by the Soviet Union respectively, in March 1962. The most recent issue is No. 401, of 23 May 1997, announcing the launch of six satellites by Luxembourg between 1988 and 1996.

Registration of objects under Resolution 1721 was considered quite satisfactory but several States expressed their interest in the preparation of a special convention on registration. Above satisfying the need to know what objects are in outer space, the

Convention was expected to assist in identification of objects in space and in providing data that might be needed with respect to other instruments of space law, in particular the Liability Convention and the Rescue Agreement.

The Registration Convention<sup>1</sup> was adopted by the General Assembly by Resolution 3235(XXIX) on 12 November 1974, was opened for signature on 14 January 1975 and entered into force on 15 September 1975. By 1997, it was ratified by 39 and signed by 4 Member States<sup>2</sup>. In addition the European Space Agency in accordance with Article VII. I of the Convention issued a declaration of acceptance of rights and

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<sup>1</sup>United Nations Treaties and Principles on Outer Space, A/AC.105/572/Rev.2, 1997.

<sup>2</sup>For detailed listing, see Annual Report 1997 of the Standing Committee on the Status of International Agreements relating to activities in Outer Space of the IISL. From among those States which have, or have had, an object in space, the following do not adhere to the Convention: Brazil, Indonesia, Israel, Italy, Luxembourg, Portugal, Saudi Arabia and Thailand.

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obligations provided for in the Convention. Its satellites are duly registered<sup>3</sup>.

The number of ratifications and signatures of the Registration Convention is markedly lower than that of the preceding three instruments of space law. There are several States listed in Footnote 3, conducting space activities which are not Parties to the Convention. It is also worth while to note that Article VII.2 of the Registration Convention imposes on its States Parties which are members of an intergovernmental organization conducting space activities the duty to take appropriate steps to ensure that the organization makes a declaration of acceptance of rights and obligations. There are several States Parties to the Convention which are members of organizations listed in Footnote 4 as conducting space activities. These organizations have as yet issued no such declaration.

The Registration Convention in its Article III, contains a provision - as had been the case earlier with Resolution 1721 - for a Registry to be maintained by the Secretary-General. For the publication of launching announcements a new series of documents ST/SG/SER.E<sup>4</sup> was introduced. By January 1998 the series has reached issue No. 329. Another series of documents, ST/SG/SER E/INF<sup>5</sup> contains information furnished by

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<sup>3</sup>From among those organizations which have, or have had, an object in space, the following have not issued a declaration of acceptance: Arabsat, Asiasat, Inmarsat, Intelsat and NATO.

<sup>4</sup>On Internet at [http://www.un.or.at/OOSA\\_Kiosk/treat/reg/register.html](http://www.un.or.at/OOSA_Kiosk/treat/reg/register.html).

<sup>5</sup>The notes contain information on the establishment of registers of space objects by the UN, Canada, USA, USSR, Czechoslovakia, ESA, Japan.

States on the establishment of national registers in compliance with Article II. The most recent issue in this series is No. 13 of 15 January 1997.

Article X of the Registration Convention provided that ten years after the entry into force of the Convention the question of a review of the Convention would be included into the agenda of the General Assembly. This happened in 1986. In the General Assembly in spite of proposals to improve the Convention, the view prevailed that it should not be amended. The General Assembly adopted Resolution 41/66 without a vote (1) recognizing great importance of registering objects launched into outer space (2) reaffirming the importance of the Registration Convention in this respect (3) urging States that have not yet done so to ratify or accede to the Convention (4) urging international intergovernmental organizations that conduct space activities to declare their acceptance of the rights and obligations provided for in the Convention and (5) requesting the Secretary General to prepare a report on past application of the Convention and to submit it to the Legal Subcommittee for information of Member States.

The Report<sup>6</sup> on the application of the Convention between 1975 and 1986 listed in its Annex III functional objects launched into outer space. Non-functional objects - or space debris according to presently used terminology - have not been included because most states have not registered such objects. The Report found that out of 1,474 functional objects launched between

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India, Fed. Rep. Germany, Spain, Ukraine, the Czech republic and Argentine.

<sup>6</sup>Application of the Convention on Registration of Space Objects Launched into Outer Space, A/AC.105/382, of 2 March 1987.

