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CLASSIFICATION OF GEOSYNCHRONOUS OBJECTS

Produced with the DISCOS Database

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Abstract

This is a status report on geosynchronous objects as of the end of 2012.

Based on orbital data in ESA's DISCOS database and on orbital data provided by KIAM the situation near the geostationary ring (here defined as orbits with mean motion between 0.9 and 1.1 revolutions per day, eccentricity smaller than 0.2 and inclination below 70 deg) is analysed. From 1291 objects for which orbital data are available, 422 are controlled inside their longitude slots, 662 are drifting above, below or through GEO, 178 are in a libration orbit, 9 are in highly-inclined orbits and 20 , whose status could not be determined. Furthermore, there are 78 uncontrolled objects without orbital data (of which 73 have not been catalogued). Thus the total number of known objects in the geostationary region is 1369 .

During 2012 at least fourteen spacecraft reached end-of-life. Nine of them were reorbited following the IADC recommendations. Four spacecraft were reorbited too low. We identified one spacecraft that seems to be abandoned or could not make any reorbiting manouevre at all in 2012 and is now librating inside the geostationary ring.

If you detect any error or if you have any comment or question please contact:

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1 Introduction

All objects near the geostationary ring which are catalogued in ESA's DISCOS Database (Database and Information System Characterising Objects in Space) are listed in this document. The main purpose is to classify all these objects according to different categories. Indeed, seven different types of categories are defined:

- C1: objects under longitude and inclination control (E-W as well as N-S control) - the longitude is nearly constant and the inclination is smaller than 0.3 degrees,
- C2: objects under longitude control (only E-W control) - the longitude is nearly constant but the inclination is higher than 0.3 degrees,
- D: objects in a drift orbit,
- L1: objects in a libration orbit around the Eastern stable point (longitude 75 degrees East),
- L2: objects in a libration orbit around the Western stable point (longitude 105 degrees West),
- L3: objects in a libration orbit around both stable points,
- I: objects in a highly inclined orbit (inclination larger than 25 degrees).

All objects are selected from ESA's DISCOS Database according to the following criteria:

- eccentricity smaller than 0.2
- mean motion between 0.9 and 1.1 revolution per sidereal day, corresponding approximately to a semi-major axis between 42164-2500 and 42164+3150 km.
- inclination lower than 70 degrees

The basic source of information are the USSTRATCOM Two-Line Elements (TLEs). The DISCOS Database is updated at regular intervals by ESOC's Space Debris Office (on average 1 TLE per week and per object is stored). The accuracy of TLE is limited. At the geostationary altitude, only objects larger than about 1 m in size are tracked on a regular basis. The main information given by this catalogue is the classification of the objects according to their type of motion. It should be noted that also some of the derived parameters like libration period and libration amplitude may sometimes have a limited accuracy. For further information about the method of classification please refer to *Classification of geostationary objects*, (Ref. 1).

This document contains three tables:

- Table 1 contains objects with recently updated orbital elements. They are ordered according to their type of motion and some orbital information is given.
- Table 2 contains objects for which there were no TLEs available during the last 6 months. The orbital data is provided by Vladimir Agapov, Keldysh Institute for Applied Mathematics, Moscow (KIAM).
- Table 3 contains all the objects in highly-inclined orbits.

- Table 4 contains all the objects of which the status cannot be determined by our software. The main reason for the difficulty to classify an object is that there are not enough TLEs available or that the status has recently changed (satellite newly launched or recently manoeuvred).

In order to find a specific object in one of the four tables, there is a list of all objects in ascending order of their COSPAR identifier in Chapter 2.

2 List of geosynchronous objects

All the catalogued objects near the geostationary ring are listed here. They are ordered according to their COSPAR designation. The status of these objects (controlled, drifting, libration), the table in which they are classified and a reference number are also given.

Column 1: COSPAR designation.

Column 2: Object's common name.

Column 3: Number of the Table in which the object is classified:

- Table 1: objects with updated TLEs,
- Table 2: objects with orbital data by KIAM or without any orbital data,
- Table 3: objects in highly inclined orbits,
- Table 4: status is indeterminate.

Column 4: The status of the object:

- C1: objects under longitude and inclination control (E-W as well as N-S control),
- C2: objects under longitude control (only E-W control),
- C: objects under control (source: KIAM - no TLEs available),
- D: objects in a drift orbit,
- L1: objects in a libration orbit around the Eastern stable point (longitude 75 degrees East),
- L2: objects in a libration orbit around the Western stable point (longitude 105 degrees West),
- L3: objects in a libration orbit around both stable points,
- I: objects in highly-inclined orbits,
- Ind: the status could not be determined,
- U: uncontrolled objects (source: KIAM - no TLEs available).

Column 5: A reference number to find the object in its table.

Please note, that objects in tables 4.8 (Unidentified objects) and 4.10 (Uncontrolled uncatalogued objects) are not included in this list.

COSPAR	NAME	TABLE	STATUS	No
63031A	Syncom 2	4.	I	1.
64047A	Syncom 3	1.	D	422.
65028A	Intelsat I F-1	1.	L2	25.
66053A	GGTS 1	1.	D	554.
66053B	IDCSP 1	1.	D	552.
66053C	IDCSP 2	1.	D	550.
66053D	IDCSP 3	1.	D	547.
66053E	IDCSP 4	1.	D	544.
66053F	IDCSP 5	1.	D	541.
66053G	IDCSP 6	1.	D	538.
66053H	IDCSP 7	1.	D	536.
66053J	Titan IIIC stage 3 (Transtage)	1.	D	534.
66110A	ATS 1	1.	D	425.
67001A	Intelsat II F-2	1.	D	423.
67003A	IDCSP 8	1.	D	558.
67003B	IDCSP 9	1.	D	557.
67003C	IDCSP 10	1.	D	556.
67003D	IDCSP 11	1.	D	555.
67003E	IDCSP 12	1.	D	553.
67003F	IDCSP 13	1.	D	546.
67003G	IDCSP 14	1.	D	543.
67003H	IDCSP 15	1.	D	539.
67026A	Intelsat II F-3	1.	L1	104.
67066A	IDCSP 16	1.	D	565.
67066B	IDCSP 17	1.	D	564.
67066C	IDCSP 18	1.	D	563.
67066D	IDCSP 19	1.	D	562.
67066E	LES 5	1.	D	561.
67066F	DODGE 1	1.	D	560.
67066G	Titan IIIC stage 3 (Transtage)	1.	D	559.
67094A	Intelsat II F-4	1.	L2	28.
67111A	ATS 3	1.	L2	5.
68050A	OPS 9341 (IDSCS 20)	1.	D	551.
68050B	OPS 9342 (IDSCS 21)	1.	D	549.
68050C	OPS 9343 (IDSCS 22)	1.	D	548.
68050D	OPS 9344 (IDSCS 23)	1.	D	545.
68050E	OPS 9345 (IDSCS 24)	1.	D	542.
68050F	OPS 9346 (IDSCS 25)	1.	D	540.
68050G	OPS 9347 (IDSCS 26)	1.	D	537.
68050H	OPS 9348 (IDSCS 27)	1.	D	535.
68050J	Titan IIIC stage 3 (Transtage)	1.	D	533.
68063A	OPS 2222 (CANYON 1)	2.	D1	70.
68063B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	10.
68081AA	Transtage 5 debris	1.	D	512.
68081AB	Transtage 5 debris	1.	D	476.
68081AC	Transtage 5 debris	1.	D	507.
68081AD	Transtage 5 debris	1.	D	532.

COSPAR	NAME	TABLE	STATUS	No
68081AE	Transtage 5 debris	1.	D	508.
68081AF	Transtage 5 debris	1.	D	504.
68081A	OV2 5	1.	D	497.
68081D	LES 6	1.	L2	23.
68081E	Titan IIIC stage 3 (Transtage)	1.	D	495.
68081G	LES 6 operational debris	1.	D	469.
68081H	LES 6 operational debris	1.	D	500.
68081J	Transtage 5 debris	1.	D	461.
68081K	Transtage 5 debris	1.	D	505.
68081L	Transtage 5 debris	1.	D	501.
68081M	Transtage 5 debris	1.	D	453.
68081N	Transtage 5 debris	1.	D	463.
68081P	Transtage 5 debris	1.	D	490.
68081Q	Transtage 5 debris	1.	D	253.
68081R	Transtage 5 debris	1.	D	450.
68081S	Transtage 5 debris	1.	D	211.
68081T	Transtage 5 debris	1.	D	514.
68081U	Transtage 5 debris	1.	D	523.
68081V	Transtage 5 debris	1.	D	251.
68081W	Transtage 5 debris	1.	D	280.
68081X	Transtage 5 debris	1.	D	493.
68081Y	Transtage 5 debris	1.	D	529.
68081Z	Transtage 5 debris	1.	D	459.
68116A	Intelsat III F-2	1.	D	2.
69013A	TACSAT 1	1.	D	430.
69013B	Titan IIIC stage 3 (Transtage)	1.	D	54.
69036A	OPS 3148 (CANYON 2)	2.	D1	43.
69036B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	4.
69045A	Intelsat III F-4	1.	D	1.
69069A	ATS 5	1.	D	279.
69069C	JPL SR-28-3 (ATS 5 AKM)	1.	D	100.
69101A	Skynet 1A	1.	L2	6.
70003A	Intelsat III F-6	1.	D	210.
70021A	NATO I	1.	L2	9.
70032A	Intelsat III F-7	2.	L1	8.
70046A	OPS 5346 (Rhyolite 1)	2.	L1	2.
70055A	Intelsat III F-8	1.	D	510.
70069A	OPS 7329 (CANYON 3)	2.	L2	2.
70069B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	11.
71006A	Intelsat IV F-2	1.	D	160.
71009A	NATO IIB	1.	L2	4.
71039A	OPS 3811 (DSP F2)	2.	D1	90.
71039B	Titan IIIC stage 3 (Transtage)	2.	D1	41.
71095A	OPS 9431 (DSCS II F-1)	1.	L2	10.
71095B	OPS 9432 (DSCS II F-2)	1.	L3	3.
71095C	Titan IIIC stage 3 (Transtage)	1.	D	41.
71116A	Intelsat IV F-3	1.	D	301.

COSPAR	NAME	TABLE	STATUS	No
72003A	Intelsat IV F-4	1.	D	336.
72010A	OPS 1570 (DSP F3)	2.	D1	51.
72010B	Titan IIIC stage 3 (Transtage)	2.	D1	30.
72041A	Intelsat IV F-5	1.	D	395.
72090A	Anik A1	1.	D	158.
72101A	OPS 9390 (CANYON 5)	2.	L1	7.
72101B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	7.
73013A	OPS 6063 (Rhyolite 2)	2.	L1	3.
73023A	Anik A2	1.	D	330.
73040A	OPS 6157 (DSP F4)	2.	D1	50.
73040B	Titan IIIC stage 3 (Transtage)	2.	D1	59.
73058A	Intelsat IV F-7	1.	D	204.
73100A	OPS 9433 (DSCS II F-3)	1.	D	57.
73100B	OPS 9434 (DSCS II F-4)	1.	D	47.
73100D	Titan IIIC stage 3 (Transtage)	1.	D	9.
74017A	Cosmos 637	1.	D	454.
74017F	Proton-K/DM fourth stage (Blok-DM)	1.	D	466.
74022A	Westar I	1.	D	353.
74033A	SMS 1	1.	D	132.
74039A	ATS 6	1.	D	503.
74039C	Titan IIIC stage 3 (Transtage)	1.	D	448.
74060A	Molniya 1-S	1.	L1	60.
74060F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	79.
74075A	Westar II	1.	D	344.
74093A	Intelsat IV F-8	1.	D	327.
74094A	Skynet 2B	1.	L1	99.
74101A	Symphonie A	1.	D	364.
75011A	SMS 2	1.	D	281.
75011F	Aerojet SVM-5 (SMS 2 AKM)	1.	D	129.
75038A	Anik A3	1.	D	386.
75042A	Intelsat IV F-1	1.	D	240.
75055A	OPS 4966 (CANYON 6)	2.	L1	1.
75055B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	9.
75077A	Symphonie B	1.	D	367.
75091A	Intelsat IVA F-1	1.	D	358.
75097A	Cosmos 775	1.	L1	66.
75097F	Proton-K/DM fourth stage (Blok-DM)	1.	D	394.
75100A	GOES 1	1.	L2	16.
75100F	Aerojet SVM-5 (GOES 1 AKM)	1.	D	502.
75117A	RCA Satcom I	1.	D	299.
75118A	OPS 3165 (DSP F5)	2.	D1	38.
75118C	Titan IIIC stage 3 (Transtage)	2.	D1	36.
75118D	OPS 3165 operational debris (Telescope aperture suncover)	2.	U	1.
75123A	Raduga 1	1.	L1	20.
75123F	Proton-K/DM fourth stage (Blok-DM)	1.	D	437.
76004A	Hermes	1.	L2	21.
76010A	Intelsat IVA F-2	1.	D	312.

COSPAR	NAME	TABLE	STATUS	No
76017A	Marisat 1	1.	D	223.
76023A	LES 8 (RTGPP)	1.	L2	11.
76023B	LES 9 (RTGPP)	1.	L2	13.
76023F	Titan IIIC stage 3 (Transtage)	1.	D	105.
76023J	LES 8, LES 9 operational debris	1.	D	104.
76023K	LES 8, LES 9 operational debris	1.	D	486.
76029A	RCA Satcom II	1.	D	134.
76035A	NATO IIIA	1.	D	340.
76042A	Comstar 1A	1.	D	334.
76053A	Marisat 2	1.	D	22.
76059A	OPS 2112 (DSP F6)	2.	D1	63.
76059C	Titan IIIC stage 3 (Transtage)	2.	D1	37.
76059D	OPS 2112 operational debris (Telescope aperture suncover)	2.	U	2.
76066A	Palapa 1	1.	D	391.
76073A	Comstar 2	1.	D	370.
76092A	Raduga 2	1.	L1	22.
76092F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	37.
76101A	Marisat 3	1.	D	50.
76107A	Ekran 1	1.	L1	38.
76107F	Proton-K/DM fourth stage (Blok-DM)	1.	D	492.
77005A	NATO IIIB	1.	D	15.
77007A	OPS 3151 (DSP F7)	2.	D1	92.
77007C	Titan IIIC stage 3 (Transtage)	2.	L2	5.
77007D	OPS 3151 operational debris (Telescope aperture suncover)	2.	D1	31.
77014A	Kiku-2	1.	D	376.
77018A	Palapa 2	1.	D	382.
77034A	OPS 9437 (DSCS II F-7)	1.	D	32.
77034B	OPS 9438 (DSCS II F-8)	1.	D	17.
77034C	Titan IIIC stage 3 (Transtage)	1.	D	19.
77038A	OPS 9751 (CANYON 7)	2.	L1	4.
77038C	Atlas SLV-3A stage 2 (Agena D)	2.	D1	6.
77041A	Intelsat IVA F-4	1.	D	273.
77048A	GOES 2	1.	D	263.
77048G	Aerojet SVM-5 (GOES 2 AKM)	1.	D	442.
77065A	Himawari	1.	D	237.
77071A	Raduga 3	1.	L1	69.
77071F	Proton-K/DM fourth stage (Blok-DM)	1.	D	66.
77080A	SIRIO 1	1.	L1	23.
77092A	Ekran 2	1.	L1	44.
77092G	Proton-K/DM fourth stage (Blok-DM)	1.	D	482.
77092H	Ekran 2 fragmentation debris	1.	L1	88.
77092J	Ekran 2 fragmentation debris	1.	D	380.
77092K	Ekran 2 fragmentation debris	1.	D	403.
77092L	Ekran 2 fragmentation debris	1.	L3	6.
77108A	Meteosat 1	1.	L1	94.
77108D	Mage 1 (Meteosat 1 AKM)	1.	D	71.
77114A	OPS 4258 (AQUACADE 3)	2.	L2	4.

COSPAR	NAME	TABLE	STATUS	No
77118A	Sakura	1.	D	169.
78002A	Intelsat IVA F-3	1.	D	356.
78012A	IUE	4.	I	2.
78016A	OPS 6391 (FLTSATCOM F1)	2.	D1	74.
78035A	Intelsat IVA F-6	1.	L1	100.
78038A	OPS 8790 (AQUACADE 4)	2.	D1	39.
78039A	Yuri	1.	L1	61.
78044A	OTS 2	1.	D	202.
78058A	OPS 9454 (VORTEX 1) (CHALET 1)	2.	D1	46.
78058B	Titan IIIC stage 3 (Transtage)	2.	D1	55.
78062A	GOES 3	1.	L2	7.
78062D	Aerojet SVM-5 (GOES 3 AKM)	1.	D	278.
78068A	Comstar 3	1.	D	221.
78071A	ESA GEOS 2	1.	D	258.
78073A	Raduga 4	1.	L1	64.
78073F	Proton-K/DM fourth stage (Blok-DM)	1.	D	48.
78106A	NATO IIIC	1.	D	121.
78113A	OPS 9441 (DSCS II F-11)	1.	D	6.
78113B	OPS 9442 (DSCS II F-12)	1.	D	115.
78113D	Titan IIIC stage 3 (Transtage)	1.	D	5.
78116A	Anik B1	1.	D	332.
79007A	Scatha	1.	D	496.
79007C	Scatha AKM	1.	D	498.
79015A	Ekran 3	1.	L1	45.
79015D	Proton-K/DM fourth stage (Blok-DM)	1.	D	483.
79035A	Raduga 5	1.	L1	19.
79035E	Proton-K/DM fourth stage (Blok-DM)	1.	D	412.
79038A	OPS 6392 (FLTSATCOM F2)	1.	D	125.
79053A	OPS 7484 (DSP F8)	2.	D1	83.
79053C	Titan IIIC stage 3 (Transtage)	2.	D1	65.
79053D	OPS 7484 operational debris (Telescope aperture suncover)	2.	U	3.
79062A	Gorizont 2	1.	L1	26.
79062D	Proton-K/DM fourth stage (Blok-DM)	1.	D	60.
79072A	Westar III	1.	D	363.
79086A	OPS 1948 (VORTEX 2) (CHALET 2)	2.	D1	45.
79086C	Titan IIIC stage 3 (Transtage)	2.	D1	54.
79087A	Ekran 4	1.	L1	36.
79087C	Proton-K/DM fourth stage (Blok-DM)	1.	D	434.
79098A	OPS 9443 (DSCS II F-13)	1.	D	20.
79098B	OPS 9444 (DSCS II F-14)	1.	D	111.
79098C	Titan IIIC stage 3 (Transtage)	1.	D	16.
79105A	Gorizont 3	1.	L1	63.
79105E	Proton-K/DM fourth stage (Blok-DM)	1.	D	140.
80004A	OPS 6393 (FLTSATCOM F3)	1.	L2	37.
80016A	Raduga 6	1.	L1	58.
80016D	Proton-K/DM fourth stage (Blok-DM)	1.	D	55.
80049A	Gorizont 4	1.	D	136.

COSPAR	NAME	TABLE	STATUS	No
80049F	Proton-K/DM fourth stage (Blok-DM)	1.	D	80.
80060A	Ekran 5	2.	L3	1.
80060F	Proton-K/DM fourth stage (Blok-DM)	1.	D	499.
80060G	Ekran 5 debris	2.	D1	42.
80074A	GOES 4	1.	D	231.
80081A	Raduga 7	1.	L2	32.
80081F	Proton-K/DM fourth stage (Blok-DM)	1.	D	366.
80087A	OPS 6394 (FLTSATCOM F4)	2.	D1	76.
80091A	SBS I	1.	D	333.
80098A	Intelsat V F-2	1.	D	163.
80104A	Ekran 6	1.	L1	40.
80104E	Proton-K/DM fourth stage (Blok-DM)	1.	D	484.
81018A	Comstar 4	1.	L1	10.
81025A	OPS 7350 (DSP F9)	2.	D1	80.
81025C	Titan IIIC stage 3 (Transtage)	2.	D1	13.
81027A	Raduga 8	1.	D	427.
81027F	Proton-K/DM fourth stage (Blok-DM)	1.	D	59.
81049A	GOES 5	1.	L2	20.
81050A	Intelsat V F-1	1.	D	161.
81057A	Meteosat 2	1.	D	144.
81057B	APPLE	1.	D	379.
81057F	Mage 1 (Meteosat 2 AKM)	1.	D	257.
81061A	Ekran 7	1.	L1	46.
81061F	Proton-K/DM fourth stage (Blok-DM)	1.	D	468.
81069A	Raduga 9	1.	L1	70.
81069F	Proton-K/DM fourth stage (Blok-DM)	1.	D	64.
81073A	FLTSATCOM F5	1.	D	130.
81076A	Himawari-2	1.	D	289.
81096A	SBS II	1.	D	407.
81102A	Raduga 10	1.	L1	18.
81102F	Proton-K/DM fourth stage (Blok-DM)	1.	D	421.
81107A	OPS 4029 (VORTEX 3)	2.	L2	3.
81107C	Titan IIIC stage 3 (Transtage)	2.	D1	56.
81114A	RCA Satcom IIIR	1.	D	396.
81119A	Intelsat V F-3	1.	D	277.
81122A	Marecs A	1.	D	11.
82004A	RCA Satcom IV	1.	D	295.
82009A	Ekran 8	1.	D	361.
82009F	Proton-K/DM fourth stage (Blok-DM)	1.	D	465.
82014A	Westar IV	1.	D	324.
82017A	Intelsat V F-4	1.	D	229.
82019A	OPS 8701 (DSP F10)	2.	D1	88.
82019B	Titan IIIC stage 3 (Transtage)	2.	D1	17.
82020A	Gorizont 5	1.	D	123.
82020F	Proton-K/DM fourth stage (Blok-DM)	1.	D	138.
82031A	Insat-IA	1.	L1	78.
82044A	Cosmos 1366	1.	L1	15.
82044F	Proton-K/DM fourth stage (Blok-DM)	1.	L3	1.

COSPAR	NAME	TABLE	STATUS	No
82058A	Westar V	1.	D	226.
82082A	Anik D1	1.	D	398.
82093A	Ekran 9	1.	L1	55.
82093F	Proton-K/DM fourth stage (Blok-DM)	1.	D	479.
82097A	Intelsat V F-5	1.	D	113.
82103A	Gorizont 6	1.	L2	30.
82103E	Proton-K/DM fourth stage (Blok-DM)	1.	D	426.
82105A	Aurora I	1.	L2	17.
82106A	DSCS II F-16	1.	D	12.
82106B	DSCS III A-01	2.	D1	91.
82106D	IUS second stage	1.	D	259.
82110B	SBS III	1.	D	359.
82110C	Anik C3	1.	D	355.
82113A	Raduga 11	1.	D	65.
82113F	Proton-K/DM fourth stage (Blok-DM)	1.	D	49.
83006A	Sakura 2A	1.	D	268.
83016A	Ekran 10	1.	D	10.
83016F	Proton-K/DM fourth stage (Blok-DM)	1.	D	473.
83026B	TDRS-1	1.	D	145.
83028A	Raduga 12	1.	L1	17.
83028F	Proton-K/DM fourth stage (Blok-DM)	1.	D	384.
83030A	RCA Satcom IR	1.	D	345.
83041A	GOES 6	1.	L2	18.
83047A	Intelsat V F-6	1.	D	212.
83058A	Eutelsat I F-1 (ECS 1)	1.	D	162.
83059B	Anik C2	1.	D	198.
83059C	Palapa Pacific System	1.	D	414.
83065A	Galaxy I	1.	D	402.
83066A	Gorizont 7	1.	D	110.
83066F	Proton-K/DM fourth stage (Blok-DM)	1.	D	53.
83077A	Arabsat 1D-R	1.	D	282.
83081A	Sakura 2B	1.	D	156.
83088A	Raduga 13	1.	D	99.
83088F	Proton-K/DM fourth stage (Blok-DM)	1.	D	52.
83089B	Insat-IB	1.	L1	90.
83094A	RCA Satcom IIR	1.	D	269.
83098A	Galaxy II	1.	D	419.
83100A	Ekran 11	1.	L1	49.
83100F	Proton-K/DM fourth stage (Blok-DM)	1.	D	470.
83105A	Intelsat V F-7	1.	D	313.
83118A	Gorizont 8	1.	D	106.
83118F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	28.
84005A	Yuri 2A	1.	D	187.
84009A	OPS 0441 (VORTEX 4)	2.	Ind	2.
84009C	Titan 34D stage 3 (Transtage)	2.	D1	64.
84016A	Raduga 14	1.	L1	21.
84016F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	43.
84022A	Cosmos 1540	1.	L1	7.

COSPAR	NAME	TABLE	STATUS	No
84022F	Proton-K/DM fourth stage (Blok-DM)	1.	D	347.
84023A	Intelsat V F-8	1.	D	42.
84028A	Ekran 12	1.	D	27.
84028F	Proton-K/DM fourth stage (Blok-DM)	1.	D	491.
84031A	Cosmos 1546	1.	L1	12.
84031F	Proton-K/DM fourth stage (Blok-DM)	1.	D	270.
84035A	STW F-2	1.	L1	96.
84037A	OPS 7641 (DSP F11)	2.	D1	84.
84037B	Titan 34D stage 3 (Transtage)	2.	D1	23.
84041A	Gorizont 9	1.	L1	34.
84041D	Proton-K/DM fourth stage (Blok-DM)	1.	D	135.
84049A	Chinasat 5 (Spacenet 1)	1.	D	371.
84063A	Raduga 15	1.	L1	86.
84063F	Proton-K/DM fourth stage (Blok-DM)	1.	D	520.
84078A	Gorizont 10	1.	L2	27.
84078F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	74.
84080A	Himawari-3	1.	D	337.
84080E	Star 27 (Himawari-3 AKM)	1.	D	320.
84081A	Eutelsat I F-2 (ECS 2)	1.	D	153.
84081B	Telecom 1A	1.	D	112.
84090A	Ekran 13	1.	D	25.
84090F	Proton-K/DM fourth stage (Blok-DM)	1.	D	481.
84093B	SBS IV	1.	D	148.
84093C	Leasat 2	1.	D	45.
84093D	Telstar 3C	1.	D	325.
84101A	Galaxy III	1.	D	339.
84113B	Arabsat 1D	1.	D	166.
84113C	Leasat 1	1.	D	126.
84114A	Spacenet 2	1.	D	321.
84114B	Marecs B2	1.	D	23.
84115A	NATO IIID	1.	D	8.
84129A	USA 7 (DSP F12)	2.	D1	78.
84129B	Titan 34D stage 3 (Transtage)	2.	D1	24.
85007A	Gorizont 11	1.	L3	12.
85007D	Proton-K/DM fourth stage (Blok-DM)	1.	D	517.
85010B	USA 8 (MAGNUM 1)	2.	C2	14.
85010D	IUS second stage	2.	D1	28.
85015A	Arabsat 1A	1.	D	429.
85015B	Brazilsat 1	1.	D	288.
85016A	Cosmos 1629	1.	L2	35.
85016F	Proton-K/DM fourth stage (Blok-DM)	1.	D	265.
85024A	Ekran 14	1.	D	7.
85024D	Proton-K/DM fourth stage (Blok-DM)	1.	D	478.
85025A	Intelsat VA F-10	1.	D	108.
85028B	Anik C1	1.	D	309.
85028C	Leasat 3	1.	D	35.
85035A	Gstar 1	1.	L2	3.
85035B	Telecom 1B	1.	L1	102.

COSPAR	NAME	TABLE	STATUS	No
85048B	Morelos 1	1.	D	275.
85048C	Arabsat 1B	1.	D	428.
85048D	Telstar 3D	1.	D	349.
85055A	Intelsat VA F-11	1.	D	392.
85070A	Raduga 16	1.	L2	31.
85070F	Proton-K/DM fourth stage (Blok-DM)	1.	D	72.
85076B	Optus A1	1.	D	323.
85076C	ASC 1	1.	L2	15.
85076D	Leasat 4	1.	D	69.
85087A	Intelsat VA F-12	1.	D	194.
85092B	USA 11 (DSCS III B-04)	2.	D1	75.
85092C	USA 12 (DSCS III B-05)	2.	D1	67.
85092E	IUS second stage	2.	D1	26.
85102A	Cosmos 1700	1.	L1	31.
85102D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	445.
85107A	Raduga 17	1.	D	410.
85107F	Proton-K/DM fourth stage (Blok-DM)	1.	D	46.
85109B	Morelos 2	1.	D	292.
85109C	Optus A2	1.	D	362.
85109D	Satcom Ku-2	1.	D	300.
86003B	Satcom Ku-1	1.	D	290.
86007A	Raduga 18	1.	D	157.
86007F	Proton-K/DM fourth stage (Blok-DM)	1.	D	70.
86010A	STTW-1	1.	L1	50.
86016A	Yuri 2B	1.	D	246.
86026A	Gstar 2	1.	D	329.
86026B	Brazilsat 2	1.	D	303.
86027A	Cosmos 1738	1.	L3	17.
86027F	Proton-K/DM fourth stage (Blok-DM)	1.	D	63.
86038A	Ekran 15	1.	D	30.
86038D	Proton-K/DM fourth stage (Blok-DM)	1.	D	488.
86044A	Gorizont 12	1.	L1	62.
86044F	Proton-K/DM fourth stage (Blok-DM)	1.	D	61.
86082A	Raduga 19	1.	D	119.
86082F	Proton-K/DM fourth stage (Blok-DM)	1.	D	51.
86090A	Gorizont 13	1.	D	33.
86090D	Proton-K/DM fourth stage (Blok-DM)	1.	L1	83.
86096A	USA 20 (FLTSATCOM F7)	2.	C2	20.
87022A	GOES 7	1.	D	354.
87022F	Star 27 (GOES 7 AKM)	1.	D	151.
87028A	Raduga 20	1.	D	24.
87028D	Proton-K/DM fourth stage (Blok-DM)	1.	D	348.
87029A	Agila 1	1.	D	357.
87040A	Gorizont 14	1.	D	58.
87040D	Proton-K/DM fourth stage (Blok-DM)	1.	D	516.
87070A	Kiku-5	1.	D	254.
87073A	Ekran 16	1.	D	29.
87073D	Proton-K/DM fourth stage (Blok-DM)	1.	D	489.

COSPAR	NAME	TABLE	STATUS	No
87078A	Optus A3	1.	D	165.
87078B	Eutelsat I F-4 (ECS 4)	1.	D	142.
87084A	Cosmos 1888	1.	L3	15.
87084D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	383.
87091A	Cosmos 1894	1.	L2	36.
87091D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	418.
87095A	TV-Sat 1	1.	D	170.
87096A	Cosmos 1897	1.	L1	35.
87096D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	441.
87097A	USA 28 (DSP F13)	2.	D1	87.
87097B	Titan 34D stage 3 (Transtage)	2.	D1	19.
87100A	Raduga 21	1.	L2	24.
87100D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	521.
87109A	Ekran 17	1.	D	21.
87109D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	458.
88012A	Sakura 3A	1.	D	97.
88014A	STTW-2	1.	L1	25.
88018A	Spacenet 3R	1.	D	308.
88018B	Telecom 1C	1.	D	86.
88028A	Gorizont 15	1.	D	73.
88028D	Proton-K/DM fourth stage (Blok-DM)	1.	D	68.
88034A	Cosmos 1940	1.	D	449.
88034D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	393.
88036A	Ekran 18	1.	D	14.
88036E	Proton-K/DM fourth stage (Blok-DM)	1.	D	474.
88040A	Intelsat VA F-13 (NSS 513)	1.	D	127.
88051A	Meteosat 3	1.	D	34.
88051C	PAS 1	1.	D	261.
88063A	Insat-IC	1.	L1	30.
88063B	Eutelsat I F-5 (ECS 5)	1.	D	98.
88066A	Cosmos 1961	1.	L1	6.
88066D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	139.
88071A	Gorizont 16	1.	D	369.
88071D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	440.
88081A	Gstar 3	1.	L2	2.
88081B	SBS V	1.	D	328.
88086A	Sakura 3B	1.	D	228.
88091B	TDRS-West	1.	C2	77.
88091D	IUS second stage	1.	D	433.
88095A	Raduga 22	1.	L1	95.
88095F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	81.
88098A	TDF 1	1.	D	220.
88108A	Ekran 19	1.	D	31.
88108D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	494.
88109A	Skynet 4B	1.	D	311.
88109B	Astra 1A	1.	D	109.
88111A	STTW-3	1.	L1	65.
89004A	Gorizont 17	1.	D	189.

COSPAR	NAME	TABLE	STATUS	No
89004F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	89.
89006A	Intelsat VA F-15	1.	D	193.
89020A	JC-Sat 1	1.	D	285.
89020B	Meteosat 4	1.	D	37.
89020E	Mage 1 (Meteosat 4 AKM)	1.	D	431.
89021B	TDRS 4	1.	D	120.
89021D	IUS second stage	1.	D	444.
89027A	Tele-X	1.	D	216.
89030A	Raduga 23	1.	L1	77.
89030D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	79.
89035A	USA 37 (VORTEX 6)	2.	Ind	1.
89035C	Titan 34D stage 3 (Transtage)	2.	D1	66.
89041A	Superbird A	1.	D	319.
89041B	DFS-Kopernikus 1	1.	D	447.
89046A	USA 39 (DSP F14)	2.	D1	81.
89046D	IUS second stage	2.	D1	14.
89046E	USA 39 operational debris (Telescope aperture suncover)	2.	U	4.
89048A	Raduga 1-1	1.	D	143.
89048D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	78.
89052A	Gorizont 18	1.	D	264.
89052D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	518.
89053A	Olympus 1	1.	D	487.
89062A	TV-Sat 2	1.	D	342.
89067A	Sirius 1	1.	D	218.
89069A	USA 43 (DSCS II F-15)	2.	D1	85.
89069B	USA 44 (DSCS III A-02)	2.	D1	71.
89069D	Titan 34D stage 3 (Transtage)	2.	D1	18.
89070A	Himawari-4	1.	D	44.
89070C	Star 27 (Himawari-4 AKM)	1.	D	150.
89077A	USA 46 (FLTSATCOM F8)	2.	C2	47.
89081A	Gorizont 19	1.	L1	67.
89081D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	443.
89087A	Intelsat VI F-2	1.	D	181.
89090B	USA 48 (MAGNUM 2)	2.	C2	16.
89090D	IUS second stage	2.	D1	61.
89098A	Raduga 24	1.	L1	56.
89098D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	76.
89101A	Cosmos 2054	1.	L2	38.
89101D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	103.
89101G	Cosmos 2054 debris	1.	D	75.
90001A	Skynet 4A	1.	D	179.
90001B	JC-Sat 2	1.	D	124.
90002B	Leasat 5	1.	C2	34.
90011A	DFH-2A	1.	L1	39.
90016A	Raduga 25	1.	L2	29.
90016D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	377.
90021A	Intelsat VI F-3	1.	C2	3.
90030A	AsiaSat 1	1.	D	235.

COSPAR	NAME	TABLE	STATUS	No
90034A	Palapa B-2R	1.	D	283.
90051A	Insat-ID	1.	L1	13.
90054A	Gorizont 20	1.	L1	33.
90054D	Proton-K/DM fourth stage (Blok-DM)	1.	D	439.
90056A	Intelsat VI F-4	1.	D	114.
90061A	Cosmos 2085	1.	L1	4.
90061D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	80.
90063A	TDF 2	1.	D	131.
90063B	DFS-Kopernikus 2	1.	D	287.
90074A	Thor I	1.	D	225.
90077A	Yuri 3A	1.	D	155.
90079A	Skynet 4C	1.	C2	85.
90079B	Eutelsat II F-1	1.	D	255.
90091A	SBS VI	1.	D	178.
90091B	Galaxy VI	1.	D	322.
90093A	Inmarsat 2-F1	1.	C2	47.
90094A	Gorizont 21	1.	L3	10.
90094D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	460.
90095A	USA 65 (DSP F15)	2.	D1	86.
90095D	IUS second stage	2.	D1	47.
90095E	USA 65 operational debris (telescope aperture cover)	2.	D1	68.
90097B	USA 67 (SDS 2 F2)(QUASAR 2)	2.	C2	13.
90100A	Satcom C-1	1.	D	217.
90100B	Gstar 4	1.	D	203.
90102A	Gorizont 22	1.	L1	98.
90102D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	77.
90112A	Raduga 26	1.	L1	32.
90112D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	378.
90116A	Raduga 1-2	1.	L1	47.
90116D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	84.
91001A	NATO IVA	1.	D	107.
91003A	Italsat 1	1.	D	365.
91003B	Eutelsat II F-2	1.	D	171.
91010A	Cosmos 2133	1.	L1	9.
91010F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	401.
91014A	Raduga 27	1.	L1	84.
91014D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	522.
91015A	Astra 1B	1.	D	122.
91015B	Meteosat 5	1.	D	118.
91015E	Mage 1 (Meteosat 5 AKM)	1.	D	406.
91018A	Inmarsat 2-F2	1.	C2	63.
91026A	Anik E2	1.	D	201.
91028A	Spacenet 4	1.	D	293.
91037A	Aurora II	1.	D	182.
91046A	Gorizont 23	1.	D	167.
91046D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	462.
91054B	TDRS 5	1.	C2	62.
91054D	IUS second stage	1.	L3	4.

COSPAR	NAME	TABLE	STATUS	No
91055A	Intelsat VI F-5	1.	D	252.
91060A	Yuri 3B	1.	D	152.
91064A	Cosmos 2155	1.	L3	5.
91064B	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	352.
91067A	Anik E1	1.	D	213.
91074A	Gorizont 24	1.	D	116.
91074D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	316.
91075A	Intelsat VI F-1	1.	D	296.
91079A	Cosmos 2172	1.	L3	14.
91079D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	133.
91080B	USA 75 (DSP F16)	2.	C2	31.
91080D	IUS second stage	2.	D1	15.
91083A	Eutelsat II F-3	1.	D	247.
91084A	Telecom 2A	1.	D	172.
91084B	Inmarsat 2-F3	1.	D	28.
91087A	Raduga 28	1.	L1	76.
91087D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	91.
92006A	USA 78 (DSCS III B-14)	2.	D1	73.
92006C	IABS	2.	D1	1.
92010A	Superbird B1	1.	D	188.
92010B	Insat-IIDT (Arabsat 1C)	1.	D	141.
92013A	Galaxy V	1.	D	245.
92017A	Gorizont 25	1.	D	343.
92017D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	472.
92021A	Telecom 2B	1.	D	284.
92021B	Inmarsat 2-F4	1.	D	83.
92027A	Palapa B4	1.	D	360.
92032A	Intelsat K (NSS K)	1.	D	40.
92037A	USA 82 (DSCS III B-12)(DSCS III F6)	2.	C2	15.
92037C	IABS	2.	D1	12.
92041A	Insat-IIA	1.	D	420.
92041B	Eutelsat II F-4	1.	D	191.
92043A	Gorizont 26	1.	D	234.
92043D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	74.
92054A	Optus B1	1.	D	222.
92057A	Satcom C-4	1.	D	183.
92059A	Cosmos 2209	1.	L2	34.
92059D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	331.
92060A	Hispasat 1A	1.	D	250.
92060B	Satcom C-3	1.	D	36.
92066A	DFS-Kopernikus 3	1.	D	318.
92072A	Galaxy VII	1.	D	314.
92074A	Ekran 20	1.	L1	42.
92074D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	475.
92082A	Gorizont 27	1.	D	417.
92082D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	92.
92084A	Superbird A1	1.	D	195.
92088A	Cosmos 2224	1.	L1	103.

COSPAR	NAME	TABLE	STATUS	No
92088D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	387.
93003B	TDRS 6	1.	C2	74.
93003D	IUS second stage	1.	D	399.
93013A	Raduga 29	1.	L1	93.
93013D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	90.
93015A	USA 98 (UFO F1)	1.	D	238.
93031A	Astra 1C	1.	C2	1.
93039A	Galaxy IV	1.	L1	2.
93046A	USA 93 (DSCS III B-09)(DSCS III F7)	2.	D1	72.
93046C	IABS	2.	D1	8.
93048A	Hispasat 1B	1.	D	317.
93048B	Insat-IIB	1.	D	368.
93056A	USA 95 (UFO F2)	2.	C2	3.
93058B	ACTS	1.	L2	1.
93062A	Raduga 30	1.	L1	16.
93062D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	101.
93066A	Intelsat VII F-1	1.	C2	58.
93069A	Gorizont 28	1.	D	305.
93069D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	435.
93072A	Gorizont 29	1.	D	408.
93072D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	519.
93073A	Solidaridad 1	1.	L2	8.
93073B	Meteosat 6	1.	D	175.
93073E	Mage 1 (Meteosat 6 AKM)	1.	D	372.
93074A	USA 97 (DSCS III B-10)(DSCS III F8)	2.	C2	36.
93074B	IABS	2.	D1	69.
93076A	NATO IVB	1.	C2	21.
93077A	Telstar 4A	1.	L2	12.
93078A	DirecTV-1	1.	D	176.
93078B	Thaicom 1	1.	D	215.
94002A	Gals 1	1.	L1	72.
94002D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	276.
94008A	Raduga 1-3	1.	L1	48.
94008D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	88.
94009A	USA 99 (Milstar DFS-1)	2.	C2	43.
94009B	Titan IVA stage 3 (Centaur)	2.	D1	33.
94012A	Raduga 31	1.	L1	57.
94012D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	96.
94013A	Galaxy IR-A	1.	D	227.
94022A	GOES 8	1.	D	164.
94030A	Gorizont 30	1.	L3	9.
94030D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	525.
94034A	Intelsat VII F-2	3.	Ind	1.
94035A	USA 104 (UFO F3)	2.	L2	1.
94038A	Cosmos 2282	1.	L2	33.
94038D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	271.
94040A	PAS 2	1.	D	219.
94040B	BS-3N	1.	D	207.

COSPAR	NAME	TABLE	STATUS	No
94043A	Apstar 1	1.	C2	59.
94047A	DirecTV-2	1.	D	137.
94049A	Brazilsat B1	1.	D	236.
94049B	Turksat 1B	1.	D	186.
94054A	USA 105 (MERCURY 1)	2.	C2	6.
94054B	Titan IVA stage 3 (Centaur)	2.	D1	57.
94055A	Optus B3	1.	C2	60.
94060A	Cosmos 2291	1.	L2	40.
94060D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	388.
94064A	Intelsat VII F-3 (NSS 703)	1.	C2	78.
94065A	Solidaridad 2	1.	C2	64.
94065B	Thaicom 2	1.	D	297.
94067A	Ekspress 1	1.	D	335.
94067D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L3	13.
94069A	Elektro 1	1.	L1	14.
94069D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	400.
94070A	Astra 1D	1.	C2	12.
94079A	Orion 1	1.	D	128.
94080A	Zongxing 6 (A)	1.	D	464.
94082A	Luch 1	1.	L2	39.
94082D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	456.
94084A	USA 107 (DSP F17)	2.	C2	42.
94084D	IUS second stage	2.	D1	20.
94087A	Raduga 32	1.	L1	5.
94087D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	389.
95001A	Intelsat VII F-4	1.	D	214.
95003A	USA 108 (UFO F4)	2.	C2	38.
95011B	Himawari-5	1.	D	267.
95011D	Star 27 (Himawari-5 AKM)	1.	D	480.
95013A	Intelsat VII F-5	1.	D	174.
95016A	Brazilsat B2	1.	C2	73.
95016B	Hot Bird 1	1.	D	249.
95019A	AMSC-1	1.	C2	67.
95022A	USA 110 (Advanced ORION 1)	2.	C2	24.
95022B	Titan IVA stage 3 (Centaur)	2.	D1	35.
95023A	Intelsat VIIA F-1	3.	Ind	2.
95025A	GOES 9	1.	D	154.
95027A	USA 111 (UFO F5)	2.	D1	82.
95029A	DirecTV-3	1.	D	180.
95035B	TDRS 7	1.	C2	37.
95035D	IUS second stage	1.	D	438.
95038A	USA 113 (DSCS III B-07)(DSCS III F9)	2.	C2	25.
95038C	IABS	2.	D1	16.
95040A	PAS 4	1.	D	39.
95041A	Mugunghwa 1 (Koreasat 1)	1.	D	310.
95043A	JC-Sat 3	1.	D	205.
95044A	N-Star 1	1.	D	200.
95045A	Cosmos 2319	1.	L3	16.

COSPAR	NAME	TABLE	STATUS	No
95045D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	411.
95049A	Telstar 402R	1.	L2	14.
95054A	Luch 1-1	1.	L1	1.
95054D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	92.
95055A	Astra 1E	3.	Ind	3.
95057A	USA 114 (UFO F6)	2.	C2	37.
95060A	USA 115 (Milstar DFS-2)	2.	C2	30.
95060B	Titan IVA stage 3 (Centaur)	2.	D1	32.
95063A	Gals 2	1.	D	350.
95063D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	97.
95064A	AsiaSat 2	1.	D	248.
95067A	Telecom 2C	1.	D	82.
95067B	Insat-IIC	1.	D	326.
95069A	Galaxy IIIR	1.	L2	19.
95073A	EchoStar 1	1.	C1	226.
96002A	PAS 3R	1.	D	192.
96002B	MEASAT 1	1.	C2	24.
96003A	Mugunghwa 2 (Koreasat 2)	1.	C2	36.
96005A	Gorizont 31	1.	D	351.
96005D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	62.
96006A	Palapa C1	1.	D	298.
96007A	N-Star 2	1.	D	241.
96015A	Intelsat VIIA F-2	1.	C1	247.
96020A	Inmarsat 3-F1	1.	C2	33.
96021A	Astra 1F	1.	C1	59.
96022A	MSAT	1.	C2	66.
96026A	USA 118 (MERCURY 2)	2.	C2	2.
96026B	Titan IVA stage 3 (Centaur)	2.	D1	58.
96030A	Palapa C2	1.	C2	57.
96030B	AMOS 1	1.	D	38.
96033A	Galaxy IX	1.	D	286.
96034A	Gorizont 32	1.	D	415.
96034D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	85.
96035A	Intelsat VII F-6	1.	C2	25.
96039A	Apstar 1A	1.	C2	30.
96040A	Arabsat 2A	1.	D	230.
96040B	Turksat 1C	1.	L1	87.
96042A	USA 127 (UFO F7)	2.	C2	46.
96044A	Italsat 2	1.	D	455.
96044B	Telecom 2D	1.	D	117.
96053A	Inmarsat 3-F2	1.	C1	268.
96053D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	94.
96054A	GE 1	1.	C1	196.
96055A	EchoStar 2	1.	L2	22.
96058A	Ekspress 2	1.	L1	51.
96058D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L1	71.
96063A	Arabsat 2B	1.	C2	19.
96063B	MEASAT 2	1.	C2	55.

COSPAR	NAME	TABLE	STATUS	No
96067A	Hot Bird 2	1.	C2	26.
96070A	Inmarsat 3-F3	1.	C1	159.
97002A	GE 2	1.	C2	8.
97002B	Nahuel 1A	1.	D	260.
97007A	JC-Sat 4	1.	C2	27.
97008A	USA 130 (DSP F18)	2.	C2	1.
97008D	IUS second stage	2.	D1	62.
97008E	USA 130 operational debris (Telescope aperture suncover)	2.	D1	60.
97009A	Intelsat VIII F-1	1.	C2	81.
97011A	Tempo 2	1.	D	184.
97016A	Thaicom 3	1.	D	147.
97016B	BSAT-1a	1.	D	197.
97019A	GOES 10	1.	D	199.
97021A	Zhongxing 6 (B)	1.	L1	81.
97025A	Thor II	1.	C2	13.
97026A	Telstar 5	1.	C1	212.
97027A	Inmarsat 3-F4	1.	C2	76.
97027B	Insat-IID	1.	D	531.
97029A	Fengyun 2A (Fengyun 2-1R)	1.	D	26.
97029C	Fengyun 2A AKM	1.	D	515.
97031A	Intelsat VIII F-2	1.	D	95.
97036A	Superbird C	1.	C2	42.
97040A	PAS 6	1.	D	4.
97041A	Cosmos 2345	1.	L3	7.
97041D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	374.
97042A	Agila 2	1.	C2	84.
97046A	PAS 5	3.	Ind	4.
97049A	Hot Bird 3	1.	D	511.
97049B	Meteosat 7	1.	C2	32.
97049E	Mage 1 (Meteosat 7 AKM)	1.	D	446.
97050A	GE 3	1.	C1	235.
97053A	Intelsat VIII F-3 (NSS 803)	1.	C2	28.
97059A	EchoStar 3	1.	C1	240.
97062A	Apstar 2R	1.	D	224.
97065A	USA 134 (DSCS III B-13)(DSCS III F10)	2.	C2	34.
97065C	IABS	1.	D	471.
97070A	Kupon 1	1.	L1	29.
97070D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	302.
97071A	Sirius 2	1.	D	266.
97071B	Cakrawatra 1	1.	L1	75.
97075A	JC-Sat 5	1.	C2	56.
97076A	Astra 1G	1.	C1	40.
97078A	Galaxy VIII-i	1.	D	315.
97083A	Intelsat 804	1.	L3	2.
97086A	HGS-1	1.	L2	26.
98002A	Skynet 4D	1.	D	209.
98006A	Brazilsat B-3A	1.	C2	72.
98006B	Inmarsat-3 F5	1.	C2	15.

COSPAR	NAME	TABLE	STATUS	No
98013A	Hot Bird 4	1.	C2	6.
98014A	Intelsat 806 (NSS 806)	1.	C1	252.
98016A	USA 138 (UFO F8)	2.	C2	27.
98024A	Nilesat 101	1.	C1	275.
98024B	BSAT-1b	1.	C1	111.
98025A	Cosmos 2350	1.	L1	11.
98025D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	385.
98028A	EchoStar 4	1.	D	173.
98029A	USA 139 (Advanced ORION 2)	2.	C2	45.
98029B	Titan IVB stage 3 (Centaur)	2.	L1	6.
98033A	Zhongwei 1	1.	C1	92.
98035A	Thor III	1.	C2	83.
98037A	Intelsat 805	1.	C1	246.
98044A	ZX 5B (ChinaSat 5B)	1.	C2	54.
98049A	ST-1	1.	C2	39.
98050A	Astra 2A	1.	C1	31.
98052A	PAS 7	1.	C1	70.
98056A	Eutelsat W2	1.	D	242.
98056B	Sirius 3	1.	C2	29.
98057A	Hot Bird 5	1.	C1	27.
98058A	USA 140 (UFO F9)	2.	D1	89.
98063A	AfriStar 1	1.	C2	10.
98063B	GE 5	1.	C2	70.
98065A	PAS 8	1.	C1	156.
98068A	Bonum 1	1.	C2	31.
98070A	Satmex 5	1.	C1	179.
98075A	PAS 6B	1.	D	208.
99005A	Telstar 6	1.	C1	55.
99006A	JC-Sat 6	1.	C1	127.
99009A	Arabsat 3A	1.	D	409.
99009B	Skynet 4E	1.	C2	18.
99010A	Raduga 1-4	1.	L1	68.
99010D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	93.
99013A	Asiasat 3S	1.	C1	106.
99016A	Insat 2E	1.	D	306.
99018A	Eutelsat W3	3.	Ind	5.
99027A	Nimiq	1.	C1	213.
99033A	Astra 1H	1.	C2	9.
99042A	Telkom 1	1.	C1	109.
99046A	Mugunghwa 3 (Koreasat 3)	1.	C1	122.
99047A	Yamal-100 No. 1	1.	D	346.
99047B	Yamal-100 No. 2	1.	D	373.
99047E	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	405.
99050A	EchoStar 5	1.	D	146.
99052A	Telstar 7	1.	C1	51.
99053A	LMI 1	1.	C1	76.
99056A	DirecTV-1R	3.	Ind	6.
99059A	Orion 2	1.	C1	269.

COSPAR	NAME	TABLE	STATUS	No
99060A	GE 4	1.	C1	234.
99063A	USA 146 (UFO F10)	2.	C2	12.
99071A	Galaxy 11	1.	C1	245.
00001A	USA 148 (DSCS III B-08)(DSCS III F11)	2.	C2	23.
00001C	IABS	2.	D1	22.
00002A	Galaxy 10R	1.	D	304.
00003A	Zhongxing-22 (FengHuo 1, FH-1)	1.	D	43.
00007A	Hispasat 1C	1.	C1	258.
00011A	Garuda 1	1.	C2	49.
00012A	Superbird 4	1.	C1	153.
00013A	Ekspress 2A	1.	C2	44.
00013D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	452.
00016A	Asiastar	1.	C1	105.
00016B	Insat 3B	1.	D	307.
00019A	Sesat	1.	C2	5.
00019D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	291.
00020A	Galaxy IVR	1.	D	338.
00022A	GOES 11	1.	D	185.
00024A	USA 149 (DSP F20)	2.	C2	29.
00024D	IUS second stage	2.	D1	53.
00024E	DSP F20 Aperture Cover	2.	D1	52.
00028A	Eutelsat W4	1.	C1	44.
00029A	Gorizont 33	1.	L3	11.
00029B	Proton-K/Briz-M fourth stage (Briz-M)	1.	D	424.
00031A	Ekspress 3A	1.	D	149.
00031D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	272.
00032A	Fengyun 2B	1.	D	390.
00032C	Fengyun 2B AKM	1.	D	413.
00034A	TDRS 8	1.	C2	40.
00036A	Cosmos-2371	1.	L1	3.
00036D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	416.
00038A	EchoStar 6	1.	C2	71.
00043A	PAS 9	3.	Ind	7.
00046A	Brasilsat B4	1.	C1	222.
00046B	Nilesat 102	1.	C1	276.
00049A	Raduga 1-5	1.	L1	53.
00049D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	102.
00052A	Eutelsat W1	1.	D	101.
00054A	Astra 2B	1.	C1	32.
00054B	GE 7	1.	C1	163.
00059A	GE-1A	1.	C1	110.
00060A	N-SAT-110	1.	C1	115.
00065A	USA 153 (DSCS III B-11)(DSCS III F12)	2.	C2	8.
00065C	IABS	2.	D1	21.
00066A	Thuraya 1	1.	D	177.
00067A	GE 6	1.	C1	231.
00068A	Europe*Star F1	1.	C1	50.
00069A	Beidou	1.	D	168.

COSPAR	NAME	TABLE	STATUS	No
00072A	PAS 1R	1.	C1	249.
00076A	Anik F1	1.	C1	190.
00080A	USA 155 (SDS 3 F2)	2.	C2	17.
00081A	Astra 2D	1.	C2	17.
00081B	GE 8 (Aurora 3)	1.	C1	162.
00082A	Beidou 1B	1.	D	239.
01002A	Turksat 2A (Eurasiasat 1)	1.	C1	48.
01005A	Sicral	1.	C2	7.
01005B	Skynet 4F	1.	C2	80.
01009A	USA 157 (Milstar-2 F2)	2.	C2	26.
01009B	Titan IVB stage 3 (Centaur)	2.	D1	40.
01011A	Eurobird 1	1.	C1	35.
01011B	BSAT-2a	1.	D	196.
01012A	XM Radio 2 (Rock)	1.	C1	181.
01014A	Ekran 21 (Ekran-M)	1.	D	294.
01014C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	87.
01015A	GSAT-1	1.	D	524.
01018A	XM Radio 1 (Roll)	1.	C1	180.
01019A	PAS 10	3.	Ind	8.
01020A	USA 158 (GeoLITE)	2.	D1	79.
01024A	Intelsat 901	1.	C1	266.
01025A	Astra 2C	1.	C1	21.
01029A	Artemis	1.	C2	11.
01031A	GOES 12	1.	C2	75.
01033A	USA 159 (DSP F21)	2.	C2	22.
01033D	IUS second stage	2.	D1	48.
01033E	USA 159 operational debris (Telescope aperture suncover)	2.	U	5.
01037A	Cosmos-2379	1.	L1	91.
01037D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	73.
01039A	Intelsat 902	1.	C1	65.
01042A	Atlantic Bird 2	1.	C1	272.
01045A	Raduga 1-6	1.	D	67.
01045D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	52.
01046A	USA 162 (SDS 3 F3)	2.	C2	32.
01052A	DirecTV-4S	1.	C1	201.
02001A	USA 164 (Milstar-2 F3)	2.	C2	4.
02001B	Titan IVB stage 3 (Centaur)	2.	D1	44.
02002A	Insat 3C	1.	C1	74.
02006A	EchoStar 7	1.	C1	176.
02007A	Intelsat 904	1.	C1	64.
02011A	TDRS 9	1.	C2	79.
02015A	JC-Sat 8	1.	C1	148.
02015B	Astra 3A	1.	C2	14.
02016A	Intelsat 903	1.	C1	255.
02019A	NSS-7	1.	C1	265.
02023A	DirecTV-5	1.	C1	188.
02027A	Intelsat 905	1.	C1	263.
02029A	Ekspress A1R (Express 4A)	1.	C2	82.