15 September 1976 and 31 October 1986, 1,438, or 97.6%-were registered with the UN, either under the Convention or under Resolution 1721(M). The unregistered 2.4% of objects have been launched by States which were not parties to the Convention or by organizations which have not declared acceptance of rights and obligations of the Convention. In a very few cases Parties to the Convention did not register their objects in time to be included in the Report.

### **B. Application of the Convention between 1986 and 1996**

The situation found in 1986 has not changed much in later years. The announcements continued to be issued as the UN Register. Between 1 November 1986 and 31 December 1996, 1297 objects were launched, of these 1225 or 94.5% were registered with the UN. The remaining 72 unregistered objects have been listed in the Annex. Table 1 gives the objects by years of launch. Table 2 presents numbers and percentages of unregistered objects up to the end of 1995. The data for 1996 have not been included in the statistics because some of the space objects may still be registered in the near future.

#### **1. What objects are in outer space**

A high percentage of objects announced looks like a rather satisfactory reply to the question of what objects are in outer space. The Convention, however, does not give information on what in outer space the objects can be found. Four basic orbital elements which have to be announced according to Article IV, i.e. (i) nodal period, (ii) inclination, (iii) apogee, and (iv) perigee, are not sufficient to determine the actual position and motion of an object in space. Moreover, initial orbital elements listed in the governmental announcements

become obsolete after every maneuver. Even in cases when no maneuver took place, orbital elements are subject to gradual changes by natural forces acting upon objects in space.

When the location and motion of a particular space object is required, other sources of data have to be consulted. Complete lists of space objects can be found in the Spacewarn Bulletin<sup>7</sup> which is reprinted in the COSPAR Information Bulletin. Sets of all orbital elements and their changes with time appear in the NASA Two Line Elements or in the ESA DISCOS System.

The value of the data in the UN Register, i.e. in the governmental launching announcements, lies in the fact that a State or organization acknowledges its responsibility by registering. It is therefore desirable to have in the UN Register all objects launched into outer space. A high percentage may not be enough. An inspection of Table 2 in the Annex shows that the percentage of unregistered objects was very low right after the Convention had entered into force but that it had been increasing ever since. It seems that some steps toward a wider adherence to the Convention should be taken in order to make the number of unregistered objects as small as possible.

#### **2. Timeliness of announcements**

The Convention states in Article IV that States of registry shall furnish to the Secretary-General information concerning space objects **as soon as practicable**. This phrase does not fix a specific maximum

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<sup>7</sup>On Internet at <http://nssdc.gsfc.gov/spacewarn/spacewarn.html>.

permissible delay. In practice, most announcements are submitted within several months, the shortest delay being about one month and the longest delays exceeding a year. Consequently one never knows if an additional announcement will or will not appear in the future. This is in a sharp contrast with announcements by COSPAR. These are published within much shorter delays and in a sequence of launching times.

The long delays of publishing launching announcements follow rather the principle as **soon as convenient** instead of **as soon as practicable**. This policy can be understood. It is more convenient to submit announcements of launchings of space objects in bulk, over several months. If space traffic is smooth, no problem arises.

### 3. Emergency

In times of need, however, a very fast circulation of information can be achieved through the mechanisms of the Registration Convention. When a decay of a satellite is imminent and its impact on the ground possible, the delays of the respective announcements become much shorter. They can be counted in hours and days instead of in months. E.g. announcement ST/SG/SERE/72/Add. 4, issued on 9 February 1983, contains a note from the Permanent Mission of the Soviet Union, dated 7 February 1983, informing that earlier that same day COSMOS 1402 ceased to exist. Another example is the announcement ST/SG/SERE/176/Add.6, issued on 10 October 1988. It contains a note dated 7 October 1988, informing about the decay of COSMOS 1900 on 2 October 1988. This is literally **as soon as practicable**.

### 4. Format of announcements.

No two States have adopted the same format of announcements. Some States give the COSPAR international designation which is widely used by the scientific community, others use national numbers or designations. Some States list non-functional objects, some do not. Some States list the decay or termination of activities, some do not.

To establish a homogeneous register, including a correct correlation of various designations, is a difficult and time consuming task. Frequent users of the UN Register had to undertake this task. Easily accessible is the processed register set up by the Office of Outer Space Affairs. It contains the list of space objects in a time sequence of launches. The national names and designations have been correlated with international designations.

### 5. Identification of space objects

**Identification in orbit** can best be made from updated orbital elements which permit a direct comparison with orbital elements of other objects. It may also be possible to follow the orbit backwards to a time of known location and motion of the object. A large structure can be identified from its radar image which gives its rough outline. For objects of an average size, radar observations provide a "radar cross section" useful as a guidance in identification. Markings on individual parts of a space object are as a rule of little use because of the distance and motion of the object.

**Identification on the ground** is possible if the object landed. If it decayed in a fall through the atmosphere, only space debris reach the ground. These might be identified from possible markings, shape or material.

It seems that the Registration Convention - providing mostly obsolete orbital elements - can assist in identification of space objects only in exceptional cases.

## 6. Conclusions

Some of the above practices, in particular **incomplete registering, long and irregular delays of announcements and different formats of announcements**, may have adversely affected the usefulness of the Convention and may be among the causes of the reluctance of some States to become parties to the Convention.

The increase of the percentage of unregistered objects is alarming. Attention should be paid to the fact that one collision of two space objects has already occurred and that the **active object participating in the collision was unregistered** at the time of collision. A study of legal consequences of such an incident may be of interest.

The existing state of affairs, in particular the awareness of possible advantages of the Registration Convention, could be improved if the COPUOS asked the Office for Outer Space Affairs to publish its processed register or its supplements at regular intervals, e.g. twice a year.

In spite of its weak points, the Registration Convention is a valuable instrument. It has **the ability to reset rapidly to an urgent situation**. Its greatest value, however, is in the acknowledgment of responsibility of launching states for space objects by registering. Its value is neither in listing space objects, nor in their identification.

### C. Perspectives for the Convention

If States perceived a new interest and a new purpose in the Convention, its future application might gain in importance. It is

up to the States to agree upon a possible new role for the Registration Convention. It might be possible to avoid an opening of the Convention and exposing it to the risk of renegotiation. The provisions of the Registration Convention are general enough to permit an agreement among launching agencies of States on adopting standards for the contents and format for announcements and on agreeing on a maximum permissible delay of registering.

There is a precedent for an informal agreement on matters not regulated by space law. A few years ago launching agencies formed a very active and useful Interagency Debris Coordinating Committee. A similar committee could take care of formally or informally proposing and maintaining certain standards of launching announcements.

Up-to-date lists of objects in space supported by the authority of governments of launching States may have several uses. Let us mention the following examples:

Space debris, as they are understood today, include fragments as well as intact bodies of spacecraft which have terminated their activities but still remain in orbit. It is possible to recognize small fragments as belonging to the class of space debris. But intact spacecraft cannot be readily distinguished from dormant objects or from scientific satellites investigating the gravity field of the Earth. It is possible to use the provisions of the Registration Convention and to announce the termination of activities of satellites which stay in orbit. All those interested would know that that particular object is not active anymore and that it became a piece of space debris. Some space agencies already keep lists of active satellites, indicating the usefulness of maintaining the evidence in the framework of the Registration Convention.

One or two announcements of terminated activities have already appeared in the series of documents ST/SG.SER.E. It may be anticipated that other such announcements will follow.

Another example concerns geostationary satellites. Their launching names are different from the names used by the ITU for assignment of nominal positions. There are cases, especially with satellites at the same nominal position, when it is not clear which launching name corresponds to which operational name or ITU designation. Authoritative statements, made in compliance with the Registration Convention, might assist in dealing with the problem of the so called "paper satellites" which never get launched but occupy nominal positions in ITU lists and require a delicate and difficult coordination with other users of the geostationary orbit.

The possibility of using the Registration Convention in the context of the Nuclear Power Satellites deserves a study.

Summing up, a large amount of effort and time has been invested in elaborating the Registration Convention. The merits of those who contributed to that achievement would be duly recognized by making the best possible use of that instrument of space law.