COSPAR	NAME	TABLE	STATUS	No
02029D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	244.
02030A	Galaxy 3C	1.	C1	210.
02035A	Atlantic Bird 3	1.	C1	278.
02035B	N-Star 3 (N-Star c)	1.	C2	51.
02038A	Hot Bird 6	1.	C1	15.
02039A	EchoStar 8	1.	C1	227.
02040A	Atlantic Bird 1	1.	C1	270.
02040B	MSG 1	1.	C2	2.
02041A	Intelsat 906	1.	C1	67.
02042B	Kodama (DRTS)	1.	C2	41.
02043A	KALPANA-1 (METSAT-1)	1.	C2	35.
02044A	Hispasat 1D	1.	C1	260.
02051A	Eutelsat W5	1.	C1	72.
02055A	TDRS 10	1.	C2	61.
02057A	NSS 6	1.	C1	100.
02062A	Nimiq 2	1.	C1	214.
03007A	Intelsat 907	1.	C1	262.
03008A	USA 167 (DSCS III A-3)(DSCS III F13)	2.	C2	33.
03008C	IABS (Apogee Boost Subsystem)	2.	D1	25.
03012A	USA 169 (Milstar-2 F4)	2.	C2	39.
03012B	Titan IVB stage 3 (Centaur)	2.	D1	34.
03013A	Insat 3A	1.	C1	98.
03013B	Galaxy XII	1.	C1	168.
03014A	Asiasat 4	1.	C1	126.
03015A	Cosmos-2397	1.	D	432.
03015F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	89.
03018A	GSAT-2	1.	D	341.
03020A	Hellas Sat 2	1.	C1	46.
03021A	Beidou 3	1.	D	436.
03024A	AMC-9 (GE-12)	1.	C1	223.
03026A	Thuraya 2	1.	C2	23.
03028A	BSAT-2c	1.	C1	113.
03028B	Optus C1 (Defense C1)	1.	C1	149.
03033A	Rainbow 1	1.	C1	239.
03034A	EchoStar 9 (Telstar 13)	1.	C1	174.
03040A	USA 170 (DSCS III B-6)(DSCS III F14)	2.	C2	41.
03040C	IABS (Apogee Boost Subsystem)	2.	D1	29.
03041A	USA 171 (Advanced ORION 3)	2.	C2	9.
03041B	Titan IVB stage 3 (Centaur)	2.	D1	27.
03043A	Eurobird 3	1.	C1	42.
03043E	Insat 3E	1.	C1	60.
03044A	Galaxy 13/Horizons-1	1.	C1	170.
03052A	Zhongxing-20 (ShenTong 1, ST-1)	1.	C1	102.
03053A	Yamal 200 N2 (Yamal 202)	1.	C1	54.
03053B	Yamal 200 N1 (Yamal 201)	1.	C1	94.
03053E	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	381.
03057A	USA 174 (UFO F11)	2.	C2	11.
03059A	AMOS 2	1.	C1	279.

COSPAR	NAME	TABLE	STATUS	No
03060A	Ekspress AM-22	1.	C1	58.
03060D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L1	41.
04001A	Estrela do Sul 1 (Telstar 14)	1.	D	159.
04003A	AMC-10 (GE 10)	1.	C1	165.
04004A	USA 176 (DSP F22)	2.	C2	10.
04004D	IUS second stage	2.	D1	49.
04007A	MBSAT	1.	C1	145.
04008A	Eutelsat W3A	1.	C1	8.
04010A	Raduga-1	1.	L1	85.
04010F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	397.
04011A	Superbird A2 (Superbird 6)	1.	D	274.
04015A	Ekspress AM-11	1.	D	233.
04015D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	451.
04016A	DirecTV-7S	1.	C1	175.
04017A	AMC-11 (GE-11)	1.	C1	167.
04022A	Intelsat 10-02	1.	C1	282.
04024A	Telstar 18 (APstar 5)	1.	C1	139.
04027A	Anik F2	1.	C1	185.
04031A	Amazonas	1.	C1	241.
04036A	GSAT 3 (EDUSAT)	1.	D	243.
04041A	AMC-15	1.	C1	193.
04042A	Fengyun 2C	1.	C2	50.
04042C	Fengyun 2C AKM	1.	D	485.
04043A	Ekspress AM-1	1.	C2	22.
04043D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	404.
04048A	AMC 16	1.	C1	221.
05003A	AMC 12	1.	C1	254.
05005A	XTAR-EUR	1.	C1	37.
05006A	Himawari-6	1.	C1	142.
05008A	XM Radio 3 (Rhythm)	1.	C1	220.
05009A	Inmarsat 4 F1	1.	C2	52.
05010A	Ekspress AM-2	1.	C1	82.
05010F	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L1	54.
05012A	Apstar 6	1.	C1	138.
05015A	Spaceway 1	1.	C1	197.
05019A	DirectTV-8	1.	C1	204.
05022A	Intelsat Americas 8 (Telstar 8)	1.	C1	217.
05023A	Ekspress AM-3	1.	C1	141.
05023H	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	457.
05028A	Thaicom 4 (IPStar 1)	1.	C1	125.
05030A	Galaxy 14	1.	C1	171.
05036A	Anik F1R	1.	C1	191.
05041A	Galaxy 15	1.	C1	166.
05041B	Syracuse 3A	1.	C1	52.
05044A	Inmarsat 4 F2	1.	C2	16.
05046A	Telkom 2	1.	C1	124.
05046B	Spaceway 2	1.	C1	206.
05049A	Insat 4A	1.	C1	85.

COSPAR	NAME	TABLE	STATUS	No
05049B	MSG 2 (Meteosat 9)	1.	C1	1.
05049E	MSG-2 operational debris (SEVIRI cooler cover)	1.	D	477.
05049F	MSG-2 operational debris (entry baffle cover)	1.	D	509.
05052A	AMC 23	1.	C1	157.
06003A	Echostar 10	1.	C1	187.
06004A	MTSAT-2	1.	C1	146.
06007A	Spainsat	1.	C1	259.
06007B	Hot Bird 7A	1.	C1	9.
06010A	JCSAT 9	1.	C1	137.
06012A	Astra 1KR	1.	C1	22.
06018A	GOES N	1.	C1	229.
06020A	Satmex 6	1.	C1	184.
06020B	Thaicom 5	1.	C1	80.
06022A	KAZSAT	1.	D	232.
06022D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	467.
06023A	Galaxy 16	1.	C1	207.
06024A	USA 187 (MITEx OSC satellite)	2.	C4	21.
06024B	USA 188 (MITEx Lockheed satellite)	2.	D1	77.
06024C	USA 189 (NRL Upper Stage/Satellite)	2.	D1	3.
06032A	Hot Bird 8	1.	C1	14.
06033A	JCSAT 3A	1.	C1	130.
06033B	Syracuse 3B	1.	C1	277.
06034A	Mugunghwa 5	1.	C1	120.
06038A	Zhongxing-22A (FengHuo 1, FH-1)	1.	C2	45.
06043A	DirecTV 9S	1.	C1	202.
06043B	Optus D1	1.	C1	152.
06048A	Xinnuo 2	1.	D	3.
06049A	XM Radio 4 (Blues)	1.	C1	183.
06051A	Badr 4	1.	C1	29.
06053A	Fengyun 2D	1.	C2	38.
06053C	Fengyun 2D AKM (FG-36 AKM)	1.	D	256.
06053D	Fengyun 2D debris	1.	L1	24.
06054A	WildBlue 1	1.	C1	186.
06054B	AMC 18	1.	C1	194.
06056A	Measat 3	1.	C1	95.
06059A	Kiku-8 (ETS VIII)	1.	C2	53.
07003A	Beidou 4	1.	D	206.
07007A	Insat 4B	1.	C1	99.
07007B	Skynet 5A	1.	C1	7.
07009A	Anik F3	1.	C1	178.
07016A	Astra 1L	1.	C1	23.
07016B	Galaxy 17	1.	C1	216.
07018A	Nigcomsat 1	1.	L1	59.
07021A	Xinnuo 3	1.	C1	3.
07031A	Zhongxing 6B	1.	C1	121.
07032A	DirecTV 10	1.	C1	198.
07036A	Spaceway 3	1.	C1	211.
07036B	BSAT-3A	1.	C1	112.

COSPAR	NAME	TABLE	STATUS	No
07037A	INSAT 4CR	1.	C1	75.
07044A	Optus D2	1.	C1	147.
07044B	Intelsat IS-11	1.	C1	251.
07046A	USA 195 (WGS F1)	2.	C1	4.
07054A	USA 197 (DSP F23)	2.	L1	5.
07054B	Delta 4 second stage	2.	D1	94.
07056A	Star One C1	1.	C1	236.
07056B	Skynet 5B	1.	C1	57.
07057A	Sirius 4	1.	C1	5.
07058A	Cosmos-2434 (Raduga-1M1)	1.	C1	71.
07058C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	530.
07063A	Rascom-QAF 1	1.	D	190.
07063B	Horizons 2	1.	C1	88.
08001A	Thuraya 3	1.	C2	43.
08003A	Ekspress AM-33	1.	C1	101.
08003B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	526.
08006A	Thor 2R	1.	C1	284.
08006C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	13.
08007A	Kizuna	1.	C1	143.
08011A	AMC 14	1.	C2	20.
08013A	DirecTV 11	1.	C1	205.
08016A	ICO G1	1.	C2	69.
08018A	Vinasat	1.	C1	136.
08018B	Star One C2	1.	C1	232.
08019A	Tian Lian 1A	1.	C1	79.
08022A	Amos 3	1.	C1	280.
08022B	Zenit-3SLB third stage (Blok-DM-SL-B)	1.	D	18.
08024A	Galaxy 18	1.	C1	173.
08028A	Zhongxing 9	1.	C1	97.
08030A	Skynet 5C	1.	C1	267.
08030B	Turksat 3A	1.	C1	47.
08033A	Cosmos-2440	1.	L1	8.
08033D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	27.
08034A	Protostar 1	1.	C1	257.
08034B	Badr 6	1.	C1	30.
08035A	Echostar 11	1.	C1	189.
08038A	Superbird C2	1.	C1	144.
08038B	AMC 21	1.	C1	172.
08039A	Inmarsat 4 F3	1.	C2	68.
08044A	Nimiq 4	1.	C1	224.
08045A	Galaxy 19	1.	C1	208.
08055A	Simon Bolivar	1.	C1	225.
08057A	Astra 1M	1.	C1	20.
08063A	Ciel 2	1.	C1	169.
08065A	Hot Bird 9	1.	C1	13.
08065B	Eutelsat W2M	1.	C1	36.
08066A	Fengyun 2E	1.	C2	46.

COSPAR	NAME	TABLE	STATUS	No
08066C	Fengyun 2E AKM (FG-36 AKM)	1.	D	506.
09001A	USA 202	2.	C2	5.
09001B	Delta 4 second stage	2.	D1	93.
09007A	Ekspress AM-44	1.	C1	271.
09007B	Ekspress MD-1	1.	C1	83.
09007D	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	56.
09008A	NSS 9	1.	C1	161.
09008B	Atlantic Bird 4A	1.	C1	4.
09009A	Telstar 11N	1.	C1	253.
09010A	Raduga-1	1.	C2	4.
09010B	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	375.
09016A	Eutelsat W2A	1.	C1	11.
09017A	USA 204 (WGS F2)	2.	C1	2.
09018A	Beidou DW 2 (Compass G2)	1.	L1	82.
09020A	SICRAL 1B	1.	C1	12.
09027A	Indostar II/Protostar II	1.	C1	108.
09032A	Measat 3A	1.	C1	96.
09033A	GOES 14	3.	Ind	9.
09034A	Sirius FM5	1.	C1	209.
09035A	Terrestar 1	1.	C2	65.
09042A	Asiasat 5	1.	C1	104.
09044A	JCSAT 12 (JCSAT-RA)	1.	C1	131.
09044B	Optus D3	1.	C1	150.
09046A	Palapa D	1.	C1	119.
09047A	USA 207 (PAN)	2.	C1	1.
09050A	Nimiq 5	1.	C1	230.
09054A	Amazonas 2	1.	C1	242.
09054B	COMSATBw-1	1.	C1	66.
09058A	NSS 12	1.	C1	62.
09058B	Thor 6	1.	C1	283.
09064A	Intelsat IS-14	1.	C1	250.
09065A	Eutelsat W7	1.	C1	43.
09067A	Intelsat IS-15	1.	C1	90.
09068A	USA 211 (WGS F3)	2.	C1	5.
09075A	DirecTV 12	1.	C1	199.
10001A	Beidou DW 3	1.	C1	140.
10002A	Raduga-1M	1.	C1	89.
10002B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	527.
10005A	Solar Dynamics Observatory	4.	I	3.
10006A	Intelsat IS-16	1.	C1	243.
10008A	GOES 15	1.	C1	164.
10010A	Echostar XIV	1.	C1	177.
10016A	SES-1	1.	C1	203.
10021A	Astra 3B	1.	C1	26.
10021B	COMSATBw-2	1.	C1	16.
10024A	Beidou DW 4	1.	C1	116.
10025A	Badr 5	1.	C1	28.
10032A	Chollian	1.	C1	132.

COSPAR	NAME	TABLE	STATUS	No
10032B	Arabsat 5A	1.	C1	38.
10034A	Echostar XV	1.	C1	238.
10036A	Beidou DW 5	4.	I	4.
10037A	Nilesat 201	1.	C1	274.
10037B	RASCOM-QAF 1R	1.	C1	2.
10039A	USA 214 (AEHF SV-1)	2.	C2	40.
10042A	Zhongxing 6A	1.	C1	129.
10045A	Michibiki	4.	I	5.
10053A	Sirius XM-5	1.	C1	219.
10056B	BSAT-3B	1.	C2	48.
10057A	Beidou DW 6	1.	C1	151.
10061A	SkyTerra 1	1.	C1	200.
10063A	USA 223 (NROL-32)	2.	C2	19.
10063B	Delta-4 second stage	2.	D1	2.
10064A	Zhongxing 20A	1.	C1	134.
10065A	Hylas	1.	C1	256.
10065B	Intelsat IS-17	1.	C1	68.
10068A	Beidou DW 7	4.	I	6.
10069A	KA-Sat	1.	C1	10.
10070A	Hispasat 1E	1.	C1	261.
10070B	Koreasat 6	1.	C1	123.
11001A	Elektro-L No. 1	1.	C1	77.
11001B	Fregat-SB	1.	D	513.
11011A	USA 227 (NROL 27)	2.	C2	48.
11013A	Beidou DW 8	4.	I	7.
11016A	Intelsat New Dawn	1.	C1	41.
11016B	Yahsat 1A	1.	C1	56.
11019A	USA 230 (SBIRS-GEO 1)	2.	C2	18.
11021A	Estrela do Sul 2	1.	C1	237.
11022A	GSAT-8	1.	C1	61.
11022B	ST-2	1.	C1	93.
11026A	Zhongxing 10	1.	C1	117.
11032A	Tian Lian 1B	1.	C1	158.
11034A	GSAT-12	1.	C1	86.
11035A	SES-3	1.	C1	195.
11035B	Kazsat-2	1.	C1	91.
11038A	Beidou DW 9	4.	I	8.
11041A	Astra 1N	1.	C1	33.
11041B	BSAT 3c	1.	C1	114.
11042A	Paksat 1R	1.	C1	45.
11047A	Zhongxing 1A	1.	C1	133.
11048A	Cosmos-2473	1.	C1	81.
11048B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	528.
11049A	SES-2	1.	C1	218.
11049B	Arabsat 5C	1.	C1	24.
11051A	Atlantic Bird 7	1.	C1	273.
11054A	QuetzSat-1	3.	Ind	10.
11056A	Intelsat IS-18	1.	C1	160.

COSPAR	NAME	TABLE	STATUS	No
11057A	Eutelsat W3C	1.	C1	17.
11059A	ViaSat-1	1.	C1	182.
11069A	Asiasat 7	1.	C1	107.
11073A	Beidou DW 10	4.	I	9.
11074A	Amos 5	1.	C1	19.
11074B	Luch-5A	3.	Ind	11.
11077A	Nigcomsat 1R	1.	C1	49.
12002A	Feng Yun 2F	1.	C1	118.
12002C	Fengyun 2F AKM (FG-36 AKM)	1.	D	262.
12003A	USA 233 (WGS F-4)	2.	C1	3.
12007A	SES-4	1.	C1	264.
12008A	Beidou DW 11	1.	C1	63.
12009A	USA 234 (MUOS)	2.	C2	28.
12011A	Intelsat IS-22	1.	C1	73.
12012A	Cosmos-2479	1.	C1	154.
12012D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L3	8.
12013A	Apstar 7	1.	C1	78.
12016A	Yahsat 1B	1.	C1	53.
12019A	USA 235 (AEHF 2)	2.	C2	35.
12023A	JCSAT 13	1.	C1	128.
12023B	Vinasat-2	1.	C1	135.
12026A	Nimiq 6	1.	C1	215.
12028A	Zhongxing 2A	1.	C1	103.
12030A	Intelsat IS-19	1.	C1	155.
12033A	USA 236 (SDS 3 F7, NROL-38)	2.	C2	44.
12034A	USA 237 (NROL-15)	2.	C2	7.
12034B	DELTA 4 R/B	2.	D1	5.
12035A	Echostar 17	1.	C1	192.
12035B	Meteosat 10	1.	C1	281.
12036A	SES-5	1.	C1	6.
12040A	Tian Lian 1-03	1.	C1	18.
12043A	Intelsat IS-20	1.	C1	69.
12043B	Hylas 2	1.	C1	39.
12045A	Intelsat IS-21	1.	C1	244.
12051A	Astra 2F	1.	C1	34.
12051B	GSAT-10	1.	C1	87.
12057A	Intelsat IS-23	1.	C1	248.
12059A	Beidou DW 16	1.	C1	84.
12061A	Luch-5B	3.	Ind	12.
12061B	Yamal-300K	3.	Ind	13.
12062A	Star One C3	1.	C1	228.
12062B	Eutelsat 21B	1.	C1	25.
12065A	Echostar XVI	1.	C1	233.
12067A	Zhongxing 12	3.	Ind	14.
12069A	Eutelsat 70B	3.	Ind	15.
12070A	Yamal-402	3.	Ind	16.
12075A	Skynet 5D	3.	Ind	17.
12075B	Mexsat Bicentenario	3.	Ind	18.

3 Table 1: Objects with Two-Line-Element data

This table contains all objects with recently updated Two-Line-Elements.

The objects are ordered according to the following criteria:

1. Status C1, then according to the ascending order of longitude of station keeping.
2. Status C2, then according to the ascending order of longitude of station keeping.
3. Status D , then according to the ascending order of the mean drift rate (which is equivalent to the decreasing order of the mean semi-major axis).
4. Status L1, then according to the ascending order of the libration period (which is equivalent to the ascending order of the libration magnitude).
5. Status L2, then according to the ascending order of the libration period (which is equivalent to the ascending order of the libration magnitude).
6. Status L3, then according to the ascending order of the libration period (which is equivalent to the ascending order of the libration magnitude).

The following symbols are used:

- nn: is the reference number.
- COSPAR: is the COSPAR identifier.
- Name: is the object's common name.
- Date: is the epoch of the last available TLE.
- $\overline{\lambda}$: is the mean longitude of the satellite (in degrees).
- $\overline{\dot{\lambda}}$: is the mean drift of the satellite (in deg/days).
- $\overline{\Delta a}$: is the difference between the satellite's mean semi-major axis and the geostationary semi-major axis (in km).
- $\overline{\Delta r_p}$: is the perigee mean deviation from the geostationary altitude (in km).
- $\overline{\Delta r_a}$: is the apogee mean deviation from the geostationary altitude (in km).
- P_{lib}: is the libration period (in days).
- $\Delta\lambda$: is the libration magnitude (in degrees): $\Delta\lambda = \lambda_{max} - \lambda_{min}$
- λ_{min}: is the minimum longitude of the libration (in degrees).
- λ_{max}: is the maximum longitude of the libration (in degrees).
- N_{ly}: is the number of Two-Line Elements stored during the last 52 weeks.
- N_{tot}: is the total number of Two-Line Elements available for this object.
- MJD1950: is the Modified Julian Date (number of days since 01-Jan-1950) corresponding to "Date"

- a, e, i, Ω, ω and λ are the latest values of the satellite's semi-major axis (in km), eccentricity, inclination (in degrees), right-ascension of the ascending node (in degrees), perigee argument (in degrees) and longitude (in degrees).

3.1 Satellites under longitude and inclination control (E-W and N-S control)

In the case where the satellite is under longitude and inclination control, there are 284 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 34.

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 1	**05049B**	**MSG 2 (Meteosat 9)**					
	28-DEC-12	0.10				52	347
	23007.146493	42163.20267	0.0002522	0.3718	352.3488	134.7410	359.7797
C1 . 2	**10037B**	**RASCOM-QAF 1R**					
	28-DEC-12	2.89				51	127
	23007.146563	42164.54765	0.0004527	0.0158	44.0883	232.9706	2.8926
C1 . 3	**07021A**	**Xinnuo 3**					
	28-DEC-12	3.03				52	285
	23007.146574	42164.30629	0.0001837	0.0388	105.5780	127.8528	3.1557
C1 . 4	**09008B**	**Atlantic Bird 4A**					
	27-DEC-12	3.10				51	205
	23006.175683	42164.11426	0.0003629	0.0656	351.8319	248.6660	3.1218
C1 . 5	**07057A**	**Sirius 4**					
	27-DEC-12	4.82				49	260
	23006.781285	42164.38030	0.0003119	0.0130	327.6022	300.9450	4.8271
C1 . 6	**12036A**	**SES-5**					
	27-DEC-12	5.04				25	25
	23006.758194	42164.35507	0.0002169	0.0709	269.1443	353.8711	4.9862
C1 . 7	**07007B**	**Skynet 5A**					
	27-DEC-12	6.01				52	295
	23006.933947	42164.51906	0.0003854	0.0695	352.3023	273.9021	6.0021
C1 . 8	**04008A**	**Eutelsat W3A**					
	28-DEC-12	7.00				52	438
	23007.010498	42164.11679	0.0003887	0.0623	354.7255	271.3631	7.0197
C1 . 9	**06007B**	**Hot Bird 7A**					
	27-DEC-12	9.00				52	333
	23006.302384	42164.42711	0.0005760	0.0463	63.5019	213.1424	8.9839
C1 . 10	**10069A**	**KA-Sat**					
	28-DEC-12	9.01				52	105
	23007.189606	42164.39571	0.0000782	0.0454	301.0591	250.3085	9.0054
C1 . 11	**09016A**	**Eutelsat W2A**					
	27-DEC-12	10.00				52	192
	23006.150313	42164.54205	0.0004984	0.0626	350.8879	286.0269	9.9854

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 12	**09020A**	**SICRAL 1B**					
	28-DEC-12	11.80				52	192
	23007.197199	42163.55026	0.0002996	0.0896	90.3450	193.0961	11.8197
C1 . 13	**08065A**	**Hot Bird 9**					
	27-DEC-12	13.00				52	211
	23006.147685	42163.91411	0.0001681	0.0671	66.1705	248.5163	13.0080
C1 . 14	**06032A**	**Hot Bird 8**					
	28-DEC-12	13.01				52	317
	23007.146806	42164.18547	0.0005086	0.0618	6.0774	318.5564	12.9984
C1 . 15	**02038A**	**Hot Bird 6**					
	26-DEC-12	13.01				52	441
	23005.232905	42164.17650	0.0006870	0.0687	270.2501	355.8216	13.0125
C1 . 16	**10021B**	**COMSATBw-2**					
	28-DEC-12	13.21				52	137
	23007.008299	42165.15739	0.0001761	0.0584	88.7183	192.1485	13.1772
C1 . 17	**11057A**	**Eutelsat W3C**					
	27-DEC-12	15.74				52	66
	23006.241979	42163.72798	0.0005198	0.0626	354.5758	282.2858	16.0292
C1 . 18	**12040A**	**Tian Lian 1-03**					
	28-DEC-12	16.80				22	22
	23007.189039	42163.90935	0.0003844	1.7525	272.6516	4.7685	16.7185
C1 . 19	**11074A**	**Amos 5**					
	27-DEC-12	17.00				51	55
	23006.930475	42164.18238	0.0000606	0.0174	87.0889	300.2933	17.0270
C1 . 20	**08057A**	**Astra 1M**					
	20-DEC-12	19.19				31	158
	22999.706042	42165.22299	0.0001755	0.0161	17.1058	245.6984	19.1827
C1 . 21	**01025A**	**Astra 2C**					
	20-DEC-12	19.20				32	462
	22999.681470	42165.57847	0.0004344	0.0549	355.0085	331.6022	19.1693
C1 . 22	**06012A**	**Astra 1KR**					
	20-DEC-12	19.20				31	261
	22999.520174	42165.01834	0.0003521	0.0475	275.3624	356.9129	19.1808
C1 . 23	**07016A**	**Astra 1L**					
	20-DEC-12	19.21				31	223
	22999.545984	42165.30177	0.0002957	0.0487	287.7195	358.8995	19.1614
C1 . 24	**11049B**	**Arabsat 5C**					
	26-DEC-12	19.99				52	68
	23005.675405	42163.98447	0.0003153	0.0638	344.2242	238.9883	20.0019
C1 . 25	**12062B**	**Eutelsat 21B**					
	28-DEC-12	21.60				7	7
	23007.839144	42165.12207	0.0002361	0.0245	14.9746	263.4538	21.5927

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 26	**10021A**	**Astra 3B**					
	28-DEC-12	23.50				45	115
	23007.906655	42164.31470	0.0001740	0.0319	323.7861	298.8575	23.4950
C1 . 27	**98057A**	**Hot Bird 5**					
	28-DEC-12	25.63				52	670
	23007.174780	42164.57176	0.0005906	0.0637	49.1847	239.3064	25.5058
C1 . 28	**10025A**	**Badr 5**					
	27-DEC-12	26.00				51	134
	23006.102824	42163.62118	0.0003590	0.0044	10.4178	217.5639	26.0222
C1 . 29	**06051A**	**Badr 4**					
	28-DEC-12	26.01				52	314
	23007.109225	42164.52327	0.0005999	0.0519	323.4750	318.3830	25.9869
C1 . 30	**08034B**	**Badr 6**					
	28-DEC-12	26.01				52	236
	23007.174780	42163.89225	0.0003193	0.0611	22.2035	297.1948	26.0226
C1 . 31	**98050A**	**Astra 2A**					
	28-DEC-12	28.18				41	625
	23007.824502	42164.02092	0.0001529	0.0569	135.7934	32.3873	28.1802
C1 . 32	**00054A**	**Astra 2B**					
	20-DEC-12	28.20				41	502
	22999.610394	42164.10137	0.0003999	0.0258	326.4364	319.3174	28.2572
C1 . 33	**11041A**	**Astra 1N**					
	20-DEC-12	28.22				38	60
	22999.753044	42165.14702	0.0000632	0.0655	39.7785	336.1542	28.2166
C1 . 34	**12051A**	**Astra 2F**					
	28-NOV-12	28.30				10	10
	22977.814329	42164.47981	0.0005929	0.0222	205.5701	351.2606	28.2320
C1 . 35	**01011A**	**Eurobird 1**					
	28-DEC-12	28.50				52	601
	23007.650972	42164.03830	0.0004233	0.0647	0.4301	251.3404	28.4927
C1 . 36	**08065B**	**Eutelsat W2M**					
	28-DEC-12	28.51				52	210
	23007.650938	42164.98021	0.0004961	0.0828	251.9941	48.7547	28.4867
C1 . 37	**05005A**	**XTAR-EUR**					
	28-DEC-12	29.01				51	390
	23007.744873	42164.56503	0.0002093	0.0185	287.9485	344.4993	28.9882
C1 . 38	**10032B**	**Arabsat 5A**					
	27-DEC-12	30.49				52	132
	23006.940671	42164.72146	0.0003454	0.0536	355.8911	279.7783	30.4810
C1 . 39	**12043B**	**Hylas 2**					
	26-DEC-12	31.03				22	22
	23005.930903	42164.57877	0.0001955	0.0276	264.8133	11.0962	30.9813