## ANNEX

### List of Unregistered Space Objects

Only functional objects in Earth orbit appear in Table 1. Unregistered objects launched between 1975 and 31 October 1986 were taken from the report quoted in footnote (27), with the exception of a few objects which were registered after the publication of that document. These were omitted in Table 1.

Data on unregistered objects launched between 1 November 1986 and 31 December 1996 were found from a comparison of COSPAR launching data with governmental announcements made in compliance with UNGA Resolution 1721, i.e. in the series of documents A/AC.105/INF, as well as in compliance with the Registration Convention, i.e. in the series ST/SG/SER.E, issued before the end of 1997. The data have been checked against McDowell's list<sup>8</sup> and against the processed catalogue of the Office for Outer Space Affairs. In the majority of cases, the three lists are in agreement. There are, however, a few instances when it was not possible to state without ambiguity whether the object in question should have been registered or not. In other cases it depended on a personal opinion whether a passing mention of a space object in a governmental announcement constituted its registration or not.

The first column of the Table gives the *International Designation*, the second column the national *Name or Designation* of the object. The third column gives the *Launching State or Agency*. In case the

object was launched from the territory of another State, the abbreviation of the latter State appears in brackets. The year of launch appears in the *International Designation*. The month and day, referred to Universal Time, appear in the fourth column under *Launching Date*. The last column gives the *Landing or Decay Date* expressed in the last two digits of the year, the month and day. For orbiting objects it says *In orbit* and for geostationary satellites *GEO*.

Most of the unregistered objects have been launched by States or organizations which were not Parties to the Registration Convention at the time of the launch. A few unregistered objects have been launched by Parties to Convention. They may be registered at some future time.

Table 2 gives the numbers of functional space objects (payloads) launched during different periods of time and the corresponding numbers of unregistered objects. The last column shows the percentage of unregistered objects. These are subject to possible slight changes if objects are added or omitted from Table 1, particularly if some objects are registered in the future. The fact that the percentage of unregistered objects has been increasing in the past twenty years has, however, been firmly established.

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<sup>8</sup>The UN registry of Space Objects, edited by Jonathan McDowell, April 1998. On the Internet at <http://hea-www.harvard.edu/QEDT/jcm/space/un/un.html>.

TABLE 1

<i>International Designation</i>	<i>Name</i>	<i>Launching State or Agency</i>	<i>Launching Date</i>	<i>Landing or Decay Date</i>
1976-117A	China 7	China	Dec 7	77 Jan 2
1977-049A	Signe 3	France (SU)	Jun 17	79 Jun 22
1978-011A	China 8	China	Jan 26	78 Feb 8
1980-015A 018A	Tansei 4 Ayame 2	Japan Japan	Feb 17 Feb 22	83 May 12 GEO
1981-093A 093B 093D 119A	China 9A China 9B China 9C Intelsat 5 F-3	China China China Intelsat (US)	Sep 19 Sep 19 Sep 19 Dec 15	81 Sep 26 82 Oct 6 82 Aug 17 GEO
1982-090A 097A	China 12 Intelsat 5 F-5	China Intelsat (US)	Sep 9 Sep 28	82 Sep 21 GEO
1893-059C 086A 105A	Palapa 3 China 13 Intelsat 5 F-7	Indonesia (US) China Intelsat (F)	Jun 16 Aug 19 Oct 19	GEO 83 Sep 3 GEO
1984-008A 011D 023A 035A 098A 115A	China 14 Palapa 4 Intelsat 5 F-8 China 15 China 16 NATO 3D	China Indonesia Intelsat (F) China China NATO (US)	Jan 29 Feb 3 Mar 5 Apr 8 Sep 12 Nov 10	In orbit 84 Nov 16 GEO GEO 84 Sep 29 GEO
1985-015A 015B 025A 048C 055A 076B 087A 096A 109C 1986-010A 026B 076A	Arabsat 1 Brasilsat Intelsat 5 F-10 Arabsat 1B Intelsat 5 F-11 Aussat 1 Intelsat 5A F-12 China 17 Aussat 2 China 18 Brasilsat 2 China 19	Arabsat (F) Brazil (F) Intelsat (US) Arabsat (US) Intelsat (US) Australia (US) Intelsat (US) China Australia (US) China Brazil (F) China	Feb 8 Feb 8 Mar 23 Jun 17 Jun 30 Aug 28 Sep 28 Oct 21 Nov 27 Feb 1 Mar 28 Oct 6	GEO GEO GEO GEO GEO GEO GEO 85 Nov 7 GEO GEO GEO 86 Oct 23
1987-029A 067A 075A 078A	Palapa 5 China 20 China 21 Eutelsat 1F-4	Indonesia (US) China China Eutelsat (F)	Mar 20 Aug 5 Sep 9 Sep 16	GEO 87 Aug 23 87 Oct 4 GEO