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 40	**97076A**	**Astra 1G**					
	28-DEC-12	31.50				41	596
	23007.076134	42164.77585	0.0003153	0.0469	331.9843	297.2777	31.5113
C1 . 41	**11016A**	**Intelsat New Dawn**					
	27-DEC-12	32.82				52	90
	23006.940671	42164.27685	0.0000593	0.0090	53.0525	108.5138	32.7980
C1 . 42	**03043A**	**Eurobird 3**					
	28-DEC-12	33.14				52	472
	23007.874826	42164.50588	0.0001378	0.0413	351.3977	183.4246	33.0829
C1 . 43	**09065A**	**Eutelsat W7**					
	27-DEC-12	35.92				52	159
	23006.940174	42164.56728	0.0004153	0.0643	345.9791	283.9655	35.9078
C1 . 44	**00028A**	**Eutelsat W4**					
	27-DEC-12	36.10				52	633
	23006.940174	42164.37076	0.0004193	0.0650	347.1983	282.8518	36.0945
C1 . 45	**11042A**	**Paksat 1R**					
	28-DEC-12	37.99				51	72
	23007.076296	42163.68481	0.0002322	0.0558	235.6700	27.4993	38.0099
C1 . 46	**03020A**	**Hellas Sat 2**					
	28-DEC-12	39.00				52	487
	23007.076319	42164.47224	0.0003946	0.0038	298.0196	341.1768	38.9833
C1 . 47	**08030B**	**Turksat 3A**					
	27-DEC-12	42.00				52	239
	23006.690428	42163.77591	0.0003237	0.0242	66.2681	205.0879	42.0107
C1 . 48	**01002A**	**Turksat 2A (Eurasiasat 1)**					
	28-DEC-12	42.01				52	603
	23007.882072	42164.43300	0.0005391	0.0453	274.0798	1.3532	41.9888
C1 . 49	**11077A**	**Nigcomsat 1R**					
	26-DEC-12	42.50				52	55
	23005.741250	42163.87375	0.0000181	0.0485	191.9679	224.6034	42.4935
C1 . 50	**00068A**	**Europe*Star F1**					
	27-DEC-12	45.01				52	607
	23006.080243	42164.24910	0.0003829	0.0103	349.9075	284.0253	45.0091
C1 . 51	**99052A**	**Telstar 7**					
	26-DEC-12	45.10				52	672
	23005.084028	42164.15407	0.0002609	0.0176	302.2539	337.5682	45.1123
C1 . 52	**05041B**	**Syracuse 3A**					
	26-DEC-12	47.00				52	365
	23005.756898	42164.90228	0.0002239	0.0117	34.0837	227.2140	46.9876
C1 . 53	**12016A**	**Yahsat 1B**					
	27-DEC-12	47.62				36	36
	23006.632998	42164.37217	0.0001390	0.0062	18.1231	244.6497	47.6065

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 54	**03053A**	**Yamal 200 N2 (Yamal 202)**					
	28-DEC-12	48.99				52	465
	23007.175394	42164.97881	0.0003118	0.0468	271.3149	4.7157	48.9518
C1 . 55	**99005A**	**Telstar 6**					
	28-DEC-12	50.46				51	696
	23007.641007	42164.81453	0.0003374	0.0274	296.8061	335.2069	50.0084
C1 . 56	**11016B**	**Yahsat 1A**					
	28-DEC-12	52.50				52	89
	23007.174965	42164.38646	0.0002020	0.0025	341.4059	322.5247	52.4965
C1 . 57	**07056B**	**Skynet 5B**					
	28-DEC-12	52.75				52	267
	23007.174965	42164.79771	0.0004305	0.0687	351.9923	279.3265	52.7291
C1 . 58	**03060A**	**Ekspress AM-22**					
	28-DEC-12	53.01				52	459
	23007.600475	42164.68950	0.0000630	0.0291	15.8489	308.5817	53.0046
C1 . 59	**96021A**	**Astra 1F**					
	28-DEC-12	54.91				46	687
	23007.694213	42164.15715	0.0002848	0.0522	22.8432	296.5725	54.9003
C1 . 60	**03043E**	**Insat 3E**					
	28-DEC-12	55.02				51	452
	23007.113449	42165.05675	0.0004813	0.0565	270.5862	358.5096	55.0546
C1 . 61	**11022A**	**GSAT-8**					
	27-DEC-12	55.05				52	86
	23006.090810	42164.37048	0.0007934	0.0041	289.4508	336.8891	55.0805
C1 . 62	**09058A**	**NSS 12**					
	28-DEC-12	57.01				52	167
	23007.178009	42164.31974	0.0003264	0.0147	340.6114	294.4670	57.0065
C1 . 63	**12008A**	**Beidou DW 11**					
	28-DEC-12	58.70				46	46
	23007.747465	42164.51373	0.0001809	1.3729	309.5615	299.1315	58.6533
C1 . 64	**02007A**	**Intelsat 904**					
	27-DEC-12	60.00				52	550
	23006.157743	42164.14090	0.0003193	0.0189	324.4327	303.2228	60.0120
C1 . 65	**01039A**	**Intelsat 902**					
	27-DEC-12	62.00				52	575
	23006.095231	42164.21883	0.0003264	0.0141	350.9747	283.3540	62.0162
C1 . 66	**09054B**	**COMSATBw-1**					
	27-DEC-12	63.01				50	168
	23006.095231	42164.49972	0.0002511	0.0182	90.8637	177.9577	62.9717
C1 . 67	**02041A**	**Intelsat 906**					
	28-DEC-12	64.16				52	525
	23007.042211	42164.35310	0.0003283	0.0147	342.6084	293.3089	64.1612

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 68	**10065B**	**Intelsat IS-17**					
	26-DEC-12	66.00				52	111
	23005.082315	42164.48514	0.0003404	0.0106	296.0227	334.7027	66.0033
C1 . 69	**12043A**	**Intelsat IS-20**					
	27-DEC-12	68.53				22	22
	23006.728067	42164.51037	0.0002242	0.0091	30.9133	276.2281	68.5207
C1 . 70	**98052A**	**PAS 7**					
	28-DEC-12	68.66				52	723
	23007.497894	42164.64269	0.0003474	0.0023	353.1126	278.5134	68.6526
C1 . 71	**07058A**	**Cosmos-2434 (Raduga-1M1)**					
	28-DEC-12	70.01				52	263
	23007.497894	42164.52691	0.0002165	0.0228	50.8418	210.1507	70.0062
C1 . 72	**02051A**	**Eutelsat W5**					
	26-DEC-12	70.50				52	507
	23005.095347	42163.89057	0.0005023	0.0416	5.1205	260.3908	70.5342
C1 . 73	**12011A**	**Intelsat IS-22**					
	26-DEC-12	72.12				41	41
	23005.966736	42164.50897	0.0002771	0.0289	35.8185	214.3191	72.1098
C1 . 74	**02002A**	**Insat 3C**					
	26-DEC-12	74.00				52	559
	23005.569606	42164.44758	0.0001341	0.0087	304.2772	320.1365	74.0598
C1 . 75	**07037A**	**INSAT 4CR**					
	27-DEC-12	74.00				52	274
	23006.991933	42164.75454	0.0004250	0.0502	78.3671	191.8778	74.0375
C1 . 76	**99053A**	**LMI 1**					
	26-DEC-12	74.98				52	680
	23005.725718	42164.53504	0.0001802	0.0097	299.7627	311.3234	74.9936
C1 . 77	**11001A**	**Elektro-L No. 1**					
	28-DEC-12	76.01				52	103
	23007.592662	42164.70716	0.0001926	0.0134	77.1991	146.9015	76.0696
C1 . 78	**12013A**	**Apstar 7**					
	27-DEC-12	76.52				38	38
	23006.633681	42164.73099	0.0002468	0.0584	64.2068	206.9494	76.5030
C1 . 79	**08019A**	**Tian Lian 1A**					
	28-DEC-12	77.01				52	247
	23007.592662	42164.31806	0.0006606	0.1160	266.8788	298.9011	77.0351
C1 . 80	**06020B**	**Thaicom 5**					
	26-DEC-12	78.50				52	336
	23005.569711	42164.51261	0.0005169	0.0446	270.6107	357.9600	78.5216
C1 . 81	**11048A**	**Cosmos-2473**					
	26-DEC-12	79.93				52	68
	23005.569757	42164.79295	0.0001613	0.0626	98.3516	242.0568	79.9387

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 82	**05010A**	**Ekspress AM-2**					
	26-DEC-12	80.00				52	396
	23005.569734	42164.65951	0.0000988	0.0445	206.8664	44.4542	80.0126
C1 . 83	**09007B**	**Ekspress MD-1**					
	26-DEC-12	80.10				52	204
	23005.563148	42164.67857	0.0002711	0.0192	262.5820	5.4120	80.1051
C1 . 84	**12059A**	**Beidou DW 16**					
	28-DEC-12	80.30				9	9
	23007.112257	42163.80086	0.0002446	1.7189	276.5499	342.2812	80.2305
C1 . 85	**05049A**	**Insat 4A**					
	28-DEC-12	83.00				52	357
	23007.762361	42164.42963	0.0007260	0.0564	78.3322	190.3920	83.0012
C1 . 86	**11034A**	**GSAT-12**					
	28-DEC-12	83.01				52	78
	23007.871563	42164.82210	0.0003807	0.0355	243.7391	214.3096	83.0104
C1 . 87	**12051B**	**GSAT-10**					
	28-DEC-12	83.04				14	14
	23007.761030	42164.33993	0.0002182	0.0398	44.5691	223.0743	83.0093
C1 . 88	**07063B**	**Horizons 2**					
	26-DEC-12	84.85				52	260
	23005.569861	42164.95947	0.0002698	0.0136	351.3073	285.9638	84.8634
C1 . 89	**10002A**	**Raduga-1M**					
	26-DEC-12	85.00				52	154
	23005.804630	42164.77052	0.0003031	0.0006	335.8182	281.7048	85.0021
C1 . 90	**09067A**	**Intelsat IS-15**					
	26-DEC-12	85.14				52	162
	23005.804155	42164.72314	0.0002601	0.0172	355.5027	275.5928	85.1665
C1 . 91	**11035B**	**Kazsat-2**					
	26-DEC-12	86.44				52	77
	23005.804155	42165.00713	0.0000788	0.0210	232.7340	80.8984	86.5174
C1 . 92	**98033A**	**Zhongwei 1**					
	27-DEC-12	87.51				52	752
	23006.911528	42164.66483	0.0002855	0.0255	269.5710	18.2348	87.5173
C1 . 93	**11022B**	**ST-2**					
	27-DEC-12	87.88				52	85
	23006.911528	42165.10777	0.0002058	0.0332	35.4942	232.9375	87.9975
C1 . 94	**03053B**	**Yamal 200 N1 (Yamal 201)**					
	28-DEC-12	90.00				52	458
	23007.171829	42164.41702	0.0002842	0.0452	271.3991	6.8917	89.9514
C1 . 95	**06056A**	**Measat 3**					
	28-DEC-12	91.49				52	313
	23007.761412	42164.87312	0.0001442	0.0272	67.5548	205.2291	91.5235

C1 .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
C1 . 96	**09032A**	**Measat 3A**					
	28-DEC-12	91.50				51	184
	23007.761412	42165.28691	0.0003860	0.0286	284.8176	358.5971	91.4904
C1 . 97	**08028A**	**Zhongxing 9**					
	26-DEC-12	92.20				52	239
	23005.570046	42164.45486	0.0004308	0.0040	342.3492	301.0002	92.2093
C1 . 98	**03013A**	**Insat 3A**					
	26-DEC-12	93.50				52	493
	23005.799387	42164.49355	0.0006252	0.0549	256.0870	17.5154	93.5117
C1 . 99	**07007A**	**Insat 4B**					
	26-DEC-12	93.50				52	300
	23005.799294	42164.67268	0.0000510	0.0140	13.9228	214.1459	93.5199
C1 . 100	**02057A**	**NSS 6**					
	28-DEC-12	95.00				44	498
	23007.759387	42164.97489	0.0002872	0.0172	300.7497	328.9106	95.0106
C1 . 101	**08003A**	**Ekspress AM-33**					
	27-DEC-12	96.49				52	256
	23006.986840	42164.94882	0.0001243	0.0429	229.8297	151.6094	96.4984
C1 . 102	**03052A**	**Zhongxing-20 (ShenTong 1, ST-1)**					
	28-DEC-12	98.11				52	465
	23007.583380	42164.34133	0.0005336	0.1804	77.1867	233.7826	98.1397
C1 . 103	**12028A**	**Zhongxing 2A**					
	28-DEC-12	98.29				31	31
	23007.219745	42164.99591	0.0003460	0.0486	217.7914	103.4430	98.2754
C1 . 104	**09042A**	**Asiasat 5**					
	28-DEC-12	100.53				52	177
	23007.628056	42165.13973	0.0001624	0.0106	329.2262	267.1592	100.4930
C1 . 105	**00016A**	**Asiastar**					
	28-DEC-12	105.00				52	654
	23007.206539	42165.64996	0.0004282	0.0303	11.4301	245.4293	104.9928
C1 . 106	**99013A**	**Asiasat 3S**					
	28-DEC-12	105.50				52	700
	23007.205069	42164.58718	0.0002136	0.0083	293.5669	343.1138	105.5139
C1 . 107	**11069A**	**Asiasat 7**					
	28-DEC-12	105.61				52	58
	23007.623229	42164.83472	0.0001496	0.0167	44.3860	182.3596	105.6150
C1 . 108	**09027A**	**Indostar II/Protostar II**					
	28-DEC-12	107.88				52	189
	23007.199722	42164.70969	0.0001406	0.0242	299.0168	332.4957	108.2108
C1 . 109	**99042A**	**Telkom 1**					
	26-DEC-12	107.98				51	682
	23005.836667	42164.36011	0.0001992	0.0097	312.7295	324.8846	108.0394

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 110	**00059A**	**GE-1A**					
	28-DEC-12	108.20				51	623
	23007.198681	42165.03516	0.0003439	0.0487	51.1313	229.3202	108.1635
C1 . 111	**98024B**	**BSAT-1b**					
	27-DEC-12	109.85				52	731
	23006.975544	42165.05731	0.0004964	0.0780	302.1693	355.2558	109.8582
C1 . 112	**07036B**	**BSAT-3A**					
	27-DEC-12	109.86				50	270
	23006.910104	42165.13552	0.0001399	0.0289	179.2843	18.8022	109.8572
C1 . 113	**03028A**	**BSAT-2c**					
	28-DEC-12	109.87				51	468
	23007.621215	42165.08282	0.0004934	0.0608	242.4845	8.0721	109.8596
C1 . 114	**11041B**	**BSAT 3c**					
	28-DEC-12	109.94				52	72
	23007.429074	42165.57090	0.0000161	0.0326	285.0628	259.1667	109.9605
C1 . 115	**00060A**	**N-SAT-110**					
	28-DEC-12	110.06				52	619
	23007.817025	42165.46885	0.0000828	0.0067	36.1683	298.3990	110.0623
C1 . 116	**10024A**	**Beidou DW 4**					
	27-DEC-12	110.50				52	136
	23006.975544	42163.33526	0.0003731	1.2751	14.8858	307.8224	110.5758
C1 . 117	**11026A**	**Zhongxing 10**					
	27-DEC-12	110.52				52	80
	23006.566701	42165.93172	0.0003640	0.0086	254.2482	287.7582	110.4756
C1 . 118	**12002A**	**Feng Yun 2F**					
	27-DEC-12	112.20				52	52
	23006.910278	42167.48412	0.0007597	1.6442	277.5272	238.7349	112.5281
C1 . 119	**09046A**	**Palapa D**					
	28-DEC-12	112.96				51	174
	23007.196933	42164.73968	0.0002396	0.0030	24.9308	272.7141	112.9722
C1 . 120	**06034A**	**Mugunghwa 5**					
	27-DEC-12	113.04				52	325
	23006.739618	42164.97769	0.0001984	0.0228	47.2859	225.4664	113.0597
C1 . 121	**07031A**	**Zhongxing 6B**					
	27-DEC-12	115.55				52	286
	23006.925405	42165.39849	0.0003061	0.0099	3.1498	281.4957	115.5299
C1 . 122	**99046A**	**Mugunghwa 3 (Koreasat 3)**					
	28-DEC-12	115.98				52	666
	23007.618681	42165.09824	0.0000525	0.0320	236.9455	29.7700	115.9143
C1 . 123	**10070B**	**Koreasat 6**					
	28-DEC-12	116.01				52	106
	23007.190139	42164.96283	0.0002301	0.0318	261.2890	51.9371	116.0216

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 124	**05046A**	**Telkom 2**					
	26-DEC-12	118.01				51	362
	23005.971262	42164.73183	0.0001328	0.0090	164.6567	114.4737	118.0351
C1 . 125	**05028A**	**Thaicom 4 (IPStar 1)**					
	27-DEC-12	119.47				52	376
	23006.593102	42164.89555	0.0002737	0.0022	324.4350	307.3128	119.5176
C1 . 126	**03014A**	**Asiasat 4**					
	27-DEC-12	122.15				52	497
	23006.523623	42165.78229	0.0001334	0.0231	43.3790	273.3478	122.0629
C1 . 127	**99006A**	**JC-Sat 6**					
	26-DEC-12	123.95				52	702
	23005.667778	42165.64772	0.0001619	0.0397	255.2460	191.6904	123.9464
C1 . 128	**12023A**	**JCSAT 13**					
	26-DEC-12	124.00				33	33
	23005.667593	42165.19580	0.0002197	0.0114	11.6686	225.9017	123.9939
C1 . 129	**10042A**	**Zhongxing 6A**					
	26-DEC-12	125.01				52	121
	23005.667269	42165.36905	0.0002392	0.0385	236.1167	194.4854	124.9843
C1 . 130	**06033A**	**JCSAT 3A**					
	28-DEC-12	127.79				52	324
	23007.180162	42165.22355	0.0002690	0.0112	328.4023	316.1263	128.0100
C1 . 131	**09044A**	**JCSAT 12 (JCSAT-RA)**					
	26-DEC-12	127.93				52	176
	23005.570972	42165.00292	0.0001729	0.0521	37.1243	192.3435	127.9342
C1 . 132	**10032A**	**Chollian**					
	26-DEC-12	128.20				52	131
	23005.827222	42165.83948	0.0000662	0.0428	50.8421	232.5840	128.1980
C1 . 133	**11047A**	**Zhongxing 1A**					
	28-DEC-12	129.84				52	68
	23007.547500	42164.61521	0.0002668	0.0434	218.2423	185.2451	129.8415
C1 . 134	**10064A**	**Zhongxing 20A**					
	27-DEC-12	130.03				52	111
	23006.902824	42165.22299	0.0003237	0.0088	250.6520	66.6558	130.0542
C1 . 135	**12023B**	**Vinasat-2**					
	28-DEC-12	131.85				33	33
	23007.161771	42165.00853	0.0002340	0.0228	288.4600	353.1033	131.8470
C1 . 136	**08018A**	**Vinasat**					
	27-DEC-12	131.94				52	245
	23006.774815	42164.86443	0.0001849	0.0154	1.2060	275.4699	131.9490
C1 . 137	**06010A**	**JCSAT 9**					
	28-DEC-12	132.02				52	345
	23007.159456	42165.13777	0.0002221	0.0185	11.2140	236.1454	132.0421

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 138	**05012A**	**Apstar 6**					
	27-DEC-12	134.00				52	395
	23006.905544	42164.66203	0.0002287	0.0289	52.0943	234.2817	134.0240
C1 . 139	**04024A**	**Telstar 18 (APstar 5)**					
	27-DEC-12	138.01				52	433
	23006.901250	42165.34494	0.0002023	0.0090	11.9804	254.7403	137.9817
C1 . 140	**10001A**	**Beidou DW 3**					
	28-DEC-12	140.00				52	155
	23007.157674	42165.14982	0.0002934	1.5940	355.7684	266.8496	140.0678
C1 . 141	**05023A**	**Ekspress AM-3**					
	28-DEC-12	140.03				52	384
	23007.155069	42165.56501	0.0004037	0.0457	103.4823	206.3516	139.9113
C1 . 142	**05006A**	**Himawari-6**					
	26-DEC-12	140.21				52	399
	23005.821921	42164.91265	0.0000513	0.0092	265.0182	119.3577	140.0298
C1 . 143	**08007A**	**Kizuna**					
	26-DEC-12	142.97				52	249
	23005.825718	42164.92835	0.0002916	0.0770	271.9429	3.2683	142.9945
C1 . 144	**08038A**	**Superbird C2**					
	28-DEC-12	143.91				52	231
	23007.150475	42164.87004	0.0002173	0.0278	277.3397	352.3831	143.9452
C1 . 145	**04007A**	**MBSAT**					
	28-DEC-12	144.06				52	447
	23007.149340	42164.94910	0.0002147	0.0105	313.6909	313.9408	144.0600
C1 . 146	**06004A**	**MTSAT-2**					
	26-DEC-12	145.02				52	350
	23005.755995	42165.33233	0.0003196	0.0249	57.1004	226.0220	144.9930
C1 . 147	**07044A**	**Optus D2**					
	27-DEC-12	152.01				52	271
	23006.667118	42164.54793	0.0003192	0.0024	352.3493	282.3719	152.0189
C1 . 148	**02015A**	**JC-Sat 8**					
	26-DEC-12	154.00				52	548
	23005.640625	42164.80248	0.0001646	0.0048	270.7104	344.8648	154.0162
C1 . 149	**03028B**	**Optus C1 (Defense C1)**					
	28-DEC-12	156.01				52	484
	23007.546111	42164.79996	0.0003873	0.0235	114.8316	145.8499	156.0124
C1 . 150	**09044B**	**Optus D3**					
	28-DEC-12	156.01				52	176
	23007.780463	42164.77276	0.0003932	0.0396	348.5234	298.2919	156.0367
C1 . 151	**10057A**	**Beidou DW 6**					
	28-DEC-12	160.00				52	114
	23007.725961	42164.49944	0.0005133	0.5183	348.4425	232.0737	159.9886

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 152	**06043B**	**Optus D1**					
	28-DEC-12	160.01				52	315
	23007.725961	42164.57120	0.0003255	0.0168	310.1390	319.0538	160.0138
C1 . 153	**00012A**	**Superbird 4**					
	28-DEC-12	162.02				52	657
	23007.650046	42164.59867	0.0002728	0.0287	246.3622	25.8332	162.0095
C1 . 154	**12012A**	**Cosmos-2479**					
	28-DEC-12	165.70				41	41
	23007.715069	42163.43533	0.0001564	1.7232	287.5848	86.7361	165.9719
C1 . 155	**12030A**	**Intelsat IS-19**					
	28-DEC-12	166.03				31	31
	23007.715069	42164.62054	0.0002587	0.0153	355.2954	288.5985	166.0152
C1 . 156	**98065A**	**PAS 8**					
	28-DEC-12	166.08				52	703
	23007.651053	42164.44870	0.0003223	0.0234	264.0220	347.9432	169.0144
C1 . 157	**05052A**	**AMC 23**					
	27-DEC-12	172.01				52	359
	23006.538438	42164.34301	0.0002993	0.0143	312.6328	317.5584	172.0131
C1 . 158	**11032A**	**Tian Lian 1B**					
	28-DEC-12	176.79				52	78
	23007.549942	42165.08730	0.0003198	0.0695	257.1939	39.0335	176.7663
C1 . 159	**96070A**	**Inmarsat 3-F3**					
	28-DEC-12	178.07				52	820
	23007.233773	42164.37665	0.0005857	0.1012	73.1235	206.5005	178.0883
C1 . 160	**11056A**	**Intelsat IS-18**					
	26-DEC-12	180.02				51	64
	23005.572431	42164.52663	0.0001328	0.0071	4.1782	262.3447	180.0042
C1 . 161	**09008A**	**NSS 9**					
	27-DEC-12	183.02				42	195
	23006.586759	42163.92140	0.0002139	0.0119	345.3447	271.7466	183.0070
C1 . 162	**00081B**	**GE 8 (Aurora 3)**					
	27-DEC-12	221.03				51	612
	23006.550509	42164.28695	0.0002656	0.0214	330.0237	305.2964	221.0011
C1 . 163	**00054B**	**GE 7**					
	27-DEC-12	223.01				51	624
	23006.567986	42164.11314	0.0002968	0.0199	5.7305	263.8894	223.0132
C1 . 164	**10008A**	**GOES 15**					
	28-DEC-12	224.94				52	149
	23007.129028	42164.11202	0.0002547	0.1706	257.2398	16.2471	224.5605
C1 . 165	**04003A**	**AMC-10 (GE 10)**					
	27-DEC-12	225.01				52	453
	23006.568414	42164.55915	0.0002668	0.0140	344.5829	285.6642	224.9941

C1 .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
C1 . 166	**05041A**	**Galaxy 15**					
	27-DEC-12	226.98				51	367
	23006.354433	42164.33376	0.0001482	0.0084	16.5661	243.8459	227.0048
C1 . 167	**04017A**	**AMC-11 (GE-11)**					
	26-DEC-12	229.01				51	437
	23005.527025	42164.38815	0.0002796	0.0190	12.7638	245.1298	229.0042
C1 . 168	**03013B**	**Galaxy XII**					
	27-DEC-12	231.01				52	494
	23006.476597	42164.89639	0.0002335	0.0250	273.3974	356.6385	231.0101
C1 . 169	**08063A**	**Ciel 2**					
	27-DEC-12	231.16				52	211
	23006.476597	42164.25807	0.0003168	0.0182	305.4461	327.6547	231.1581
C1 . 170	**03044A**	**Galaxy 13/Horizons-1**					
	26-DEC-12	233.01				51	465
	23005.587731	42164.33348	0.0000839	0.0260	5.9063	103.1953	232.9791
C1 . 171	**05030A**	**Galaxy 14**					
	28-DEC-12	235.00				52	378
	23007.599919	42164.73239	0.0002446	0.0214	326.7578	299.4329	234.9964
C1 . 172	**08038B**	**AMC 21**					
	28-DEC-12	235.11				52	232
	23007.599919	42164.50981	0.0002443	0.0190	331.8377	286.2484	235.1077
C1 . 173	**08024A**	**Galaxy 18**					
	28-DEC-12	237.00				52	243
	23007.467569	42164.60092	0.0003290	0.0095	86.8864	184.5231	236.9960
C1 . 174	**03034A**	**EchoStar 9 (Telstar 13)**					
	28-DEC-12	239.01				51	479
	23007.359873	42164.70801	0.0003443	0.0189	19.2353	257.5651	239.0081
C1 . 175	**04016A**	**DirecTV-7S**					
	28-DEC-12	240.91				52	438
	23007.019676	42164.40244	0.0002937	0.0095	336.9896	291.9807	240.9408
C1 . 176	**02006A**	**EchoStar 7**					
	28-DEC-12	241.04				52	553
	23007.115069	42164.19948	0.0001725	0.0280	17.7006	287.8412	241.2182
C1 . 177	**10010A**	**Echostar XIV**					
	28-DEC-12	241.11				52	146
	23007.510035	42164.32928	0.0002802	0.0101	321.3216	313.1209	241.1198
C1 . 178	**07009A**	**Anik F3**					
	28-DEC-12	241.30				52	295
	23007.510035	42164.67044	0.0002325	0.0066	334.6655	297.1797	241.2908
C1 . 179	**98070A**	**Satmex 5**					
	27-DEC-12	243.21				52	717
	23006.061782	42164.51289	0.0002371	0.0057	7.4904	255.6864	243.1960

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 180	**01018A**	**XM Radio 1 (Roll)**					
	28-DEC-12	244.75				52	591
	23007.510451	42164.69259	0.0004369	0.0931	235.0334	347.7782	244.7399
C1 . 181	**01012A**	**XM Radio 2 (Rock)**					
	28-DEC-12	244.76				52	603
	23007.356481	42164.45234	0.0003375	0.0646	275.8736	51.4505	244.7695
C1 . 182	**11059A**	**ViaSat-1**					
	27-DEC-12	244.91				52	64
	23006.565440	42164.45963	0.0002835	0.0008	352.8056	280.8163	244.9026
C1 . 183	**06049A**	**XM Radio 4 (Blues)**					
	27-DEC-12	244.91				52	317
	23006.565440	42164.48794	0.0001028	0.0174	225.1025	84.7191	244.7424
C1 . 184	**06020A**	**Satmex 6**					
	28-DEC-12	246.99				52	338
	23007.247037	42164.59727	0.0002230	0.0344	230.9266	34.1213	247.0044
C1 . 185	**04027A**	**Anik F2**					
	27-DEC-12	248.86				51	426
	23006.553704	42164.56223	0.0000136	0.0270	1.0300	338.3398	248.9246
C1 . 186	**06054A**	**WildBlue 1**					
	27-DEC-12	248.92				52	311
	23006.553704	42164.50280	0.0002041	0.0048	315.6282	312.2097	248.8385
C1 . 187	**06003A**	**Echostar 10**					
	28-DEC-12	249.80				52	354
	23007.263067	42164.73632	0.0001294	0.0146	346.1339	278.9202	249.7989
C1 . 188	**02023A**	**DirecTV-5**					
	27-DEC-12	249.94				52	544
	23006.497292	42164.66399	0.0003589	0.0073	323.8045	309.4372	249.8860
C1 . 189	**08035A**	**Echostar 11**					
	28-DEC-12	250.01				52	236
	23007.537049	42164.52383	0.0003017	0.0167	354.7216	286.5242	250.0157
C1 . 190	**00076A**	**Anik F1**					
	28-DEC-12	252.63				52	618
	23007.583183	42164.39039	0.0002475	0.0263	99.1381	202.3425	252.7056
C1 . 191	**05036A**	**Anik F1R**					
	28-DEC-12	252.70				51	372
	23007.583183	42164.70240	0.0001770	0.0191	313.4261	296.6552	252.7034
C1 . 192	**12035A**	**Echostar 17**					
	28-DEC-12	252.91				26	26
	23007.583183	42164.65839	0.0001743	0.0114	28.3461	191.0817	252.8922
C1 . 193	**04041A**	**AMC-15**					
	28-DEC-12	254.97				52	417
	23007.262998	42164.62559	0.0002491	0.0156	350.0265	266.6214	254.9519

C1 .nn	COSPAR	NAME					
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C1 . 194	**06054B**	**AMC 18**					
	28-DEC-12	255.06				52	312
	23007.543819	42164.66904	0.0003328	0.0231	293.1648	344.9106	255.0654
C1 . 195	**11035A**	**SES-3**					
	27-DEC-12	256.93				52	77
	23006.513981	42164.54990	0.0002651	0.0216	322.9890	307.4933	256.9170
C1 . 196	**96054A**	**GE 1**					
	28-DEC-12	256.99				52	820
	23007.202315	42164.58942	0.0003387	0.0188	13.3637	248.4860	257.0122
C1 . 197	**05015A**	**Spaceway 1**					
	28-DEC-12	257.13				52	392
	23007.406447	42164.33096	0.0001075	0.0549	185.9250	16.0901	257.1128
C1 . 198	**07032A**	**DirecTV 10**					
	28-DEC-12	257.22				52	285
	23007.202315	42164.38534	0.0000462	0.0251	223.2595	339.9173	257.2120
C1 . 199	**09075A**	**DirecTV 12**					
	28-DEC-12	257.24				52	158
	23007.406447	42164.69707	0.0000320	0.0328	197.6617	92.8562	257.2442
C1 . 200	**10061A**	**SkyTerra 1**					
	27-DEC-12	258.70				52	112
	23006.435752	42164.61101	0.0003898	5.1489	321.5417	190.8298	258.7137
C1 . 201	**01052A**	**DirecTV-4S**					
	27-DEC-12	258.85				52	565
	23006.516887	42164.77417	0.0001712	0.0217	53.5686	213.0103	258.8416
C1 . 202	**06043A**	**DirecTV 9S**					
	27-DEC-12	258.90				52	318
	23006.516887	42164.57232	0.0003552	0.0204	265.3322	358.9933	258.9054
C1 . 203	**10016A**	**SES-1**					
	26-DEC-12	259.01				52	141
	23005.445220	42164.53280	0.0002708	0.0161	317.6751	314.1476	259.0134
C1 . 204	**05019A**	**DirectTV-8**					
	27-DEC-12	259.17				52	387
	23006.516887	42164.52383	0.0003508	0.0125	354.2944	278.9835	259.1480
C1 . 205	**08013A**	**DirecTV 11**					
	27-DEC-12	260.74				52	250
	23006.332199	42164.65334	0.0000190	0.0230	173.9504	110.5682	260.7844
C1 . 206	**05046B**	**Spaceway 2**					
	28-DEC-12	260.86				52	367
	23007.536794	42164.76015	0.0000457	0.0231	186.8769	139.9169	260.8959
C1 . 207	**06023A**	**Galaxy 16**					
	28-DEC-12	261.00				52	336
	23007.233970	42164.54485	0.0003257	0.0150	278.6840	351.1465	261.0145

C1 .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
C1 . 208	**08045A**	**Galaxy 19**					
	27-DEC-12	262.93				52	225
	23006.517315	42164.66371	0.0003265	0.0086	146.4714	125.2699	262.9552
C1 . 209	**09034A**	**Sirius FM5**					
	27-DEC-12	264.00				51	183
	23006.066863	42164.55719	0.0001884	0.0017	330.3323	24.5965	264.0129
C1 . 210	**02030A**	**Galaxy 3C**					
	28-DEC-12	264.95				52	535
	23007.132674	42164.61690	0.0000853	0.0200	181.2074	142.1165	264.9281
C1 . 211	**07036A**	**Spaceway 3**					
	28-DEC-12	265.05				52	280
	23007.401632	42164.80304	0.0000446	0.0255	190.9112	138.6398	265.0632
C1 . 212	**97026A**	**Telstar 5**					
	26-DEC-12	266.90				52	791
	23005.382025	42164.65586	0.0003220	0.0250	271.8801	3.0838	266.9161
C1 . 213	**99027A**	**Nimiq**					
	27-DEC-12	268.88				51	689
	23006.524630	42164.58214	0.0005637	0.1196	71.5967	245.5218	268.8895
C1 . 214	**02062A**	**Nimiq 2**					
	27-DEC-12	268.88				51	509
	23006.487986	42165.08478	0.0004070	0.0507	218.4286	34.8849	268.8855
C1 . 215	**12026A**	**Nimiq 6**					
	28-DEC-12	268.89				33	33
	23007.436400	42164.63372	0.0005310	0.0434	243.1508	102.4945	268.9028
C1 . 216	**07016B**	**Galaxy 17**					
	27-DEC-12	269.00				52	289
	23006.524479	42164.57373	0.0003379	0.0037	10.6715	265.9302	269.0094
C1 . 217	**05022A**	**Intelsat Americas 8 (Telstar 8)**					
	28-DEC-12	271.00				51	384
	23007.351852	42165.07777	0.0002583	0.0301	62.4212	104.2822	270.9951
C1 . 218	**11049A**	**SES-2**					
	26-DEC-12	273.00				51	66
	23005.359630	42164.64829	0.0003240	0.0169	317.1781	322.5459	273.0141
C1 . 219	**10053A**	**Sirius XM-5**					
	28-DEC-12	274.78				52	117
	23007.411331	42164.78706	0.0002004	0.0026	6.2887	156.0876	274.7700
C1 . 220	**05008A**	**XM Radio 3 (Rhythm)**					
	28-DEC-12	274.91				52	397
	23007.411331	42164.81622	0.0000293	0.0201	164.6517	2.2467	274.9264
C1 . 221	**04048A**	**AMC 16**					
	27-DEC-12	274.92				51	408
	23006.397581	42164.68586	0.0002795	0.0166	333.7419	296.0641	275.0109

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 222	**00046A**	**Brasilsat B4**					
	27-DEC-12	276.00				52	631
	23006.121644	42164.92218	0.0002724	0.0493	154.9741	123.3536	276.0030
C1 . 223	**03024A**	**AMC-9 (GE-12)**					
	27-DEC-12	276.66				52	486
	23006.355799	42164.95582	0.0003088	0.0215	300.1773	332.2190	276.9984
C1 . 224	**08044A**	**Nimiq 4**					
	28-DEC-12	278.00				52	225
	23007.377222	42164.43664	0.0002532	0.0062	8.7640	278.4006	278.0127
C1 . 225	**08055A**	**Simon Bolivar**					
	28-DEC-12	282.01				52	219
	23007.352141	42164.73800	0.0001536	0.0471	226.9255	66.5865	282.0088
C1 . 226	**95073A**	**EchoStar 1**					
	28-DEC-12	282.85				52	833
	23007.250532	42165.05254	0.0002371	0.0236	276.9338	6.4722	282.8516
C1 . 227	**02039A**	**EchoStar 8**					
	28-DEC-12	282.98				52	530
	23007.250532	42163.71228	0.0003003	0.0213	45.4829	237.8646	283.0653
C1 . 228	**12062A**	**Star One C3**					
	28-DEC-12	285.00				7	7
	23007.352211	42165.12515	0.0002602	0.0657	110.3296	162.6152	284.9976
C1 . 229	**06018A**	**GOES N**					
	28-DEC-12	285.17				52	342
	23007.280602	42165.79799	0.0001303	0.2875	95.8155	317.7249	285.3886
C1 . 230	**09050A**	**Nimiq 5**					
	28-DEC-12	287.30				52	173
	23007.384016	42165.14001	0.0002774	0.0158	286.3915	357.9979	287.2967
C1 . 231	**00067A**	**GE 6**					
	28-DEC-12	288.00				52	619
	23007.384016	42164.79351	0.0003212	0.0192	323.0623	311.0155	288.0139
C1 . 232	**08018B**	**Star One C2**					
	28-DEC-12	290.04				52	246
	23007.385150	42164.76996	0.0002428	0.0287	49.8875	241.1449	290.0219
C1 . 233	**12065A**	**Echostar XVI**					
	28-DEC-12	292.90				6	6
	23007.352407	42140.93435	0.0005543	0.0437	268.5748	290.9933	293.0022
C1 . 234	**99060A**	**GE 4**					
	27-DEC-12	293.00				52	667
	23006.505174	42164.81565	0.0000238	0.0258	42.1718	233.0864	292.9989
C1 . 235	**97050A**	**GE 3**					
	27-DEC-12	293.01				52	776
	23006.263889	42164.46664	0.0002258	0.0174	326.7637	305.9695	292.9985

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 236	**07056A**	**Star One C1**					
	26-DEC-12	295.01				52	265
	23005.360174	42164.26032	0.0002588	0.0388	250.2591	35.8017	295.0107
C1 . 237	**11021A**	**Estrela do Sul 2**					
	28-DEC-12	296.96				52	86
	23007.426840	42164.98610	0.0002605	0.0221	298.9382	328.4778	297.0197
C1 . 238	**10034A**	**Echostar XV**					
	28-DEC-12	298.43				51	129
	23007.563796	42165.30990	0.0002691	0.0177	330.9349	318.8121	298.3369
C1 . 239	**03033A**	**Rainbow 1**					
	28-DEC-12	298.45				51	481
	23007.586817	42165.05787	0.0001819	0.0125	9.7922	303.8876	298.6642
C1 . 240	**97059A**	**EchoStar 3**					
	28-DEC-12	298.51				51	770
	23007.578843	42164.47140	0.0001999	0.0183	0.6803	304.3867	298.2257
C1 . 241	**04031A**	**Amazonas**					
	27-DEC-12	298.99				50	425
	23006.349734	42165.32728	0.0003996	0.0346	315.2052	345.6886	299.0126
C1 . 242	**09054A**	**Amazonas 2**					
	28-DEC-12	299.01				52	171
	23007.594977	42164.62391	0.0002580	0.0354	156.6928	95.2212	299.0087
C1 . 243	**10006A**	**Intelsat IS-16**					
	28-DEC-12	301.90				52	151
	23007.073900	42165.02563	0.0002693	0.0146	11.9656	263.3479	301.9029
C1 . 244	**12045A**	**Intelsat IS-21**					
	28-DEC-12	302.04				19	19
	23007.073900	42165.15879	0.0001173	0.0166	10.2080	271.5976	301.9860
C1 . 245	**99071A**	**Galaxy 11**					
	27-DEC-12	304.46				52	665
	23006.356470	42164.68614	0.0000351	0.0391	189.7589	148.4591	304.4615
C1 . 246	**98037A**	**Intelsat 805**					
	27-DEC-12	304.51				52	733
	23006.356458	42164.59980	0.0003164	0.0087	10.6330	265.5859	304.5169
C1 . 247	**96015A**	**Intelsat VIIA F-2**					
	27-DEC-12	307.00				52	839
	23006.356528	42165.01049	0.0003842	0.1535	75.0944	194.1336	307.0089
C1 . 248	**12057A**	**Intelsat IS-23**					
	27-DEC-12	307.17				11	11
	23006.443796	42165.08002	0.0001587	0.0201	1.0701	27.7671	306.9989
C1 . 249	**00072A**	**PAS 1R**					
	28-DEC-12	309.99				52	597
	23007.394352	42164.95190	0.0000362	0.0282	166.8264	102.4425	310.0220

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 250	**09064A**	**Intelsat IS-14**					
	27-DEC-12	314.99				52	162
	23006.297523	42164.51401	0.0002250	0.0102	1.9543	264.8437	315.0262
C1 . 251	**07044B**	**Intelsat IS-11**					
	26-DEC-12	316.96				51	268
	23005.289919	42164.92246	0.0003413	0.0399	262.3990	20.7532	317.0058
C1 . 252	**98014A**	**Intelsat 806 (NSS 806)**					
	27-DEC-12	319.42				43	732
	23006.364144	42164.79603	0.0003351	0.0179	350.1085	300.8436	319.5046
C1 . 253	**09009A**	**Telstar 11N**					
	27-DEC-12	322.44				52	201
	23006.363576	42164.70997	0.0002501	0.0016	7.8109	266.7941	322.4525
C1 . 254	**05003A**	**AMC 12**					
	27-DEC-12	322.59				52	383
	23006.363576	42164.87425	0.0003311	0.0182	317.7659	323.4429	322.5967
C1 . 255	**02016A**	**Intelsat 903**					
	26-DEC-12	325.49				51	534
	23005.279699	42164.88910	0.0003452	0.0063	3.7334	273.2184	325.5046
C1 . 256	**10065A**	**Hylas**					
	27-DEC-12	326.51				52	110
	23006.298322	42164.72903	0.0001858	0.0207	336.1142	305.3187	326.5241
C1 . 257	**08034A**	**Protostar 1**					
	28-DEC-12	328.50				52	235
	23007.151563	42164.47140	0.0002530	0.0207	327.8440	291.4151	328.5118
C1 . 258	**00007A**	**Hispasat 1C**					
	31-DEC-12	329.98				52	643
	23010.352245	42164.49691	0.0003745	0.0228	23.8844	297.9969	330.0107
C1 . 259	**06007A**	**Spainsat**					
	29-DEC-12	330.00				51	332
	23008.392269	42164.54653	0.0004790	0.0436	223.4542	45.1916	330.0361
C1 . 260	**02044A**	**Hispasat 1D**					
	28-DEC-12	330.00				52	508
	23007.659884	42164.64914	0.0006025	0.0313	321.0206	334.1825	330.0179
C1 . 261	**10070A**	**Hispasat 1E**					
	26-DEC-12	330.15				52	106
	23005.416493	42164.67801	0.0002550	0.0490	111.6740	121.5548	330.0164
C1 . 262	**03007A**	**Intelsat 907**					
	28-DEC-12	332.52				52	489
	23007.149190	42164.80416	0.0003499	0.0104	346.6651	287.4941	332.5053
C1 . 263	**02027A**	**Intelsat 905**					
	27-DEC-12	335.49				52	516
	23006.308021	42164.65334	0.0002879	0.0216	288.4222	334.6124	335.5021

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 264	**12007A**	**SES-4**					
	28-DEC-12	338.01				47	47
	23007.254282	42164.72959	0.0002227	0.0165	317.9120	312.7143	338.0131
C1 . 265	**02019A**	**NSS-7**					
	28-DEC-12	338.95				42	533
	23007.243808	42164.56111	0.0002622	0.0213	319.7367	318.7340	340.0240
C1 . 266	**01024A**	**Intelsat 901**					
	27-DEC-12	342.00				51	588
	23006.363970	42164.60709	0.0003521	0.0074	357.5904	277.4330	342.0141
C1 . 267	**08030A**	**Skynet 5C**					
	27-DEC-12	342.21				52	239
	23006.363970	42164.76155	0.0003818	0.0678	339.5778	279.7590	342.1806
C1 . 268	**96053A**	**Inmarsat 3-F2**					
	28-DEC-12	344.51				52	828
	23007.328750	42164.90929	0.0006098	0.0582	340.1783	292.1207	344.4954
C1 . 269	**99059A**	**Orion 2**					
	31-DEC-12	345.00				53	675
	23010.217049	42164.83304	0.0002976	0.0178	269.4248	2.6333	345.0041
C1 . 270	**02040A**	**Atlantic Bird 1**					
	28-DEC-12	347.51				52	522
	23007.077847	42164.41534	0.0003065	0.0675	340.7615	323.1587	347.5392
C1 . 271	**09007A**	**Ekspress AM-44**					
	27-DEC-12	349.01				52	204
	23006.363241	42164.79351	0.0000356	0.0058	260.1620	112.3153	349.0007
C1 . 272	**01042A**	**Atlantic Bird 2**					
	26-DEC-12	351.92				52	571
	23005.354826	42164.55831	0.0005224	0.0546	7.6690	260.1777	351.9159
C1 . 273	**11051A**	**Atlantic Bird 7**					
	28-DEC-12	352.71				52	67
	23007.256400	42164.48598	0.0005466	0.0580	351.2647	216.3480	352.7055
C1 . 274	**10037A**	**Nilesat 201**					
	26-DEC-12	353.00				52	126
	23005.178507	42164.51037	0.0005074	0.0514	172.1317	70.6782	353.0108
C1 . 275	**98024A**	**Nilesat 101**					
	28-DEC-12	353.01				52	740
	23007.075602	42164.45122	0.0004422	0.0743	64.0037	227.3840	353.0233
C1 . 276	**00046B**	**Nilesat 102**					
	28-DEC-12	353.01				52	629
	23007.256400	42164.43160	0.0007150	0.0246	298.3171	340.2272	353.0399
C1 . 277	**06033B**	**Syracuse 3B**					
	27-DEC-12	354.81				52	326
	23006.061528	42164.56896	0.0003571	0.0326	40.0477	219.0138	354.8009

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 278	**02035A**	**Atlantic Bird 3**					
	27-DEC-12	355.00				52	529
	23006.300972	42164.78930	0.0004727	0.0428	331.9087	293.8611	355.0052
C1 . 279	**03059A**	**AMOS 2**					
	28-DEC-12	356.01				52	452
	23007.179074	42164.88378	0.0003348	0.0331	284.8981	346.1677	355.9838
C1 . 280	**08022A**	**Amos 3**					
	26-DEC-12	356.05				51	244
	23005.291111	42164.52915	0.0001147	0.0058	263.0735	327.2754	355.9916
C1 . 281	**12035B**	**Meteosat 10**					
	28-DEC-12	356.50				24	24
	23007.075301	42163.41683	0.0000715	1.4610	251.0104	64.3426	356.4637
C1 . 282	**04022A**	**Intelsat 10-02**					
	28-DEC-12	359.05				52	431
	23007.146470	42164.65306	0.0000915	0.0177	74.2351	184.6072	359.0403
C1 . 283	**09058B**	**Thor 6**					
	28-DEC-12	359.20				52	167
	23007.880162	42164.33152	0.0001809	0.0413	169.6841	93.5075	359.1776
C1 . 284	**08006A**	**Thor 2R**					
	28-DEC-12	359.25				52	250
	23007.146481	42164.61970	0.0002781	0.0489	206.2259	66.3314	359.2484

3.2 Satellites under longitude control (only E-W control)

In the case where the satellite is only under longitude control, there are 85 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 34.

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 1	**93031A**	**Astra 1C**					
	28-DEC-12	2.00				52	795
	23007.318345	42164.79239	0.0004952	5.5706	61.9329	208.8491	1.9738
C2 . 2	**02040B**	**MSG 1**					
	28-DEC-12	9.36				52	511
	23007.189606	42163.24275	0.0001893	1.7696	61.8580	177.6363	9.3287
C2 . 3	**90021A**	**Intelsat VI F-3**					
	27-DEC-12	11.50				52	1091
	23006.809803	42164.13361	0.0000655	9.2590	51.7040	215.6934	11.4913
C2 . 4	**09010A**	**Raduga-1**					
	28-DEC-12	11.80				52	201
	23007.242778	42163.88440	0.0002219	2.4049	93.4779	178.8958	11.4788
C2 . 5	**00019A**	**Sesat**					
	27-DEC-12	15.55				52	645
	23006.301539	42164.36768	0.0004268	0.9959	76.0826	165.9413	14.4860
C2 . 6	**98013A**	**Hot Bird 4**					
	27-DEC-12	15.80				52	592
	23006.079560	42163.90038	0.0005603	1.0593	77.2641	193.6948	15.8181
C2 . 7	**01005A**	**Sicral**					
	28-DEC-12	16.20				52	599
	23007.188877	42163.72742	0.0003973	4.3612	64.6331	217.6088	16.2021
C2 . 8	**97002A**	**GE 2**					
	28-DEC-12	19.03				52	806
	23007.181713	42164.31610	0.0004506	1.0866	76.0005	206.9915	18.9805
C2 . 9	**99033A**	**Astra 1H**					
	28-DEC-12	19.20				39	538
	23007.181713	42163.74059	0.0001283	0.5128	79.3834	73.6188	19.4144
C2 . 10	**98063A**	**AfriStar 1**					
	28-DEC-12	21.00				52	721
	23007.056782	42164.36852	0.0004496	0.4883	76.5569	197.0296	20.9848
C2 . 11	**01029A**	**Artemis**					
	27-DEC-12	21.41				52	584
	23006.227627	42163.96317	0.0003135	10.3039	51.9583	234.9182	21.3667
C2 . 12	**94070A**	**Astra 1D**					
	28-DEC-12	23.11				50	808
	23007.881678	42164.51009	0.0003425	4.6496	63.7100	208.8715	23.0962
C2 . 13	**97025A**	**Thor II**					
	27-DEC-12	23.31				52	769
	23006.228345	42163.76610	0.0000779	4.0668	65.7796	219.6523	23.3247

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 14	**02015B**	**Astra 3A**					
	28-DEC-12	23.52				47	503
	23007.881678	42163.72854	0.0004886	0.5660	77.3982	192.7494	23.7162
C2 . 15	**98006B**	**Inmarsat-3 F5**					
	28-DEC-12	24.94				52	761
	23007.147072	42165.72173	0.0005272	0.3049	353.5169	276.1891	24.7796
C2 . 16	**05044A**	**Inmarsat 4 F2**					
	26-DEC-12	25.09				52	365
	23005.159630	42164.17902	0.0003094	2.2607	344.8614	290.8482	25.0957
C2 . 17	**00081A**	**Astra 2D**					
	19-DEC-12	28.17				39	504
	22998.896192	42165.21598	0.0000085	0.6620	81.1925	98.3782	27.9738
C2 . 18	**99009B**	**Skynet 4E**					
	28-DEC-12	32.40				51	677
	23007.821806	42164.10557	0.0002696	8.0028	42.5129	223.3896	32.3665
C2 . 19	**96063A**	**Arabsat 2B**					
	28-DEC-12	34.15				50	770
	23007.821644	42164.12940	0.0004906	0.3720	80.9822	208.0526	33.9870
C2 . 20	**08011A**	**AMC 14**					
	27-DEC-12	34.48				52	247
	23006.760394	42163.65622	0.0044770	15.9029	90.7073	358.3863	34.4660
C2 . 21	**93076A**	**NATO IVB**					
	28-DEC-12	34.96				52	888
	23007.745602	42164.63147	0.0003357	10.3400	39.6693	222.6495	35.4695
C2 . 22	**04043A**	**Ekspress AM-1**					
	28-DEC-12	40.01				52	416
	23007.882072	42164.22499	0.0001417	2.2559	71.3861	306.7299	40.0092
C2 . 23	**03026A**	**Thuraya 2**					
	28-DEC-12	44.04				52	488
	23007.109051	42164.59391	0.0005053	3.3855	16.7856	257.8450	44.0313
C2 . 24	**96002B**	**MEASAT 1**					
	27-DEC-12	46.00				52	847
	23006.122153	42163.83030	0.0000994	4.6012	64.2187	190.5410	46.0075
C2 . 25	**96035A**	**Intelsat VII F-6**					
	27-DEC-12	47.52				52	828
	23006.166065	42164.02484	0.0003325	0.6042	79.1951	199.9658	47.5096
C2 . 26	**96067A**	**Hot Bird 2**					
	26-DEC-12	48.24				52	622
	23005.084120	42163.73835	0.0005113	3.2901	68.3516	201.3687	48.2456
C2 . 27	**97007A**	**JC-Sat 4**					
	27-DEC-12	50.28				52	797
	23006.167720	42164.12996	0.0004111	4.5166	64.4249	219.0569	50.2765

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 28	**97053A**	**Intelsat VIII F-3 (NSS 803)**					
	28-DEC-12	50.52				43	757
	23007.641007	42164.40581	0.0003589	0.5308	78.7700	186.9989	50.4971
C2 . 29	**98056B**	**Sirius 3**					
	27-DEC-12	51.14				52	712
	23006.102442	42164.31162	0.0000691	3.4405	67.8557	219.5286	51.1873
C2 . 30	**96039A**	**Apstar 1A**					
	27-DEC-12	51.52				52	853
	23006.102269	42164.80276	0.0001402	6.6452	58.4359	208.1677	51.8453
C2 . 31	**98068A**	**Bonum 1**					
	28-DEC-12	55.99				52	724
	23007.179769	42164.55074	0.0002493	1.0749	77.8981	169.8168	55.9908
C2 . 32	**97049B**	**Meteosat 7**					
	26-DEC-12	57.47				52	778
	23005.092199	42164.97489	0.0001907	8.0896	54.1513	196.2210	57.3748
C2 . 33	**96020A**	**Inmarsat 3-F1**					
	27-DEC-12	64.14				52	815
	23006.872049	42164.59896	0.0005982	0.7120	73.5635	197.0837	64.4930
C2 . 34	**90002B**	**Leasat 5**					
	27-DEC-12	72.01				52	1077
	23006.633565	42164.24854	0.0001177	10.3324	25.9761	213.7403	71.9624
C2 . 35	**02043A**	**KALPANA-1 (METSAT-1)**					
	28-DEC-12	74.00				52	520
	23007.110660	42164.69259	0.0006418	3.2869	68.4541	201.3049	73.9727
C2 . 36	**96003A**	**Mugunghwa 2 (Koreasat 2)**					
	28-DEC-12	74.81				52	813
	23007.110660	42164.74052	0.0000611	5.3441	62.2232	135.0765	74.8007
C2 . 37	**95035B**	**TDRS 7**					
	28-DEC-12	84.76				52	882
	23007.072222	42164.76463	0.0030373	13.4315	33.5177	344.3905	84.8808
C2 . 38	**06053A**	**Fengyun 2D**					
	31-DEC-12	86.47				53	314
	23010.634259	42165.19159	0.0000640	2.7973	72.7151	247.4370	87.2577
C2 . 39	**98049A**	**ST-1**					
	28-DEC-12	88.02				52	726
	23007.867581	42164.70829	0.0004197	1.1848	76.0399	200.3340	88.1573
C2 . 40	**00034A**	**TDRS 8**					
	28-DEC-12	89.08				52	637
	23007.562384	42164.35086	0.0004970	4.3768	74.0388	159.0745	89.2815
C2 . 41	**02042B**	**Kodama (DRTS)**					
	26-DEC-12	90.75				52	523
	23005.570012	42164.93256	0.0002700	1.8435	73.6775	188.7199	90.7299

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 42	**97036A**	**Superbird C**					
	28-DEC-12	93.00				51	772
	23007.562465	42164.74473	0.0002430	3.6340	67.1770	71.4492	92.9921
C2 . 43	**08001A**	**Thuraya 3**					
	28-DEC-12	98.63				52	255
	23007.223113	42164.70913	0.0005445	4.7641	340.3523	291.6708	98.6524
C2 . 44	**00013A**	**Ekspress 2A**					
	26-DEC-12	102.78				52	657
	23005.841759	42162.42875	0.0019193	6.1895	59.8590	89.7559	102.5086
C2 . 45	**06038A**	**Zhongxing-22A (FengHuo 1, FH-1)**					
	26-DEC-12	103.23				52	325
	23005.794271	42164.05904	0.0001706	2.6729	70.1658	206.6978	101.5022
C2 . 46	**08066A**	**Fengyun 2E**					
	28-DEC-12	104.34				52	211
	23007.211933	42163.47934	0.0000906	0.9671	39.5113	49.5195	104.4719
C2 . 47	**90093A**	**Inmarsat 2-F1**					
	27-DEC-12	109.02				51	1001
	23006.566667	42165.97461	0.0004103	9.2399	42.8781	228.5266	108.9415
C2 . 48	**10056B**	**BSAT-3B**					
	28-DEC-12	109.62				51	114
	23007.817025	42164.35114	0.0002345	0.6466	75.1501	271.7698	109.6356
C2 . 49	**00011A**	**Garuda 1**					
	28-DEC-12	123.02				52	648
	23007.801238	42163.45019	0.0002995	1.0607	227.1588	80.3875	122.9678
C2 . 50	**04042A**	**Fengyun 2C**					
	28-DEC-12	123.49				52	419
	23007.435150	42167.22281	0.0001624	4.3856	64.1290	71.3399	123.4556
C2 . 51	**02035B**	**N-Star 3 (N-Star c)**					
	26-DEC-12	135.97				52	527
	23005.705914	42165.14001	0.0002451	1.3813	76.9057	169.2308	136.0140
C2 . 52	**05009A**	**Inmarsat 4 F1**					
	28-DEC-12	143.50				52	398
	23007.153299	42164.98358	0.0003377	2.5649	347.9898	279.1549	143.5108
C2 . 53	**06059A**	**Kiku-8 (ETS VIII)**					
	27-DEC-12	145.90				52	308
	23006.419525	42165.13300	0.0005259	2.4029	71.2988	213.2339	145.7475
C2 . 54	**98044A**	**ZX 5B (ChinaSat 5B)**					
	28-DEC-12	146.24				52	744
	23007.503183	42164.68978	0.0005302	1.1257	75.4797	188.2980	146.0433
C2 . 55	**96063B**	**MEASAT 2**					
	28-DEC-12	148.02				52	817
	23007.504329	42164.66063	0.0000425	4.5613	64.2561	199.3741	148.0164