<i>International Designation</i>	<i>Name</i>	<i>Launching State or Agency</i>	<i>Launching Date</i>	<i>Landing or Decay Date</i>
1988-014A	DFH 2A	China	Mar 7	GEO
026A	San Marco 5	Italy	Mar 25	88 Dec 6
040A	Intelsat 5A F-13	Intelsat (F)	May 18	GEO
051B	Oscar 13	Germany (F)	Jun 15	In orbit
052A	Nova 2	US	Jun 16	In orbit
067A	FSW 11	China	Aug 5	88 Aug 13
080A	Feng Jün 1	China	Sep 6	In orbit
111A	DFH 2B	China	Dec 22	GEO
1989-006A	Intelsat 5 F-15	Intelsat (F)	Jan 27	GEO
041A	Superbird A	Japan	Jun 5	GEO
072A	USA 45	US	Sep 6	In orbit
087A	Intelsat 6 F-2	Intelsat (F)	Oct 27	GEO
1990-002A	STS 32	US	Jan 9	90 Jan 20
005E	Microsat 2	Brazil (F)	Jan 22	In orbit
005G	Microsat 4	Argentina (F)	Jan 22	In orbit
021A	Intelsat 6 F-3	Intelsat (US)	Mar 14	GEO
027A	Offeq 2	Israel	Apr 3	90 Jul 9
031A	USA 56	US	Apr 11	In orbit ?
031B	USA 57	US	Apr 11	In orbit ?
031C	USA 58	US	Apr 11	In orbit ?
049A	Rosat	Germany (US)	Jun 1	In orbit
050E	USA 62	US	Jun 8	In orbit
056A	Intelsat 6 F-4	Intelsat (US)	Jun 23	GEO
059A	Badr 1	Pakistan (Chin)	Jul 16	90 Dec 8
081A	Feng Jün 1-2	China	Sep 3	91 Mar 11
081B	China 31	China	Sep 3	91 Mar 11
081C	China 32	China	Sep 3	91 Jul 24
089A	FSW 1-12	China	Oct 5	90 Oct 23
093A	Inmarsat 2 F-1	Inmarsat (UK)	Oct 30	GEO
1991-018A	Inmarsat 2	Inmarsat (UK)	Mar 8	GEO
040A	STS 40	US	Jun 5	91 Jun 14
050D	Microsat 4	US	Jul 17	92 Jan 23
055A	Intelsat 6 F-5	Intelsat (F)	Aug 14	GEO
060A	Yuri 3B	Japan	Aug 25	GEO
062A	Yohkoh	Japan	Aug 30	In orbit
075A	Intelsat 6 F-1	Intelsat (F)	Oct 29	GEO
076D	USA 76	US	Nov 8	In orbit
076E	USA 77	US	Nov 8	In orbit
084B	Inmarsat 2 F-3	Inmarsat (F)	Dec 16	GEO