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 56	**97075A**	**JC-Sat 5**					
	27-DEC-12	150.00				52	757
	23006.775012	42164.58438	0.0005095	2.4192	71.0657	206.4336	150.0115
C2 . 57	**96030A**	**Palapa C2**					
	27-DEC-12	150.50				52	815
	23006.775012	42165.02311	0.0001801	2.4043	71.2784	197.9480	150.4900
C2 . 58	**93066A**	**Intelsat VII F-1**					
	27-DEC-12	157.00				52	936
	23006.341771	42164.78594	0.0004077	0.9175	77.3738	190.3481	157.0016
C2 . 59	**94043A**	**Apstar 1**					
	28-DEC-12	162.99				52	955
	23007.103206	42164.59391	0.0001823	7.3161	56.6428	249.6169	162.9797
C2 . 60	**94055A**	**Optus B3**					
	27-DEC-12	164.00				52	913
	23006.604433	42164.59279	0.0002846	4.4493	64.6592	195.9334	163.9812
C2 . 61	**02055A**	**TDRS 10**					
	28-DEC-12	185.73				52	499
	23007.205417	42165.75285	0.0012654	1.9480	64.6534	190.9318	185.5933
C2 . 62	**91054B**	**TDRS 5**					
	28-DEC-12	192.44				52	1070
	23007.253831	42165.46913	0.0016134	12.4715	40.0958	340.0216	192.3537
C2 . 63	**91018A**	**Inmarsat 2-F2**					
	28-DEC-12	216.94				52	1033
	23007.466111	42164.70268	0.0003886	8.5749	44.0435	237.4153	218.0087
C2 . 64	**94065A**	**Solidaridad 2**					
	27-DEC-12	246.33				52	919
	23006.535035	42164.45599	0.0004096	4.2434	65.3740	210.7668	245.0880
C2 . 65	**09035A**	**Terrestar 1**					
	28-DEC-12	249.00				52	184
	23007.247477	42164.51009	0.0003311	4.3959	324.9525	304.2020	249.0130
C2 . 66	**96022A**	**MSAT**					
	27-DEC-12	253.51				52	854
	23006.495741	42164.49215	0.0006059	4.8539	63.4695	214.3839	253.4889
C2 . 67	**95019A**	**AMSC-1**					
	28-DEC-12	258.70				52	892
	23007.560660	42164.45599	0.0006234	7.4374	56.6479	199.8564	256.7177
C2 . 68	**08039A**	**Inmarsat 4 F3**					
	28-DEC-12	262.37				52	231
	23007.307870	42164.70436	0.0003220	3.0080	345.1390	287.4468	262.3700
C2 . 69	**08016A**	**ICO G1**					
	28-DEC-12	267.15				51	246
	23007.472234	42164.54009	0.0003925	4.5510	339.2452	296.0228	267.1804

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 70	**98063B**	**GE 5**					
	28-DEC-12	280.85				52	706
	23007.202130	42165.15262	0.0005148	2.1951	72.3511	202.7079	279.0596
C2 . 71	**00038A**	**EchoStar 6**					
	28-DEC-12	283.05				52	635
	23007.250532	42163.74368	0.0002849	0.9075	77.5681	200.0491	283.1721
C2 . 72	**98006A**	**Brazilsat B-3A**					
	28-DEC-12	285.00				52	748
	23007.352211	42164.33544	0.0005441	0.7773	80.8063	176.2001	285.0279
C2 . 73	**95016A**	**Brazilsat B2**					
	27-DEC-12	292.01				52	871
	23006.043183	42165.12487	0.0002324	4.2823	65.6149	205.1785	291.9809
C2 . 74	**93003B**	**TDRS 6**					
	28-DEC-12	297.70				52	984
	23007.246863	42166.84654	0.0010353	11.8871	42.9199	314.9912	297.4643
C2 . 75	**01031A**	**GOES 12**					
	27-DEC-12	300.12				52	582
	23006.356377	42165.84032	0.0002438	2.6846	71.0088	220.1954	300.3964
C2 . 76	**97027A**	**Inmarsat 3-F4**					
	28-DEC-12	306.01				52	788
	23007.210833	42164.23088	0.0004936	2.6552	69.1811	204.3889	306.0384
C2 . 77	**88091B**	**TDRS-West**					
	27-DEC-12	311.11				52	1084
	23006.357859	42164.07866	0.0010156	13.9480	26.0827	327.2975	311.4144
C2 . 78	**94064A**	**Intelsat VII F-3 (NSS 703)**					
	28-DEC-12	312.96				43	841
	23007.388391	42164.98610	0.0003273	2.9183	69.5223	201.5626	312.9546
C2 . 79	**02011A**	**TDRS 9**					
	27-DEC-12	319.02				52	547
	23006.364144	42165.01526	0.0012176	1.9591	121.2441	251.6539	319.1360
C2 . 80	**01005B**	**Skynet 4F**					
	27-DEC-12	326.01				52	592
	23006.126123	42164.75258	0.0003313	6.4474	49.7832	210.4589	326.0374
C2 . 81	**97009A**	**Intelsat VIII F-1**					
	27-DEC-12	328.91				51	759
	23006.012685	42164.92695	0.0004516	3.7451	67.0005	217.2153	330.5045
C2 . 82	**02029A**	**Ekspress A1R (Express 4A)**					
	28-DEC-12	346.01				52	541
	23007.182222	42164.58522	0.0000274	2.9765	69.4867	247.8949	346.0222
C2 . 83	**98035A**	**Thor III**					
	27-DEC-12	355.70				52	726
	23006.149977	42164.49579	0.0002263	2.3432	71.3455	205.1516	355.6854

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 84	**97042A**	**Agila 2**					
	28-DEC-12	356.95				52	771
	23007.318507	42164.52719	0.0005220	1.6656	75.3450	194.9898	356.9239
C2 . 85	**90079A**	**Skynet 4C**					
	26-DEC-12	358.80				52	1056
	23005.810324	42163.78881	0.0002965	12.2337	33.6319	240.6422	358.7180

3.3 Objects in a drift orbit

In the case where the object is in a drift orbit, there are 565 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 34.

D .nn	COSPAR	NAME					
	Date	$\overline{\dot{\lambda}}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 1	**69045A**	**Intelsat III F-4**					
	26-DEC-12	-36.83	3135.861	3011.932	3259.791	51	226
	23005.933796	45300.07684	0.0024538	14.3720	328.4269	329.2809	256.3203
D . 2	**68116A**	**Intelsat III F-2**					
	26-DEC-12	-36.29	3085.643	2624.154	3547.131	52	223
	23005.874306	45249.86613	0.0098593	14.1475	331.1615	336.1296	280.2119
D . 3	**06048A**	**Xinnuo 2**					
	27-DEC-12	-26.69	2215.101	2033.545	2396.658	51	314
	23006.144051	44379.33301	0.0040652	3.1451	139.0928	123.3098	351.1536
D . 4	**97040A**	**PAS 6**					
	27-DEC-12	-23.67	1949.995	-1115.832	5015.821	52	411
	23006.631736	44114.34101	0.0693882	13.9056	358.9262	135.9312	40.7955
D . 5	**78113D**	**Titan IIIC stage 3 (Transtage)**					
	26-DEC-12	-23.46	1931.718	727.375	3136.061	51	917
	23005.446053	44096.11591	0.0269117	18.0256	353.2709	301.8451	94.7558
D . 6	**78113A**	**OPS 9441 (DSCS II F-11)**					
	23-DEC-12	-22.47	1845.506	1729.940	1961.072	51	1043
	23002.468588	44009.92358	0.0029295	16.8848	358.1600	77.2827	97.3993
D . 7	**85024A**	**Ekran 14**					
	28-DEC-12	-19.72	1608.709	1532.662	1684.756	51	1028
	23007.509306	43773.04944	0.0015687	16.8134	4.7431	241.3440	83.8921
D . 8	**84115A**	**NATO IIID**					
	27-DEC-12	-19.15	1560.190	1130.897	1989.482	52	1059
	23006.889884	43724.26230	0.0102519	12.6084	32.2494	11.4711	335.3847
D . 9	**73100D**	**Titan IIIC stage 3 (Transtage)**					
	27-DEC-12	-18.99	1546.977	363.946	2730.008	51	942
	23006.377315	43711.48702	0.0265807	16.0070	337.4554	355.5868	105.1358
D . 10	**83016A**	**Ekran 10**					
	25-DEC-12	-18.88	1537.284	1387.750	1686.817	52	1023
	23004.221563	43701.14867	0.0029785	16.9606	356.2836	265.4699	182.0598
D . 11	**81122A**	**Marecs A**					
	27-DEC-12	-18.84	1534.082	1018.173	2049.990	52	1050
	23006.172060	43698.37254	0.0115139	15.3447	8.6248	140.2237	211.5082
D . 12	**82106A**	**DSCS II F-16**					
	27-DEC-12	-18.66	1518.637	1501.074	1536.200	51	1090
	23006.153773	43682.92151	0.0005296	16.0292	8.6464	65.9626	217.3327
D . 13	**08006C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	27-DEC-12	-18.55	1509.180	370.990	2647.369	52	92
	23006.424271	43673.12497	0.0261652	5.0292	46.1513	201.2771	155.8521

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 14	**88036A**	**Ekran 18**					
	27-DEC-12	-18.45	1500.490	1445.315	1555.666	52	1016
	23006.536088	43663.60741	0.0012696	16.0629	15.0079	353.0795	85.6162
D . 15	**77005A**	**NATO IIIB**					
	26-DEC-12	-18.01	1463.811	1270.703	1656.919	52	1025
	23005.587951	43628.21739	0.0042215	15.1948	351.6029	288.4221	44.0165
D . 16	**79098C**	**Titan IIIC stage 3 (Transtage)**					
	27-DEC-12	-17.84	1448.883	70.730	2827.036	52	1018
	23006.009433	43613.19706	0.0311921	17.2734	353.9493	306.6620	251.8285
D . 17	**77034B**	**OPS 9438 (DSCS II F-8)**					
	28-DEC-12	-17.45	1415.995	1263.735	1568.254	49	997
	23007.449711	43580.19811	0.0035210	16.6920	348.3668	29.4593	89.3776
D . 18	**08022B**	**Zenit-3SLB third stage (Blok-DM-SL-B)**					
	28-DEC-12	-17.06	1383.331	-807.603	3574.265	52	236
	23007.475301	43547.27549	0.0509645	4.9253	69.8559	296.5397	156.0967
D . 19	**77034C**	**Titan IIIC stage 3 (Transtage)**					
	27-DEC-12	-16.97	1375.367	65.347	2685.387	51	1026
	23006.106655	43540.82825	0.0299628	17.0318	346.3579	332.2618	210.4006
D . 20	**79098A**	**OPS 9443 (DSCS II F-13)**					
	26-DEC-12	-16.83	1363.557	1321.753	1405.362	49	1056
	23005.839826	43527.69355	0.0010452	16.4350	357.8091	18.4474	319.8010
D . 21	**87109A**	**Ekran 17**					
	28-DEC-12	-15.81	1277.523	1095.489	1459.557	52	1004
	23007.511678	43442.10164	0.0042957	15.6287	17.6150	109.8642	96.5366
D . 22	**76053A**	**Marisat 2**					
	26-DEC-12	-15.75	1272.536	730.892	1814.180	52	1027
	23005.768044	43436.60394	0.0122044	15.6631	347.1943	202.8524	334.5075
D . 23	**84114B**	**Marecs B2**					
	27-DEC-12	-15.64	1263.987	755.629	1772.344	51	1097
	23006.198588	43428.20159	0.0114055	15.9667	16.4631	287.3556	207.6690
D . 24	**87028A**	**Raduga 20**					
	28-DEC-12	-15.52	1253.486	1132.340	1374.632	52	970
	23007.159340	43417.92132	0.0030055	16.5592	13.2741	42.1872	219.1465
D . 25	**84090A**	**Ekran 13**					
	27-DEC-12	-15.30	1235.382	1169.286	1301.479	52	1048
	23006.901863	43399.40460	0.0020115	16.3544	1.5194	75.0038	300.3223
D . 26	**97029A**	**Fengyun 2A (Fengyun 2-1R)**					
	26-DEC-12	-15.20	1226.823	812.147	1641.500	52	782
	23005.951366	43390.87899	0.0096754	11.2909	47.9508	108.9032	330.6520
D . 27	**84028A**	**Ekran 12**					
	28-DEC-12	-15.17	1224.020	1182.489	1265.550	52	1022
	23007.227257	43387.80860	0.0008807	16.4297	358.2847	35.6953	179.4589

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 28	**91084B**	**Inmarsat 2-F3**					
	27-DEC-12	-15.16	1223.291	1172.769	1273.813	51	979
	23006.556100	43387.56560	0.0012409	8.8341	48.9380	336.4842	112.2108
D . 29	**87073A**	**Ekran 16**					
	27-DEC-12	-13.64	1096.837	1077.924	1115.749	52	943
	23006.867060	43260.99996	0.0005031	15.7647	11.2351	62.7357	322.4348
D . 30	**86038A**	**Ekran 15**					
	27-DEC-12	-13.42	1078.348	1023.011	1133.685	52	991
	23006.933194	43242.55599	0.0008362	15.9736	6.3560	260.1159	293.5323
D . 31	**88108A**	**Ekran 19**					
	27-DEC-12	-13.03	1046.570	923.623	1169.517	52	1089
	23006.070104	43211.30897	0.0029688	15.3043	19.9298	83.7134	259.1039
D . 32	**77034A**	**OPS 9437 (DSCS II F-7)**					
	27-DEC-12	-12.96	1040.322	964.840	1115.804	52	982
	23006.073704	43204.69903	0.0014989	16.4905	345.2637	226.0384	222.6662
D . 33	**86090A**	**Gorizont 13**					
	27-DEC-12	-12.77	1025.021	958.150	1091.891	52	1000
	23006.687488	43189.14982	0.0012767	15.5814	12.0664	243.3907	27.9063
D . 34	**88051A**	**Meteosat 3**					
	27-DEC-12	-11.97	958.918	933.445	984.391	51	1058
	23006.639803	43123.43790	0.0004111	14.8755	25.8985	306.8689	59.0410
D . 35	**85028C**	**Leasat 3**					
	27-DEC-12	-11.92	954.423	625.543	1283.303	50	1117
	23006.322350	43118.40480	0.0075984	17.6927	358.3277	167.8607	146.2855
D . 36	**92060B**	**Satcom C-3**					
	26-DEC-12	-11.75	940.160	835.655	1044.664	52	1019
	23005.531296	43104.23283	0.0023242	7.3745	57.5062	256.1349	130.4533
D . 37	**89020B**	**Meteosat 4**					
	27-DEC-12	-11.39	910.951	827.599	994.303	52	1029
	23006.788090	43075.02422	0.0019901	14.4353	30.6917	62.9544	10.5469
D . 38	**96030B**	**AMOS 1**					
	27-DEC-12	-11.36	908.621	867.154	950.087	52	843
	23006.486817	43072.52741	0.0008261	3.9262	67.1711	50.5136	155.3398
D . 39	**95040A**	**PAS 4**					
	27-DEC-12	-11.33	905.983	809.365	1002.601	52	829
	23006.388137	43070.03746	0.0023686	2.5125	71.7568	124.3372	195.4652
D . 40	**92032A**	**Intelsat K (NSS K)**					
	25-DEC-12	-11.14	890.283	501.276	1279.289	52	996
	23004.817928	43054.08040	0.0087267	9.4855	54.0211	233.0639	23.9786
D . 41	**71095C**	**Titan IIIC stage 3 (Transtage)**					
	26-DEC-12	-11.11	887.593	208.080	1567.107	51	1005
	23005.593808	43051.63830	0.0154916	13.3280	329.7365	47.5228	21.8008

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 42	**84023A**	**Intelsat V F-8**					
	26-DEC-12	-10.74	857.525	768.805	946.245	51	1116
	23005.632025	43021.79078	0.0019327	15.0223	21.7724	80.3812	58.9619
D . 43	**00003A**	**Zhongxing-22 (FengHuo 1, FH-1)**					
	26-DEC-12	-10.62	848.000	835.000	860.000	52	666
	23005.469329	43011.85831	0.0002908	4.1813	63.2526	218.9718	158.6516
D . 44	**89070A**	**Himawari-4**					
	26-DEC-12	-10.30	821.854	625.888	1017.820	52	1079
	23005.633403	42986.41671	0.0049076	14.2333	31.3026	18.4785	67.9500
D . 45	**84093C**	**Leasat 2**					
	27-DEC-12	-10.14	808.799	678.336	939.263	51	1098
	23006.260289	42972.70302	0.0031119	16.6331	0.7251	142.4141	171.1192
D . 46	**85107F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-10.00	797.146	711.999	882.293	51	989
	23007.515648	42961.68836	0.0019211	15.4528	6.9222	1.6012	83.9537
D . 47	**73100B**	**OPS 9434 (DSCS II F-4)**					
	26-DEC-12	-9.92	790.362	490.176	1090.549	50	1030
	23005.800799	42954.52066	0.0069641	14.1589	335.2776	308.5523	310.6975
D . 48	**78073F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-9.74	775.649	708.673	842.626	52	1014
	23005.477141	42940.38934	0.0017259	15.3269	340.9646	45.2855	73.9809
D . 49	**82113F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-9.73	774.724	679.783	869.665	50	1007
	23007.228681	42938.78213	0.0023382	15.5857	356.7190	147.0143	177.4677
D . 50	**76101A**	**Marisat 3**					
	27-DEC-12	-9.66	769.274	348.678	1189.870	51	1081
	23006.528762	42933.78689	0.0098503	13.2408	346.6618	230.1208	59.0518
D . 51	**86082F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	-9.63	766.719	648.684	884.755	50	933
	23006.018148	42931.51430	0.0029642	15.3405	10.2130	43.2301	268.0349
D . 52	**83088F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-9.57	761.912	691.999	831.825	52	1011
	23007.194769	42926.17788	0.0017181	15.7097	359.3555	20.9730	192.2706
D . 53	**83066F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-9.56	761.193	715.598	806.788	52	1007
	23007.420023	42925.82902	0.0012939	15.6553	359.0639	61.9150	110.7278
D . 54	**69013B**	**Titan IIIC stage 3 (Transtage)**					
	26-DEC-12	-9.55	760.729	202.632	1318.826	50	947
	23005.970486	42925.21310	0.0129150	9.4548	317.0022	77.0883	233.2993
D . 55	**80016D**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-9.54	759.912	697.280	822.543	51	1033
	23005.327708	42924.11940	0.0016907	15.5894	345.2871	151.4645	132.1948

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 56	**09007D**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	28-DEC-12	-9.51	757.548	-60.796	1575.892	52	202
	23007.198461	42921.99141	0.0193368	3.4294	71.8012	302.5445	261.1110
D . 57	**73100A**	**OPS 9433 (DSCS II F-3)**					
	26-DEC-12	-9.43	750.364	625.353	875.375	52	934
	23005.535718	42914.79280	0.0032658	14.7389	334.4891	94.9841	46.5927
D . 58	**87040A**	**Gorizont 14**					
	27-DEC-12	-9.42	749.638	625.920	873.356	52	1044
	23006.342384	42913.42644	0.0032030	15.5959	4.6467	80.1870	145.5549
D . 59	**81027F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	-9.40	748.115	674.511	821.718	52	1009
	23006.269433	42911.99223	0.0020259	15.9389	348.1604	82.2330	155.2625
D . 60	**79062D**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	-9.37	746.182	727.055	765.308	52	974
	23006.715127	42910.24884	0.0006307	15.6216	344.8469	112.5504	350.8957
D . 61	**86044F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-9.37	745.871	703.328	788.413	52	1026
	23005.792164	42910.15746	0.0012446	15.3221	9.1472	66.0549	348.4408
D . 62	**96005D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-9.36	744.606	691.074	798.137	50	789
	23007.147720	42909.34705	0.0015148	12.5837	41.7238	50.0579	251.6712
D . 63	**86027F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-9.30	740.161	584.806	895.516	51	1013
	23005.592905	42905.17259	0.0037747	15.9343	8.6320	17.8512	59.8571
D . 64	**81069F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	-9.27	737.372	644.717	830.027	52	1012
	23006.619630	42901.82409	0.0024203	15.7798	349.5421	56.9905	30.2305
D . 65	**82113A**	**Raduga 11**					
	26-DEC-12	-9.24	734.984	558.309	911.660	51	950
	23005.918299	42899.17258	0.0039867	15.4600	357.0011	154.6393	290.8216
D . 66	**77071F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-9.13	725.911	676.013	775.808	51	989
	23007.261123	42890.07717	0.0010749	14.8999	337.8800	25.2170	146.8215
D . 67	**01045A**	**Raduga 1-6**					
	28-DEC-12	-9.10	724.181	652.729	795.634	52	569
	23007.158623	42888.73238	0.0017211	8.7453	56.0131	69.5307	262.0181
D . 68	**88028D**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	-8.96	712.775	620.951	804.599	52	1027
	23006.431979	42876.55301	0.0021715	15.4356	15.7845	6.5619	124.0230
D . 69	**85076D**	**Leasat 4**					
	26-DEC-12	-8.91	708.258	681.522	734.995	52	1001
	23005.370880	42872.18283	0.0003613	13.6340	8.2402	251.0076	139.4360

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 70	**86007F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-8.91	708.073	575.132	841.015	52	1010
	23005.795440	42872.44497	0.0033869	15.4288	7.1184	48.4455	345.3896
D . 71	**77108D**	**Mage 1 (Meteosat 1 AKM)**					
	28-DEC-12	-8.89	706.525	324.575	1088.475	49	605
	23007.261019	42870.88590	0.0086053	15.5353	338.6583	9.3279	147.7378
D . 72	**85070F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-8.89	706.501	656.663	756.339	52	1016
	23007.311192	42870.40520	0.0013443	15.4297	5.6877	56.1624	156.6397
D . 73	**88028A**	**Gorizont 15**					
	26-DEC-12	-8.81	700.038	552.527	847.549	50	1052
	23005.989190	42864.28209	0.0038123	15.3802	16.0032	62.3193	284.4346
D . 74	**92043D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-8.79	698.382	591.696	805.068	51	899
	23006.803137	42862.45884	0.0026500	14.1024	31.2698	59.8983	5.7511
D . 75	**89101G**	**Cosmos 2054 debris**					
	26-DEC-12	-8.72	693.293	560.253	826.334	48	643
	23005.999491	42857.66710	0.0028158	14.7620	22.0712	195.7536	286.3084
D . 76	**89098D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-8.71	691.994	614.888	769.101	51	979
	23005.892245	42856.42879	0.0020479	15.0092	22.3020	56.5832	325.5351
D . 77	**90102D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-8.66	688.022	607.908	768.136	50	939
	23006.536736	42852.74271	0.0020388	14.5761	25.2998	71.2210	95.9087
D . 78	**89048D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-8.57	681.125	586.460	775.789	50	947
	23005.979757	42845.60431	0.0023980	14.8542	20.2100	18.1187	291.7431
D . 79	**89030D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-12	-8.46	671.559	597.210	745.907	51	1015
	23010.868218	42836.07444	0.0019849	14.8228	19.3068	69.7943	326.3192
D . 80	**80049F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-8.41	667.704	542.625	792.782	52	1026
	23005.842095	42832.05365	0.0032668	15.6477	347.2501	83.1786	308.7598
D . 81	**88095F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-12	-8.40	667.296	607.901	726.691	51	1006
	23010.702049	42831.36091	0.0014387	14.9433	17.7434	121.9294	24.6659
D . 82	**95067A**	**Telecom 2C**					
	26-DEC-12	-8.40	666.875	604.543	729.207	52	862
	23005.917164	42830.62331	0.0016396	8.1383	55.6424	180.5400	349.5801
D . 83	**92021B**	**Inmarsat 2-F4**					
	28-DEC-12	-8.39	665.892	635.128	696.655	48	998
	23007.056829	42830.29446	0.0003926	7.1151	43.4022	17.5271	285.9831

D .nn	COSPAR	NAME					
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D . 84	**90116D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-8.38	665.638	518.637	812.639	51	999
	23006.543090	42830.71835	0.0033816	14.5428	25.7222	332.5842	93.6376
D . 85	**96034D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-8.37	664.931	528.938	800.925	51	803
	23005.453576	42828.94240	0.0032144	12.4148	42.5917	334.6886	143.7965
D . 86	**88018B**	**Telecom 1C**					
	27-DEC-12	-8.34	662.254	241.257	1083.252	52	987
	23006.811215	42826.27444	0.0100928	13.9086	34.8249	22.0675	6.5607
D . 87	**01014C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	27-DEC-12	-8.31	659.493	-84.532	1403.517	52	581
	23006.380220	42823.49762	0.0165480	9.2572	59.0060	102.3795	187.6539
D . 88	**94008D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-8.30	658.899	564.220	753.577	52	867
	23006.548750	42823.75873	0.0020366	13.5659	36.4042	302.6694	102.2471
D . 89	**89004F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-8.20	650.888	549.249	752.526	51	1018
	23005.381713	42815.13431	0.0024556	14.8519	18.6288	5.1576	145.9834
D . 90	**93013D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-8.14	645.767	575.137	716.396	52	848
	23006.601620	42810.33540	0.0018785	13.9111	33.5199	359.0865	80.4751
D . 91	**91087D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-8.11	643.727	565.221	722.233	52	900
	23007.488831	42808.44102	0.0016611	14.3140	29.1582	312.4777	115.7152
D . 92	**92082D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-8.10	642.485	598.103	686.868	50	892
	23005.402569	42806.33520	0.0010326	14.0087	32.2139	347.9862	151.9814
D . 93	**99010D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-8.02	636.299	548.594	724.005	52	663
	23007.085463	42800.84958	0.0018403	12.0031	52.4162	211.5403	284.5686
D . 94	**96053D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-7.85	622.701	406.897	838.505	51	717
	23007.438090	42786.19757	0.0051417	11.3003	47.1817	186.6509	152.0928
D . 95	**97031A**	**Intelsat VIII F-2**					
	26-DEC-12	-7.79	617.912	511.285	724.540	52	778
	23005.666516	42782.48180	0.0026920	1.7444	72.0102	178.2291	95.7363
D . 96	**94012D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-7.79	617.862	471.598	764.127	52	842
	23006.543819	42782.35825	0.0036379	13.5067	36.2527	355.2704	104.0394
D . 97	**88012A**	**Sakura 3A**					
	31-DEC-12	-7.69	609.891	575.585	644.197	52	1007
	23010.979167	42774.15507	0.0006732	13.5431	37.3655	212.9141	304.0712

D .nn	COSPAR	NAME					
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D . 98	**88063B**	**Eutelsat I F-5 (ECS 5)**					
	31-DEC-12	-7.59	601.677	548.882	654.472	50	974
	23010.850000	42765.37408	0.0012245	14.1173	31.1111	30.4261	344.5605
D . 99	**83088A**	**Raduga 13**					
	28-DEC-12	-7.56	599.170	525.678	672.662	51	934
	23007.104537	42763.52939	0.0015098	15.4759	358.9237	315.6354	224.2181
D . 100	**69069C**	**JPL SR-28-3 (ATS 5 AKM)**					
	26-DEC-12	-7.54	597.368	40.473	1154.262	50	783
	23005.945185	42761.65064	0.0132311	10.9634	322.8879	166.4424	247.2272
D . 101	**00052A**	**Eutelsat W1**					
	27-DEC-12	-7.54	597.298	563.713	630.882	52	622
	23006.552650	42760.97207	0.0011294	1.2250	85.2708	169.4412	148.7123
D . 102	**00049D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-7.50	594.458	520.355	668.562	52	606
	23006.396019	42757.89403	0.0014614	9.5646	52.2063	260.5970	173.1571
D . 103	**89101D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-7.28	576.986	534.053	619.919	51	969
	23006.419907	42741.29317	0.0011552	14.6479	21.9279	83.0347	134.6204
D . 104	**76023J**	**LES 8, LES 9 operational debris**					
	26-DEC-12	-7.25	573.901	-31.017	1178.819	51	792
	23005.618148	42737.54539	0.0157008	11.6529	121.4703	304.3687	161.7871
D . 105	**76023F**	**Titan IIIC stage 3 (Transtage)**					
	28-DEC-12	-7.24	573.499	-22.658	1169.657	52	994
	23007.449977	42737.62223	0.0154910	11.6568	121.4061	305.2795	220.4939
D . 106	**83118A**	**Gorizont 8**					
	27-DEC-12	-7.22	571.503	461.010	681.996	51	940
	23006.579549	42736.00841	0.0029189	15.2817	0.1005	56.3402	55.3078
D . 107	**91001A**	**NATO IVA**					
	26-DEC-12	-7.16	567.196	542.787	591.604	50	1048
	23005.697940	42731.63685	0.0004075	11.4467	32.8415	86.5927	46.0420
D . 108	**85025A**	**Intelsat VA F-10**					
	27-DEC-12	-7.15	566.260	428.521	704.000	52	1100
	23006.186898	42730.91454	0.0031322	14.4972	25.3022	249.7382	221.6332
D . 109	**88109B**	**Astra 1A**					
	28-DEC-12	-6.97	551.844	484.103	619.585	52	985
	23007.860231	42715.52912	0.0015536	10.4751	48.9864	349.1570	1.5441
D . 110	**83066A**	**Gorizont 7**					
	28-DEC-12	-6.94	548.844	500.790	596.897	51	955
	23007.016655	42713.41096	0.0008293	15.3135	358.5822	216.8640	255.6720
D . 111	**79098B**	**OPS 9444 (DSCS II F-14)**					
	27-DEC-12	-6.92	547.737	525.640	569.834	48	1033
	23006.275718	42711.42103	0.0004851	15.3951	353.5497	17.8817	158.1694

D .nn	COSPAR	NAME					
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D . 112	**84081B**	**Telecom 1A**					
	28-DEC-12	-6.74	532.774	377.099	688.448	52	994
	23007.466238	42697.57670	0.0034191	14.8577	18.6505	276.6111	113.1157
D . 113	**82097A**	**Intelsat V F-5**					
	26-DEC-12	-6.71	530.876	424.790	636.963	52	1064
	23005.737836	42695.04889	0.0023026	14.8247	15.4979	283.8694	14.0152
D . 114	**90056A**	**Intelsat VI F-4**					
	27-DEC-12	-6.62	523.600	495.852	551.348	52	996
	23006.629398	42688.35703	0.0005048	9.5929	52.4945	207.2825	89.3403
D . 115	**78113B**	**OPS 9442 (DSCS II F-12)**					
	27-DEC-12	-6.59	521.426	494.215	548.637	49	1006
	23006.151435	42685.60454	0.0007787	15.4348	351.9989	57.6541	201.5408
D . 116	**91074A**	**Gorizont 24**					
	28-DEC-12	-6.59	521.148	442.949	599.347	50	1031
	23007.092106	42685.84678	0.0018344	14.1262	28.3761	124.5355	258.4557
D . 117	**96044B**	**Telecom 2D**					
	28-DEC-12	-6.57	519.850	448.600	591.099	52	807
	23007.795486	42683.95978	0.0017104	5.8864	60.6641	245.2896	36.3354
D . 118	**91015B**	**Meteosat 5**					
	27-DEC-12	-6.56	518.667	497.405	539.929	52	1055
	23006.546493	42683.23978	0.0005503	13.4017	34.9579	139.2528	101.8537
D . 119	**86082A**	**Raduga 19**					
	28-DEC-12	-6.53	516.116	468.243	563.989	52	1034
	23007.337002	42679.84743	0.0013709	14.9975	9.6722	58.4938	151.3160
D . 120	**89021B**	**TDRS 4**					
	27-DEC-12	-6.45	509.510	463.583	555.437	51	1111
	23006.988993	42673.64712	0.0015180	11.2433	32.5047	217.7573	299.5121
D . 121	**78106A**	**NATO IIIC**					
	28-DEC-12	-6.43	508.652	488.024	529.280	52	1022
	23007.312743	42672.88451	0.0002601	14.8201	359.5305	188.5616	149.7861
D . 122	**91015A**	**Astra 1B**					
	27-DEC-12	-6.35	501.676	477.438	525.913	52	871
	23006.493611	42665.40268	0.0007361	6.4815	60.0070	224.8787	145.7535
D . 123	**82020A**	**Gorizont 5**					
	26-DEC-12	-6.27	495.708	354.843	636.573	52	963
	23005.345069	42659.48354	0.0035853	15.6750	351.4990	111.9520	132.4332
D . 124	**90001B**	**JC-Sat 2**					
	27-DEC-12	-6.25	493.768	239.166	748.369	51	1043
	23006.982558	42657.54894	0.0061374	10.3357	59.1261	191.5508	328.3717
D . 125	**79038A**	**OPS 6392 (FLTSATCOM F2)**					
	25-DEC-12	-6.23	492.280	420.441	564.120	51	1114
	23004.379155	42656.36890	0.0015725	15.0589	350.6295	313.8859	119.7249

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 126	**84113C**	**Leasat 1**					
	24-DEC-12	-6.23	491.845	365.789	617.900	51	1001
	23003.630451	42656.59111	0.0028377	13.2442	17.3069	168.5099	56.8682
D . 127	**88040A**	**Intelsat VA F-13 (NSS 513)**					
	24-DEC-12	-6.11	482.642	426.313	538.971	52	1151
	23003.888333	42646.50060	0.0013946	13.6128	34.3220	339.5442	340.6656
D . 128	**94079A**	**Orion 1**					
	27-DEC-12	-6.09	481.049	398.613	563.486	51	858
	23006.652222	42645.89437	0.0019206	7.7806	56.4009	251.4296	84.7860
D . 129	**75011F**	**Aerojet SVM-5 (SMS 2 AKM)**					
	27-DEC-12	-6.07	479.409	55.005	903.812	51	811
	23006.069329	42643.84856	0.0097232	13.5198	332.0710	355.4302	211.0912
D . 130	**81073A**	**FLTSATCOM F5**					
	27-DEC-12	-6.00	473.810	431.725	515.894	51	1018
	23006.982419	42638.65325	0.0010521	19.5438	4.8944	23.3053	274.4461
D . 131	**90063A**	**TDF 2**					
	27-DEC-12	-5.99	472.708	274.613	670.802	51	1003
	23006.289178	42635.84794	0.0050417	12.1940	43.8450	193.2614	203.4296
D . 132	**74033A**	**SMS 1**					
	23-DEC-12	-5.98	472.236	407.011	537.461	50	938
	23002.445185	42637.07067	0.0014706	14.4260	325.4861	291.3477	72.6904
D . 133	**91079D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-5.95	469.959	444.768	495.151	51	897
	23005.850127	42633.73648	0.0005340	14.2113	28.2505	3.6870	346.4892
D . 134	**76029A**	**RCA Satcom II**					
	27-DEC-12	-5.94	468.703	222.415	714.990	51	964
	23006.014572	42633.63417	0.0057712	15.3426	356.3099	103.4502	255.8303
D . 135	**84041D**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-12	-5.93	468.104	403.930	532.277	52	1024
	23010.915197	42632.71024	0.0017841	15.1703	0.6899	83.0799	290.7248
D . 136	**80049A**	**Gorizont 4**					
	26-DEC-12	-5.92	467.612	448.362	486.862	52	943
	23005.936181	42632.07251	0.0001867	15.2175	346.6255	186.3804	273.7955
D . 137	**94047A**	**DirecTV-2**					
	26-DEC-12	-5.90	465.658	419.508	511.809	52	939
	23005.859248	42629.58003	0.0009872	5.4254	62.6634	216.2844	17.3393
D . 138	**82020F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	-5.89	465.291	350.231	580.351	52	1016
	23004.393970	42629.67828	0.0030035	15.7267	351.0596	71.5642	115.2660
D . 139	**88066D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-5.81	458.735	316.471	600.999	52	1010
	23006.312095	42622.08865	0.0035346	14.7325	16.2637	15.7463	167.8527

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 140	**79105E**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-5.72	451.519	382.805	520.233	52	989
	23007.853565	42616.06879	0.0016916	15.1700	344.7200	154.3652	299.8281
D . 141	**92010B**	**Insat-IIDT (Arabsat 1C)**					
	28-DEC-12	-5.72	451.249	349.579	552.919	51	949
	23007.055162	42615.59520	0.0024952	9.0718	53.6224	149.9674	296.9411
D . 142	**87078B**	**Eutelsat I F-4 (ECS 4)**					
	27-DEC-12	-5.71	450.211	415.628	484.794	50	1038
	23006.007546	42614.58905	0.0007416	14.1992	27.2539	283.2295	288.5836
D . 143	**89048A**	**Raduga 1-1**					
	27-DEC-12	-5.64	444.647	364.410	524.884	52	1108
	23006.407384	42608.42104	0.0021767	14.5777	19.7849	24.1133	136.9672
D . 144	**81057A**	**Meteosat 2**					
	27-DEC-12	-5.58	439.888	313.852	565.924	50	1019
	23006.901238	42604.15079	0.0029593	15.1207	4.6446	253.4515	303.1218
D . 145	**83026B**	**TDRS-1**					
	27-DEC-12	-5.51	434.208	345.557	522.859	50	1151
	23006.080093	42598.87322	0.0021590	13.8783	0.6048	132.0612	236.0192
D . 146	**99050A**	**EchoStar 5**					
	27-DEC-12	-5.50	433.544	414.139	452.950	52	677
	23006.255394	42598.40069	0.0004993	3.1808	68.9862	184.0570	240.5267
D . 147	**97016A**	**Thaicom 3**					
	27-DEC-12	-5.48	431.787	78.453	785.120	51	776
	23006.603738	42596.26971	0.0084039	5.7109	62.0245	284.7569	107.1188
D . 148	**84093B**	**SBS IV**					
	27-DEC-12	-5.44	428.867	386.438	471.296	51	1158
	23006.112535	42593.65882	0.0008754	14.0534	26.4067	346.9170	249.9012
D . 149	**00031A**	**Ekspress 3A**					
	28-DEC-12	-5.43	428.483	416.181	440.785	52	638
	23007.247963	42591.86508	0.0002785	4.0412	66.1466	101.0407	239.7820
D . 150	**89070C**	**Star 27 (Himawari-4 AKM)**					
	27-DEC-12	-5.43	428.239	-634.435	1490.914	50	627
	23006.703565	42592.67409	0.0241927	14.1525	20.7672	290.1320	28.3335
D . 151	**87022F**	**Star 27 (GOES 7 AKM)**					
	26-DEC-12	-5.41	426.751	-4173.511	5027.012	50	372
	23005.931944	42591.27861	0.1064289	15.1166	5.5975	312.5158	285.7349
D . 152	**91060A**	**Yuri 3B**					
	23-DEC-12	-5.34	421.180	398.336	444.025	51	942
	23002.796192	42585.01356	0.0005878	11.1885	36.8084	41.8546	17.4748
D . 153	**84081A**	**Eutelsat I F-2 (ECS 2)**					
	31-DEC-12	-5.32	419.048	386.181	451.915	52	1027
	23010.952824	42583.37618	0.0009075	14.7695	17.8590	75.6548	294.2162

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 154	**95025A**	**GOES 9**					
	28-DEC-12	-5.30	418.229	397.974	438.485	52	892
	23007.227569	42582.77305	0.0004102	8.2590	55.1145	16.2910	236.0522
D . 155	**90077A**	**Yuri 3A**					
	27-DEC-12	-5.27	415.316	376.310	454.323	51	1010
	23006.055336	42579.72382	0.0009377	12.6543	44.5882	148.0923	288.7815
D . 156	**83081A**	**Sakura 2B**					
	24-DEC-12	-5.26	414.698	392.142	437.255	48	971
	23003.633287	42579.38167	0.0002750	15.0132	9.5224	330.4334	47.9838
D . 157	**86007A**	**Raduga 18**					
	27-DEC-12	-5.26	414.555	113.995	715.116	51	1008
	23006.627523	42579.28112	0.0076019	15.0466	6.3157	68.7076	44.7424
D . 158	**72090A**	**Anik A1**					
	31-DEC-12	-5.20	410.109	350.403	469.816	52	907
	23010.650995	42573.86134	0.0015194	14.5712	343.5774	67.4808	8.9441
D . 159	**04001A**	**Estrela do Sul 1 (Telstar 14)**					
	27-DEC-12	-5.19	409.143	391.229	427.057	52	450
	23006.098356	42573.36164	0.0003824	1.2974	73.4093	216.9835	300.9329
D . 160	**71006A**	**Intelsat IV F-2**					
	27-DEC-12	-5.17	407.333	346.396	468.271	52	957
	23006.890394	42572.18627	0.0011737	13.8829	334.2435	321.4960	276.8801
D . 161	**81050A**	**Intelsat V F-1**					
	26-DEC-12	-5.10	401.985	379.940	424.030	52	1092
	23005.729560	42566.15874	0.0003924	14.8953	9.3410	133.8838	11.1358
D . 162	**83058A**	**Eutelsat I F-1 (ECS 1)**					
	24-DEC-12	-5.05	398.012	355.696	440.328	51	1053
	23003.772477	42561.81326	0.0010857	14.7698	14.4389	64.5973	2.7820
D . 163	**80098A**	**Intelsat V F-2**					
	26-DEC-12	-4.99	393.424	337.864	448.985	51	1086
	23005.333299	42556.42055	0.0010940	14.7903	11.4647	189.9124	156.2465
D . 164	**94022A**	**GOES 8**					
	26-DEC-12	-4.93	387.934	362.635	413.233	52	943
	23005.579954	42552.36496	0.0005584	8.7191	56.6780	197.7599	112.3288
D . 165	**87078A**	**Optus A3**					
	28-DEC-12	-4.92	387.644	357.685	417.603	51	1021
	23007.391759	42551.10326	0.0004445	12.9204	35.8726	266.1929	157.5506
D . 166	**84113B**	**Arabsat 1D**					
	24-DEC-12	-4.92	387.555	269.918	505.192	51	1071
	23003.781713	42551.33902	0.0025294	14.0695	26.6323	261.1141	11.2350
D . 167	**91046A**	**Gorizont 23**					
	30-DEC-12	-4.92	387.263	361.265	413.261	53	951
	23009.756250	42551.04476	0.0004094	14.2179	26.8617	205.6249	15.0484

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 168	**00069A**	**Beidou**					
	27-DEC-12	-4.91	386.857	310.732	462.982	52	624
	23006.217755	42551.72564	0.0018126	4.0483	67.2530	262.6996	252.2798
D . 169	**77118A**	**Sakura**					
	27-DEC-12	-4.89	385.454	367.139	403.768	51	975
	23006.750301	42548.99740	0.0003217	15.1860	348.0455	13.2880	341.3447
D . 170	**87095A**	**TV-Sat 1**					
	26-DEC-12	-4.88	384.437	130.296	638.577	52	802
	23005.931956	42548.54374	0.0061641	14.6118	11.9316	2.9535	300.6720
D . 171	**91003B**	**Eutelsat II F-2**					
	28-DEC-12	-4.80	378.042	354.800	401.284	52	981
	23007.013391	42542.19177	0.0004938	11.3190	46.3666	21.0429	304.6814
D . 172	**91084A**	**Telecom 2A**					
	26-DEC-12	-4.76	374.788	359.160	390.416	51	1024
	23005.525833	42538.75516	0.0001099	10.1963	49.9547	156.0557	125.2044
D . 173	**98028A**	**EchoStar 4**					
	27-DEC-12	-4.76	374.373	334.476	414.270	52	739
	23006.086725	42539.54704	0.0013745	3.9268	58.1626	187.9241	290.7040
D . 174	**95013A**	**Intelsat VII F-5**					
	27-DEC-12	-4.68	368.386	284.522	452.250	52	890
	23006.111678	42532.79418	0.0018216	2.7496	69.6032	346.2323	292.9014
D . 175	**93073B**	**Meteosat 6**					
	26-DEC-12	-4.64	365.413	346.326	384.499	52	916
	23005.710845	42530.24744	0.0003453	11.0872	44.7155	89.6486	53.2350
D . 176	**93078A**	**DirecTV-1**					
	27-DEC-12	-4.64	364.900	324.852	404.948	52	974
	23006.331539	42529.09852	0.0008737	3.6302	67.7573	69.0635	211.9700
D . 177	**00066A**	**Thuraya 1**					
	27-DEC-12	-4.63	364.766	333.890	395.642	52	610
	23006.978275	42529.01001	0.0006950	5.0755	28.8904	251.6583	299.7425
D . 178	**90091A**	**SBS VI**					
	27-DEC-12	-4.61	363.053	328.406	397.700	52	1071
	23006.141215	42527.74976	0.0007241	4.8222	64.7956	4.3660	277.7269
D . 179	**90001A**	**Skynet 4A**					
	26-DEC-12	-4.60	361.672	311.136	412.209	49	1036
	23005.994641	42526.06490	0.0011685	11.9369	28.5879	187.4487	294.6305
D . 180	**95029A**	**DirecTV-3**					
	27-DEC-12	-4.58	360.493	344.042	376.944	51	864
	23006.708738	42525.55744	0.0001321	3.3452	68.7015	242.6836	76.6150
D . 181	**89087A**	**Intelsat VI F-2**					
	27-DEC-12	-4.56	359.043	335.661	382.424	52	1042
	23006.310752	42523.00863	0.0004156	9.7924	49.9563	46.2649	201.8938

D .nn	COSPAR	NAME					
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D . 182	**91037A**	**Aurora II**					
	28-DEC-12	-4.54	357.103	341.038	373.168	52	1051
	23007.547025	42520.72817	0.0004036	10.4835	49.2516	130.4956	114.9363
D . 183	**92057A**	**Satcom C-4**					
	26-DEC-12	-4.52	356.025	344.553	367.497	51	938
	23005.937384	42519.48657	0.0000475	7.7909	56.3524	358.6208	342.9881
D . 184	**97011A**	**Tempo 2**					
	27-DEC-12	-4.47	351.713	230.448	472.978	51	789
	23006.049016	42515.79123	0.0029707	6.2006	60.3735	191.3343	306.5873
D . 185	**00022A**	**GOES 11**					
	28-DEC-12	-4.43	348.649	328.396	368.901	51	650
	23007.046516	42512.10956	0.0003022	1.5733	107.7424	31.3936	353.1724
D . 186	**94049B**	**Turksat 1B**					
	27-DEC-12	-4.41	347.333	279.876	414.790	51	873
	23006.491968	42510.86173	0.0016519	7.7011	56.5151	343.6170	142.9040
D . 187	**84005A**	**Yuri 2A**					
	27-DEC-12	-4.39	345.606	295.523	395.689	50	988
	23006.043368	42510.80765	0.0009531	14.9238	9.8154	106.7860	258.4027
D . 188	**92010A**	**Superbird B1**					
	28-DEC-12	-4.39	345.330	277.190	413.470	52	1031
	23007.239248	42509.73243	0.0013131	10.1929	49.8636	354.7052	226.5948
D . 189	**89004A**	**Gorizont 17**					
	27-DEC-12	-4.35	342.052	255.122	428.982	50	1135
	23006.772257	42505.61014	0.0022973	14.4954	17.9030	35.3570	3.4247
D . 190	**07063A**	**Rascom-QAF 1**					
	26-DEC-12	-4.35	341.880	296.768	386.993	52	258
	23005.819282	42506.42994	0.0008825	1.9300	74.0376	315.2773	42.6198
D . 191	**92041B**	**Eutelsat II F-4**					
	25-DEC-12	-4.30	338.339	313.784	362.893	51	913
	23004.813299	42502.42628	0.0005455	10.4679	49.7114	135.0761	22.2124
D . 192	**96002A**	**PAS 3R**					
	27-DEC-12	-4.27	335.936	293.438	378.434	52	836
	23006.501065	42499.19812	0.0012191	2.9296	68.5633	162.6159	151.4366
D . 193	**89006A**	**Intelsat VA F-15**					
	27-DEC-12	-4.20	330.539	239.836	421.242	51	1106
	23006.142708	42495.58408	0.0021876	12.7073	40.1655	349.9270	252.7247
D . 194	**85087A**	**Intelsat VA F-12**					
	27-DEC-12	-4.17	327.770	307.896	347.644	52	1101
	23006.275255	42491.90336	0.0005450	14.0411	29.7822	188.4475	194.5444
D . 195	**92084A**	**Superbird A1**					
	28-DEC-12	-4.16	326.990	264.034	389.946	52	991
	23007.442199	42490.04086	0.0014711	5.9389	56.0420	35.2505	159.5340

D .nn	COSPAR	NAME					
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D . 196	**01011B**	**BSAT-2a**					
	27-DEC-12	-4.15	326.695	314.826	338.564	52	589
	23006.314826	42491.58012	0.0002544	1.5423	89.5535	122.9048	239.0874
D . 197	**97016B**	**BSAT-1a**					
	27-DEC-12	-4.15	326.370	314.320	338.419	50	772
	23006.762616	42491.27288	0.0002413	1.9341	65.7884	185.5142	54.0007
D . 198	**83059B**	**Anik C2**					
	26-DEC-12	-4.14	325.626	164.337	486.914	51	1120
	23005.954549	42489.88569	0.0038126	14.4730	21.5121	349.6759	301.9806
D . 199	**97019A**	**GOES 10**					
	27-DEC-12	-4.14	325.470	221.560	429.380	52	794
	23006.322731	42489.61164	0.0026254	6.4962	58.5051	108.8312	206.2830
D . 200	**95044A**	**N-Star 1**					
	28-DEC-12	-4.12	324.207	281.587	366.827	51	841
	23007.052396	42488.35173	0.0010755	6.5019	59.3650	244.9246	303.3591
D . 201	**91026A**	**Anik E2**					
	28-DEC-12	-4.12	324.181	291.332	357.030	51	1068
	23007.779988	42488.30687	0.0006016	8.7084	54.0403	256.6545	35.5064
D . 202	**78044A**	**OTS 2**					
	31-DEC-12	-4.08	320.710	290.052	351.368	51	916
	23010.647917	42484.63972	0.0006201	15.0474	352.5014	220.4417	18.7697
D . 203	**90100B**	**Gstar 4**					
	28-DEC-12	-4.07	320.011	305.127	334.895	51	1098
	23007.010694	42483.92638	0.0002764	9.2699	52.6052	177.0742	311.8378
D . 204	**73058A**	**Intelsat IV F-7**					
	25-DEC-12	-4.06	319.247	294.307	344.187	51	969
	23004.514965	42484.39375	0.0007068	15.0501	347.9043	76.6018	68.1822
D . 205	**95043A**	**JC-Sat 3**					
	28-DEC-12	-4.05	318.361	252.002	384.719	51	841
	23007.539039	42482.40554	0.0014604	7.0409	53.2356	312.6844	121.5883
D . 206	**07003A**	**Beidou 4**					
	26-DEC-12	-4.04	317.676	67.343	568.010	50	298
	23005.599398	42481.23957	0.0060289	1.2047	258.2949	347.0778	308.1532
D . 207	**94040B**	**BS-3N**					
	24-DEC-12	-4.04	317.642	300.740	334.544	52	863
	23003.909977	42481.03020	0.0004270	6.8500	58.8832	282.7592	357.2877
D . 208	**98075A**	**PAS 6B**					
	27-DEC-12	-4.03	316.985	239.203	394.768	52	696
	23006.619190	42481.62003	0.0017661	4.2870	65.4102	42.0493	105.9021
D . 209	**98002A**	**Skynet 4D**					
	27-DEC-12	-4.03	316.834	292.019	341.650	52	718
	23006.069537	42481.54633	0.0005873	8.2359	45.9366	28.8796	284.9359

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 210	**70003A**	**Intelsat III F-6**					
	23-DEC-12	-4.02	315.982	273.369	358.594	49	552
	23002.205127	42479.20517	0.0008850	9.5201	317.4698	322.0899	151.4712
D . 211	**68081S**	**Transtage 5 debris**					
	27-DEC-12	-4.00	314.316	-1046.097	1674.729	14	14
	23006.975440	42478.85075	0.0318574	8.8411	328.3249	265.9403	236.7641
D . 212	**83047A**	**Intelsat V F-6**					
	27-DEC-12	-3.99	313.827	262.691	364.963	48	1051
	23006.439572	42478.14851	0.0026129	14.5674	18.7488	188.2669	124.1700
D . 213	**91067A**	**Anik E1**					
	28-DEC-12	-3.97	312.222	291.880	332.564	52	1049
	23007.152326	42477.05708	0.0008485	8.6965	54.5460	205.7343	262.5972
D . 214	**95001A**	**Intelsat VII F-4**					
	27-DEC-12	-3.93	309.055	291.022	327.089	52	879
	23006.048519	42472.95270	0.0001632	3.1766	68.3765	71.5147	314.6191
D . 215	**93078B**	**Thaicom 1**					
	28-DEC-12	-3.93	308.568	289.664	327.472	52	899
	23007.258738	42473.38693	0.0003995	3.3621	67.4551	66.4306	236.9058
D . 216	**89027A**	**Tele-X**					
	31-DEC-12	-3.93	308.459	282.134	334.783	52	1016
	23010.325625	42472.00205	0.0002218	13.0401	38.6630	92.6897	181.3490
D . 217	**90100A**	**Satcom C-1**					
	27-DEC-12	-3.92	308.288	283.683	332.894	51	1099
	23006.529213	42472.12281	0.0005820	7.7490	54.1056	272.7442	127.0429
D . 218	**89067A**	**Sirius 1**					
	26-DEC-12	-3.91	307.422	276.547	338.296	52	1023
	23005.983819	42471.28953	0.0008172	11.4818	45.4641	279.5506	315.3348
D . 219	**94040A**	**PAS 2**					
	27-DEC-12	-3.89	305.350	273.251	337.448	51	935
	23006.071319	42469.51892	0.0004135	3.5659	71.2243	291.4641	309.2099
D . 220	**88098A**	**TDF 1**					
	27-DEC-12	-3.88	305.047	280.125	329.969	52	1022
	23006.756366	42469.11418	0.0007260	13.2859	36.6387	115.1008	27.8090
D . 221	**78068A**	**Comstar 3**					
	27-DEC-12	-3.87	304.418	219.121	389.714	52	1003
	23006.470301	42469.28544	0.0019626	14.9947	1.2962	182.9504	95.6506
D . 222	**92054A**	**Optus B1**					
	27-DEC-12	-3.84	302.021	260.969	343.074	52	999
	23006.426516	42465.20719	0.0007902	5.8265	61.2313	6.7456	171.2426
D . 223	**76017A**	**Marisat 1**					
	26-DEC-12	-3.84	301.728	257.683	345.774	50	1047
	23005.207801	42465.05995	0.0012098	14.0792	343.7327	76.7375	173.9694

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 224	**97062A**	**Apstar 2R**					
	28-DEC-12	-3.83	300.840	257.041	344.639	52	784
	23007.267535	42465.20034	0.0010763	0.6032	78.0452	187.0993	215.0309
D . 225	**90074A**	**Thor I**					
	28-DEC-12	-3.83	300.758	287.378	314.138	52	997
	23007.559271	42465.26597	0.0002076	10.1126	50.4752	118.3427	111.7237
D . 226	**82058A**	**Westar V**					
	26-DEC-12	-3.81	299.238	232.442	366.034	52	969
	23005.813738	42462.66684	0.0014855	14.4525	22.8693	135.3599	354.3613
D . 227	**94013A**	**Galaxy IR-A**					
	28-DEC-12	-3.79	297.352	284.636	310.067	50	947
	23007.398854	42460.65036	0.0000528	6.1219	58.9876	173.6785	178.0224
D . 228	**88086A**	**Sakura 3B**					
	27-DEC-12	-3.78	296.635	274.668	318.602	51	992
	23006.550741	42461.39068	0.0003146	12.7776	39.9283	228.8227	105.2145
D . 229	**82017A**	**Intelsat V F-4**					
	31-DEC-12	-3.76	295.255	166.735	423.776	53	1052
	23010.947315	42459.99565	0.0035231	14.7072	12.3877	98.3571	291.0373
D . 230	**96040A**	**Arabsat 2A**					
	26-DEC-12	-3.76	295.224	253.502	336.947	51	819
	23005.420104	42458.41647	0.0005867	9.4441	51.6208	301.1747	164.9610
D . 231	**80074A**	**GOES 4**					
	31-DEC-12	-3.76	295.053	145.967	444.139	53	918
	23010.708970	42458.47381	0.0032622	15.1042	352.1565	333.8211	356.2652
D . 232	**06022A**	**KAZSAT**					
	27-DEC-12	-3.74	294.058	278.654	309.463	52	335
	23006.473090	42457.16744	0.0003828	3.1254	69.3138	49.9436	162.3052
D . 233	**04015A**	**Ekspress AM-11**					
	27-DEC-12	-3.73	293.128	271.009	315.247	51	434
	23006.048472	42457.31091	0.0004782	6.0003	60.6489	172.7982	307.1277
D . 234	**92043A**	**Gorizont 26**					
	26-DEC-12	-3.71	291.416	165.507	417.326	52	1029
	23005.820648	42454.85131	0.0031058	13.6439	29.9896	135.6703	359.1124
D . 235	**90030A**	**AsiaSat 1**					
	27-DEC-12	-3.71	291.249	277.389	305.108	52	1043
	23006.584815	42456.23450	0.0001214	11.7955	44.6762	239.1010	97.6660
D . 236	**94049A**	**Brazilsat B1**					
	28-DEC-12	-3.69	289.698	266.031	313.365	52	904
	23007.856053	42453.40235	0.0004077	5.2293	62.9448	44.5554	16.9278
D . 237	**77065A**	**Himawari**					
	27-DEC-12	-3.69	289.550	221.073	358.028	48	938
	23006.059491	42454.31403	0.0019351	14.7789	344.6815	103.8059	227.5650