<i>International Designation</i>	<i>Name</i>	<i>Launching State or Agency</i>	<i>Launching Date</i>	<i>Landing or Decay Date</i>
1992-010B	Arabsat 1C	Arabsat (F)	Feb 26	GEO
021B	Inmarsat 2 F-4	Inmarsat (F)	Apr 15	GEO
026A	STS 49	US	May 7	92 May 16
027A	Palapa 7	Indonesia (US)	May 14	GEO
070B	Lageos 2	Italy (US)	Oct 22	In orbit
090A	Optus B-2	Australia (Chin)	Dec 21	95 Jun 29
1993-017B	SEDS 1	US	Mar 30	93 Mar 30
058B	ACTS	US	Sep 12	GEO
058C	Orfeus SPAS	Germany (US)	Sep 12	93 Sep 22
061D	Posat 1	Portugal (F)	Sep 26	In orbit
061F	Itamsat	Italy (F)	Sep 26	In orbit
066A	Intelsat 7 F-1	Intelsat (F)	Oct 22	GEO
073A	Solidaridad 1	Mexico (F)	Nov 20	GEO
073B	Metoesat 6	ESA (F)	Nov 20	GEO
078B	Thaicom 1	Thailand (F)	Dec 18	GEO
1994-003B	Tubsat 2	Germany (CIS)	Jan 25	In orbit
006H	Bremsat	Germany (US)	Feb 3	95 Feb 12
010A	Shijian 4	China	Feb 8	In orbit
034A	Intelsat 702	Intelsat (F)	Jun 17	GEO
034B	STRV 1A	UK/ESA (F)	Jun 17	In orbit
034C	STRV 1B	UK (F)	Jun 17	In orbit
040A	Panamasat 2	US (F)	Jul 8	GEO
049A	Brasilsat B1	Brazil	Aug 10	GEO
049B	Turksat 1B	Turkey (F)	Aug 10	GEO
055A	Optus B-3	Australia (Chin)	Aug 27	GEO
064A	Intelsat 703	Intelsat (US)	Oct 6	GEO
065A	Solidaridad 2	Mexico (F)	Oct 8	GEO
065B	Thaicom 2	Thailand (F)	Oct 8	GEO
073A	STS 66	US	Nov 3	94 Nov 14
073B	Crista SPAS	US	Nov 3	94 Nov 14
1995-001A	Intelsat 704	Intelsat (US)	Jan 10	GEO
004H	Oderacs 2F	US	Feb 3	Decayed ?
013A	Intelsat 705	Intelsat (US)	Mar 22	GEO
016A	Brasilsat B2	Brazil (F)	Mar 28	GEO
023A	Intelsat 706	Intelsat (F)	May 17	GEO
033B	Cerise	France	Jul 7	In orbit
057A	UFO 6 USA114	US	Oct 22	GEO
067A	Telecom 2C	France	Dec 6	GEO
069A	Galaxy 3R	US	Dec 15	GEO
072B	Skipper	US (CIS)	Dec 28	In orbit
073A	Echostar 1	US (Chin)	Dec 28	GEO

<i>International Designation</i>	<i>Name</i>	<i>Launching State or Agency</i>	<i>Launching Date</i>	<i>Landing or Decay Date</i>
1996-002B	Measat	Malaysia (F)	Jan 12	GEO
006A	Palapa C1	Indonesia (US)	Feb 1	GEO
015A	Intelsat 707	Intelsat (F)	Mar 14	GEO
020A	Inmarsat 3 F-1	UK (US)	Apr 3	GEO
022A	MSAT 1	Canada (F)	Apr 20	GEO
030A	Palapa C2	Indonesia (F)	May 16	GEO
030B	Amos 1	Israel (F)	May 16	GEO
035A	Intelsat 709	US (F)	Jun 15	GEO
040A	Arabsat 2A	Arabsat (F)	Jul 9	GEO
040B	Turksat 1C	Turkey (F)	Jul 9	GEO
044B	Telecom 2D	France	Aug 8	GEO
048A	China Star 7	China	Aug 18	In orbit
052B	Unamsat B	Mexico (RF)	Sep 5	In orbit
053A	Inmarsat 3 F-2	Inmarsat (RF)	Sep 6	GEO
059A	FSW 23	China	Oct 20	In orbit
063A	Arabsat 2B	Arabsat (RF)	Nov 13	GEO
063B	Measat 2	Malaysia (RF)	Nov 13	GEO
065B	Orfeus Spas	Germany (US)	Nov 20	96 Dec 4
070A	Inmarsat 3 F-3	Inmarsat (US)	Dec 18	GEO

**TABLE 2**

<i>Years</i>	<i>No. of payloads</i>		
	<i>Launched</i>	<i>Unregistered</i>	<i>Percentage</i>
1976 - 1980	587	5	0.9 %
1981 - 1985	780	24	3.1 %
1986 - 1990	707	36	5.1 %
1991 - 1995	593	51	8.6 %
1996	98	19	