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 238	**93015A**	**USA 98 (UFO F1)**					
	28-DEC-12	-3.68	288.908	259.901	317.916	52	880
	23007.532454	42453.68181	0.0007476	17.1025	165.9724	103.8893	236.9062
D . 239	**00082A**	**Beidou 1B**					
	27-DEC-12	-3.67	288.489	-34.113	611.091	52	614
	23006.761539	42453.73970	0.0080471	5.0448	62.8933	324.6441	51.3966
D . 240	**75042A**	**Intelsat IV F-1**					
	27-DEC-12	-3.65	286.343	235.092	337.594	51	999
	23006.889873	42450.71152	0.0013135	15.0091	354.1953	128.2160	297.2218
D . 241	**96007A**	**N-Star 2**					
	27-DEC-12	-3.65	286.290	261.190	311.391	51	818
	23006.158738	42451.31454	0.0006579	5.4202	62.4504	174.8379	269.0954
D . 242	**98056A**	**Eutelsat W2**					
	27-DEC-12	-3.64	285.936	268.637	303.235	45	706
	23006.222789	42450.92250	0.0003848	2.6228	71.1121	55.5703	254.3594
D . 243	**04036A**	**GSAT 3 (EDUSAT)**					
	26-DEC-12	-3.62	284.560	269.413	299.708	52	419
	23005.966863	42447.90737	0.0002732	1.9499	73.3962	8.6948	348.7949
D . 244	**02029D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	27-DEC-12	-3.62	284.255	227.034	341.475	51	523
	23006.302338	42448.07356	0.0010795	9.2015	52.4107	264.4185	207.2154
D . 245	**92013A**	**Galaxy V**					
	27-DEC-12	-3.55	278.453	216.351	340.556	52	1051
	23006.729815	42443.57719	0.0015179	7.2035	57.8662	329.1077	58.3520
D . 246	**86016A**	**Yuri 2B**					
	26-DEC-12	-3.54	277.684	201.338	354.030	52	1018
	23005.349398	42440.86369	0.0016386	14.6189	17.6360	90.4545	156.8185
D . 247	**91083A**	**Eutelsat II F-3**					
	27-DEC-12	-3.52	276.039	262.653	289.425	51	980
	23006.309769	42439.92481	0.0000210	11.2034	46.7053	352.0105	198.9841
D . 248	**95064A**	**AsiaSat 2**					
	27-DEC-12	-3.49	273.699	247.447	299.951	52	852
	23006.342465	42437.97826	0.0009058	1.8674	72.8850	202.2475	212.6306
D . 249	**95016B**	**Hot Bird 1**					
	27-DEC-12	-3.45	270.752	256.776	284.728	51	675
	23006.607396	42435.52060	0.0003564	6.1653	60.7866	8.5331	105.5179
D . 250	**92060A**	**Hispasat 1A**					
	25-DEC-12	-3.44	270.213	249.033	291.393	51	928
	23004.871389	42433.72523	0.0004289	9.1626	52.7879	184.5448	4.2530
D . 251	**68081V**	**Transtage 5 debris**					
	26-DEC-12	-3.42	269.022	-1637.869	2175.912	10	10
	23005.971019	42433.26980	0.0445202	8.4913	327.1699	255.0743	236.8556

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 252	**91055A**	**Intelsat VI F-5**					
	28-DEC-12	-3.41	267.992	257.291	278.693	52	1051
	23007.029028	42431.92834	0.0000571	7.4085	57.5626	136.6364	310.1348
D . 253	**68081Q**	**Transtage 5 debris**					
	27-DEC-12	-3.39	266.378	-855.919	1388.675	23	23
	23006.593912	42429.94797	0.0268174	8.8468	328.0915	298.5407	15.2015
D . 254	**87070A**	**Kiku-5**					
	30-DEC-12	-3.38	265.449	229.570	301.328	50	1075
	23009.829850	42428.67825	0.0006551	14.5090	20.8704	297.1934	342.4350
D . 255	**90079B**	**Eutelsat II F-1**					
	27-DEC-12	-3.34	261.853	241.470	282.237	51	943
	23006.450741	42425.03021	0.0001762	11.9639	43.8044	141.1321	145.2201
D . 256	**06053C**	**Fengyun 2D AKM (FG-36 AKM)**					
	27-DEC-12	-3.30	259.209	-175.795	694.212	51	302
	23006.894653	42422.83147	0.0100186	2.7766	73.1151	284.6114	12.7272
D . 257	**81057F**	**Mage 1 (Meteosat 2 AKM)**					
	27-DEC-12	-3.24	254.327	-58.854	567.508	50	774
	23006.400150	42419.71886	0.0075662	15.1549	349.5521	74.9455	110.0846
D . 258	**78071A**	**ESA GEOS 2**					
	28-DEC-12	-3.22	253.023	230.615	275.430	52	942
	23007.160486	42416.42387	0.0001171	14.3560	340.5585	181.6330	185.7879
D . 259	**82106D**	**IUS second stage**					
	26-DEC-12	-3.21	251.741	59.750	443.732	51	966
	23005.995660	42416.91556	0.0043012	15.4184	358.8542	297.0983	264.1202
D . 260	**97002B**	**Nahuel 1A**					
	27-DEC-12	-3.19	250.637	225.482	275.791	52	799
	23006.145544	42415.58223	0.0004627	4.7799	64.0563	80.7368	275.4721
D . 261	**88051C**	**PAS 1**					
	26-DEC-12	-3.17	248.978	229.534	268.422	51	1059
	23005.828495	42412.63822	0.0003086	10.4655	48.9084	240.0525	14.8726
D . 262	**12002C**	**Fengyun 2F AKM (FG-36 AKM)**					
	26-DEC-12	-3.17	248.770	17.362	480.179	44	44
	23005.264468	42414.01969	0.0054427	1.6966	278.4986	256.4843	88.3786
D . 263	**77048A**	**GOES 2**					
	27-DEC-12	-3.15	247.380	182.304	312.456	52	1110
	23006.251644	42410.35262	0.0013224	14.6142	344.9295	279.8116	158.0716
D . 264	**89052A**	**Gorizont 18**					
	28-DEC-12	-3.14	246.586	101.575	391.598	50	1048
	23007.527859	42411.82379	0.0033439	14.3471	19.3950	219.9665	91.7577
D . 265	**85016F**	**Proton-K/DM fourth stage (Blok-DM)**					
	29-DEC-12	-3.13	245.509	138.784	352.234	53	1030
	23008.678206	42409.62135	0.0027319	14.9231	2.3844	114.0869	20.0229

D .nn	COSPAR	NAME					
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D . 266	**97071A**	**Sirius 2**					
	27-DEC-12	-3.13	245.161	227.889	262.432	52	754
	23006.638495	42410.33271	0.0002049	3.5468	67.9560	300.6812	101.2469
D . 267	**95011B**	**Himawari-5**					
	27-DEC-12	-3.12	245.087	213.490	276.684	51	820
	23006.093935	42410.06591	0.0008818	10.3222	47.6664	17.3420	277.8772
D . 268	**83006A**	**Sakura 2A**					
	27-DEC-12	-3.12	244.915	204.758	285.072	52	965
	23006.191736	42408.82839	0.0007737	14.8699	6.1077	192.0574	201.0119
D . 269	**83094A**	**RCA Satcom IIR**					
	26-DEC-12	-3.10	242.823	172.857	312.788	52	1099
	23005.910278	42406.40993	0.0014838	13.7646	32.4498	301.2333	328.8255
D . 270	**84031F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	-3.06	239.716	173.780	305.651	51	1003
	23007.455324	42405.10472	0.0017247	14.9246	359.2670	109.1608	98.2437
D . 271	**94038D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-3.04	238.025	133.378	342.671	51	842
	23005.615081	42403.37853	0.0026890	12.2235	38.3742	15.9860	81.5229
D . 272	**00031D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	27-DEC-12	-3.00	235.595	177.943	293.246	52	621
	23006.662488	42400.94379	0.0014229	10.7386	47.9354	343.3276	72.8392
D . 273	**77041A**	**Intelsat IVA F-4**					
	31-DEC-12	-2.99	234.582	181.807	287.356	51	1011
	23010.672986	42398.19077	0.0013270	14.9535	358.1435	126.1793	15.5328
D . 274	**04011A**	**Superbird A2 (Superbird 6)**					
	27-DEC-12	-2.92	228.994	178.973	279.014	51	436
	23006.311956	42393.33052	0.0028254	7.3064	57.2807	274.4729	208.3674
D . 275	**85048B**	**Morelos 1**					
	28-DEC-12	-2.90	227.176	210.545	243.807	49	1031
	23007.358576	42390.00854	0.0004941	14.0177	29.3535	18.2654	163.0888
D . 276	**94002D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	25-DEC-12	-2.90	227.121	59.655	394.587	52	866
	23004.091586	42392.30334	0.0044563	13.8071	30.1612	13.9739	263.3154
D . 277	**81119A**	**Intelsat V F-3**					
	27-DEC-12	-2.89	226.590	127.806	325.373	51	1067
	23006.045741	42392.16042	0.0023356	14.6513	12.2097	101.4254	260.1107
D . 278	**78062D**	**Aerojet SVM-5 (GOES 3 AKM)**					
	26-DEC-12	-2.87	224.738	-252.943	702.418	51	858
	23005.881447	42389.75627	0.0111951	15.1793	341.9714	308.6369	287.8952
D . 279	**69069A**	**ATS 5**					
	26-DEC-12	-2.81	220.612	200.598	240.625	52	900
	23005.852419	42385.61301	0.0003083	10.3506	320.3763	186.8694	277.8366

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D . 280	**68081W**	**Transtage 5 debris**					
	28-DEC-12	-2.81	220.586	-678.087	1119.259	17	17
	23007.234873	42383.43840	0.0210577	8.4319	326.7679	243.9857	143.0114
D . 281	**75011A**	**SMS 2**					
	27-DEC-12	-2.75	215.330	159.397	271.264	50	887
	23006.561319	42380.04596	0.0014185	14.4228	339.4377	120.1084	41.0869
D . 282	**83077A**	**Arabsat 1D-R**					
	28-DEC-12	-2.70	211.258	103.601	318.915	49	1072
	23007.098009	42376.73965	0.0027944	14.0660	28.3012	33.7712	256.2556
D . 283	**90034A**	**Palapa B-2R**					
	28-DEC-12	-2.68	210.120	165.820	254.421	49	1025
	23007.174653	42375.48753	0.0011522	10.9093	48.1585	5.4353	248.2436
D . 284	**92021A**	**Telecom 2B**					
	27-DEC-12	-2.67	209.490	174.427	244.554	51	991
	23006.793056	42373.98516	0.0010984	10.6151	48.1846	353.5837	25.9869
D . 285	**89020A**	**JC-Sat 1**					
	28-DEC-12	-2.66	208.381	189.872	226.889	51	1035
	23007.291123	42372.08504	0.0004289	12.8040	39.7940	13.8310	197.8579
D . 286	**96033A**	**Galaxy IX**					
	27-DEC-12	-2.64	206.823	164.281	249.365	52	828
	23006.002905	42370.02595	0.0009013	3.8337	66.6247	34.1117	329.4594
D . 287	**90063B**	**DFS-Kopernikus 2**					
	26-DEC-12	-2.61	204.465	189.497	219.432	52	1008
	23005.552002	42369.07566	0.0000998	10.6420	48.2615	164.5597	114.0734
D . 288	**85015B**	**Brazilsat 1**					
	27-DEC-12	-2.61	204.275	186.752	221.798	52	1123
	23006.746528	42368.31836	0.0002194	13.7844	31.3334	235.6081	25.9631
D . 289	**81076A**	**Himawari-2**					
	27-DEC-12	-2.60	203.343	159.114	247.572	50	937
	23006.402824	42367.94866	0.0008698	14.9408	353.0316	174.0031	111.7604
D . 290	**86003B**	**Satcom Ku-1**					
	26-DEC-12	-2.59	202.965	185.847	220.083	51	1102
	23005.701111	42367.97335	0.0001139	13.0681	37.7416	41.2806	49.7656
D . 291	**00019D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	28-DEC-12	-2.58	201.949	144.101	259.796	52	625
	23007.735567	42366.79081	0.0013247	11.0852	47.1905	191.0437	44.7676
D . 292	**85109B**	**Morelos 2**					
	26-DEC-12	-2.55	200.072	176.421	223.723	52	1158
	23005.262442	42364.45664	0.0006400	12.0765	42.6782	9.0662	213.0405
D . 293	**91028A**	**Spacenet 4**					
	28-DEC-12	-2.53	198.548	186.094	211.001	51	1067
	23007.684340	42364.34998	0.0002323	8.1883	54.9781	222.3444	71.0021

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 294	**01014A**	**Ekran 21 (Ekran-M)**					
	26-DEC-12	-2.47	193.372	64.227	322.516	52	600
	23005.934236	42356.22291	0.0029948	8.9047	58.4981	302.2761	345.9981
D . 295	**82004A**	**RCA Satcom IV**					
	27-DEC-12	-2.46	192.980	173.487	212.474	52	1012
	23006.554144	42358.45018	0.0003077	14.4181	21.4480	72.4585	85.5841
D . 296	**91075A**	**Intelsat VI F-1**					
	27-DEC-12	-2.46	192.556	181.926	203.185	52	1008
	23006.702928	42358.36143	0.0002482	7.3825	56.4247	238.6069	66.6835
D . 297	**94065B**	**Thaicom 2**					
	27-DEC-12	-2.46	192.488	177.795	207.180	51	843
	23006.136539	42357.48296	0.0001694	2.4589	70.0527	19.1299	284.3654
D . 298	**96006A**	**Palapa C1**					
	28-DEC-12	-2.45	191.838	156.256	227.419	52	849
	23007.017975	42357.41349	0.0005625	0.9613	77.9599	55.9167	256.6911
D . 299	**75117A**	**RCA Satcom I**					
	27-DEC-12	-2.43	190.047	94.986	285.108	50	955
	23006.311840	42352.21427	0.0020025	14.8968	353.2901	136.3687	145.0197
D . 300	**85109D**	**Satcom Ku-2**					
	27-DEC-12	-2.40	188.118	154.532	221.703	52	1144
	23006.389178	42350.50961	0.0008580	12.8412	38.9615	148.5129	162.6499
D . 301	**71116A**	**Intelsat IV F-3**					
	25-DEC-12	-2.35	183.729	129.861	237.597	49	988
	23004.319618	42346.95685	0.0011651	14.7274	344.2331	350.6946	134.9309
D . 302	**97070D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	-2.30	180.315	115.375	245.254	48	719
	23005.842824	42342.90734	0.0017319	12.5082	40.6298	21.8271	1.5594
D . 303	**86026B**	**Brazilsat 2**					
	28-DEC-12	-2.28	178.208	162.743	193.674	52	1149
	23007.316400	42341.24752	0.0001817	13.0732	36.8788	240.4702	185.7927
D . 304	**00002A**	**Galaxy 10R**					
	28-DEC-12	-2.28	178.169	162.431	193.907	52	664
	23007.715139	42344.13467	0.0002263	4.1014	65.9542	16.3287	70.7037
D . 305	**93069A**	**Gorizont 28**					
	28-DEC-12	-2.24	175.009	30.178	319.840	52	988
	23007.324595	42337.75788	0.0034353	13.2086	33.8407	36.2947	180.0532
D . 306	**99016A**	**Insat 2E**					
	26-DEC-12	-2.22	174.117	149.711	198.523	52	687
	23005.586667	42337.69613	0.0006287	2.1031	72.3111	134.7226	125.0571
D . 307	**00016B**	**Insat 3B**					
	27-DEC-12	-2.22	173.600	153.445	193.755	51	645
	23006.246748	42338.58632	0.0002969	1.0101	76.4754	131.7527	250.1762

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 308	**88018A**	**Spacenet 3R**					
	28-DEC-12	-2.20	172.248	157.363	187.132	51	1058
	23007.361215	42334.87861	0.0002800	11.4640	45.2539	86.1684	178.0203
D . 309	**85028B**	**Anik C1**					
	26-DEC-12	-2.20	171.820	108.773	234.866	52	1088
	23005.466563	42334.96725	0.0016237	12.9184	39.0032	13.1445	135.7257
D . 310	**95041A**	**Mugunghwa 1 (Koreasat 1)**					
	27-DEC-12	-2.18	170.447	153.584	187.310	52	813
	23006.223183	42335.57183	0.0003375	11.6757	44.3863	50.6440	227.9553
D . 311	**88109A**	**Skynet 4B**					
	27-DEC-12	-2.12	165.969	148.854	183.084	51	1043
	23006.941481	42330.78075	0.0002891	14.4141	23.2672	166.7502	307.5592
D . 312	**76010A**	**Intelsat IVA F-2**					
	28-DEC-12	-2.11	165.144	142.307	187.981	50	979
	23007.474375	42331.03894	0.0005288	14.8786	352.8572	133.2509	84.8113
D . 313	**83105A**	**Intelsat V F-7**					
	28-DEC-12	-2.08	162.759	134.028	191.491	51	1046
	23007.254919	42325.83931	0.0005130	14.5193	16.7031	335.4394	187.8156
D . 314	**92072A**	**Galaxy VII**					
	26-DEC-12	-2.07	161.962	129.497	194.427	52	981
	23005.407731	42324.16079	0.0008860	10.6508	47.9961	271.8843	165.7823
D . 315	**97078A**	**Galaxy VIII-i**					
	27-DEC-12	-2.06	161.477	132.483	190.471	52	757
	23006.093507	42326.63151	0.0006516	9.0997	52.5473	281.0080	282.7831
D . 316	**91074D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-2.04	159.843	146.359	173.326	50	885
	23007.345139	42322.11204	0.0003901	13.9044	27.2246	37.6414	165.8258
D . 317	**93048A**	**Hispasat 1B**					
	27-DEC-12	-1.98	154.644	127.146	182.143	52	883
	23006.063148	42319.17320	0.0009567	8.2897	54.3706	196.0188	295.5906
D . 318	**92066A**	**DFS-Kopernikus 3**					
	27-DEC-12	-1.95	152.796	134.851	170.741	51	937
	23006.257141	42317.60170	0.0003567	9.7562	50.6050	66.7929	221.8983
D . 319	**89041A**	**Superbird A**					
	27-DEC-12	-1.89	148.209	121.700	174.718	52	968
	23006.354560	42310.51948	0.0005544	14.4779	18.0356	264.5270	154.1216
D . 320	**84080E**	**Star 27 (Himawari-3 AKM)**					
	28-DEC-12	-1.89	147.956	-434.529	730.441	49	588
	23007.323403	42311.40739	0.0134215	14.7837	2.4228	335.2079	148.1900
D . 321	**84114A**	**Spacenet 2**					
	24-DEC-12	-1.86	145.493	105.184	185.802	52	1082
	23003.936296	42308.39294	0.0008930	12.8535	38.7953	324.3120	327.8057

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 322	**90091B**	**Galaxy VI**					
	25-DEC-12	-1.84	143.963	127.941	159.984	51	1038
	23004.629398	42309.98365	0.0003226	9.0555	52.6954	85.7948	91.5517
D . 323	**85076B**	**Optus A1**					
	26-DEC-12	-1.84	143.772	124.627	162.917	50	940
	23005.321354	42306.09534	0.0001985	14.2091	25.2061	298.4667	174.3012
D . 324	**82014A**	**Westar IV**					
	25-DEC-12	-1.81	141.388	124.359	158.417	51	1027
	23004.726470	42305.28036	0.0003684	14.3796	20.9485	142.9359	24.8323
D . 325	**84093D**	**Telstar 3C**					
	27-DEC-12	-1.78	138.962	119.502	158.423	50	1099
	23006.614769	42305.48926	0.0005050	13.6815	32.0966	21.0985	74.3291
D . 326	**95067B**	**Insat-IIC**					
	25-DEC-12	-1.77	138.317	118.437	158.197	52	809
	23004.711134	42304.70654	0.0004444	9.5665	52.1957	246.0114	61.4688
D . 327	**74093A**	**Intelsat IV F-8**					
	27-DEC-12	-1.75	136.987	114.248	159.726	51	984
	23006.180556	42300.05417	0.0005569	14.8526	353.4300	59.0234	192.4418
D . 328	**88081B**	**SBS V**					
	27-DEC-12	-1.73	135.636	111.536	159.736	52	1098
	23006.637569	42302.17712	0.0005061	11.1496	46.3048	202.9110	80.2329
D . 329	**86026A**	**Gstar 2**					
	25-DEC-12	-1.72	134.699	116.271	153.127	51	1085
	23004.916007	42297.10107	0.0003924	13.6382	32.7004	339.4697	328.1163
D . 330	**73023A**	**Anik A2**					
	28-DEC-12	-1.71	133.759	76.325	191.193	49	927
	23007.335336	42297.01687	0.0010121	14.7718	347.4926	295.2567	129.4869
D . 331	**92059D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	21-DEC-12	-1.71	133.568	84.230	182.906	50	889
	23000.893368	42296.55577	0.0009098	13.7812	29.9533	197.4945	337.4509
D . 332	**78116A**	**Anik B1**					
	27-DEC-12	-1.65	128.795	93.966	163.624	51	1001
	23006.472373	42295.24459	0.0019544	14.7736	2.4365	201.3490	95.9710
D . 333	**80091A**	**SBS I**					
	27-DEC-12	-1.62	126.909	97.273	156.545	50	1055
	23006.020475	42293.12278	0.0008667	14.9231	4.5605	43.9750	261.3756
D . 334	**76042A**	**Comstar 1A**					
	26-DEC-12	-1.62	126.831	109.237	144.426	52	985
	23005.154039	42290.56714	0.0001760	14.8385	353.5221	192.8740	203.0268
D . 335	**94067A**	**Ekspress 1**					
	27-DEC-12	-1.61	125.938	107.789	144.087	51	918
	23006.047616	42290.72558	0.0004170	10.8811	47.0676	103.6799	294.0206

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 336	**72003A**	**Intelsat IV F-4**					
	27-DEC-12	-1.60	124.754	104.990	144.518	52	1000
	23006.516285	42291.36051	0.0003928	14.7295	346.5325	33.7558	64.3186
D . 337	**84080A**	**Himawari-3**					
	27-DEC-12	-1.59	124.008	93.388	154.628	52	943
	23006.539433	42290.74423	0.0007122	14.6178	9.1795	22.9526	78.6234
D . 338	**00020A**	**Galaxy IVR**					
	28-DEC-12	-1.58	123.133	108.726	137.540	52	650
	23007.048796	42287.08285	0.0002362	5.6772	61.3638	78.9199	306.7622
D . 339	**84101A**	**Galaxy III**					
	28-DEC-12	-1.56	122.332	91.358	153.306	50	1113
	23007.356759	42284.03291	0.0005317	13.6952	31.9072	282.0452	166.2171
D . 340	**76035A**	**NATO IIIA**					
	26-DEC-12	-1.55	120.849	18.155	223.544	52	1001
	23005.376331	42285.68487	0.0022784	13.1330	342.9068	185.9563	112.1536
D . 341	**03018A**	**GSAT-2**					
	26-DEC-12	-1.53	119.245	102.760	135.730	52	490
	23005.349444	42283.54986	0.0004820	1.7771	73.4056	228.0733	211.5617
D . 342	**89062A**	**TV-Sat 2**					
	26-DEC-12	-1.52	119.181	87.680	150.683	52	997
	23005.395868	42280.85143	0.0003252	12.1624	42.1753	100.2144	164.4014
D . 343	**92017A**	**Gorizont 25**					
	27-DEC-12	-1.52	119.065	4.248	233.882	49	1071
	23006.873102	42281.30504	0.0027066	13.7225	28.5224	344.2047	337.3994
D . 344	**74075A**	**Westar II**					
	27-DEC-12	-1.51	117.962	98.152	137.771	52	896
	23006.595058	42282.98807	0.0005158	14.7196	349.8065	86.1070	39.1918
D . 345	**83030A**	**RCA Satcom IR**					
	28-DEC-12	-1.49	116.690	73.985	159.395	52	1020
	23007.381586	42279.24538	0.0009781	14.1931	24.8724	4.2964	150.2933
D . 346	**99047A**	**Yamal-100 No. 1**					
	28-DEC-12	-1.47	114.733	-268.477	497.944	51	642
	23007.350903	42276.81036	0.0084673	11.4158	45.1849	289.2827	180.7313
D . 347	**84022F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	-1.46	113.765	13.617	213.914	52	1002
	23004.926007	42278.82372	0.0024627	15.9651	357.2085	16.5045	289.1138
D . 348	**87028D**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	-1.45	113.397	-3.012	229.807	52	1008
	23006.331308	42274.86158	0.0027911	15.3697	9.0352	344.8726	153.4934
D . 349	**85048D**	**Telstar 3D**					
	27-DEC-12	-1.43	111.641	99.005	124.278	51	1105
	23006.223241	42276.50700	0.0002365	13.5510	33.1347	66.0474	216.7032

D .nn	COSPAR	NAME					
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D . 350	**95063A**	**Gals 2**					
	27-DEC-12	-1.39	108.756	81.192	136.320	51	877
	23006.852650	42271.06935	0.0006084	10.7413	47.5811	228.0164	3.8428
D . 351	**96005A**	**Gorizont 31**					
	25-DEC-12	-1.38	107.548	21.872	193.224	50	865
	23004.703368	42273.88276	0.0021321	12.1747	40.3321	99.5371	52.7403
D . 352	**91064B**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-1.36	106.334	88.213	124.455	49	892
	23006.110370	42273.27558	0.0002503	14.0293	26.2130	337.8481	250.4956
D . 353	**74022A**	**Westar I**					
	28-DEC-12	-1.35	105.391	77.474	133.308	52	920
	23007.367662	42269.43462	0.0003476	14.7328	348.8198	265.2884	119.2125
D . 354	**87022A**	**GOES 7**					
	27-DEC-12	-1.34	105.018	89.086	120.950	52	1142
	23006.210509	42269.62475	0.0002777	14.1290	23.6078	327.8883	211.7384
D . 355	**82110C**	**Anik C3**					
	27-DEC-12	-1.32	103.288	86.898	119.679	49	1100
	23006.864109	42265.47948	0.0003093	14.3701	20.2129	8.5799	332.4329
D . 356	**78002A**	**Intelsat IVA F-3**					
	28-DEC-12	-1.31	102.379	85.620	119.138	52	978
	23007.170278	42265.87120	0.0003656	14.7725	359.6652	109.3177	201.3911
D . 357	**87029A**	**Agila 1**					
	28-DEC-12	-1.30	101.804	80.990	122.618	51	1091
	23007.105544	42268.44455	0.0003079	13.3282	35.1138	317.8672	260.1400
D . 358	**75091A**	**Intelsat IVA F-1**					
	31-DEC-12	-1.24	96.733	73.196	120.271	52	994
	23010.908137	42262.38889	0.0006887	14.7771	353.1936	97.5495	285.6467
D . 359	**82110B**	**SBS III**					
	27-DEC-12	-1.22	95.339	58.855	131.822	50	1123
	23006.670579	42261.94621	0.0007222	14.3531	20.4282	345.6368	42.4793
D . 360	**92027A**	**Palapa B4**					
	28-DEC-12	-1.20	93.713	75.189	112.238	51	957
	23007.459225	42254.55300	0.0001912	7.1935	56.7646	289.1970	154.0254
D . 361	**82009A**	**Ekran 8**					
	27-DEC-12	-1.20	93.398	-22.653	209.448	50	1033
	23006.493843	42261.49932	0.0026184	14.8125	348.1693	202.7268	73.9171
D . 362	**85109C**	**Optus A2**					
	27-DEC-12	-1.18	92.467	77.529	107.405	49	1120
	23006.417535	42254.34670	0.0001316	14.0155	26.5216	192.6318	139.9326
D . 363	**79072A**	**Westar III**					
	27-DEC-12	-1.17	91.728	74.505	108.950	52	946
	23006.208866	42254.57104	0.0000432	14.6670	7.0678	185.3562	195.8123

D .nn	COSPAR	NAME					
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D . 364	**74101A**	**Symphonie A**					
	28-DEC-12	-1.13	88.436	70.136	106.736	51	904
	23007.188079	42250.93241	0.0002324	13.8792	335.9791	170.7295	171.2435
D . 365	**91003A**	**Italsat 1**					
	26-DEC-12	-1.11	86.454	24.324	148.584	52	956
	23005.108947	42253.74247	0.0012462	12.8398	38.3763	281.7784	264.0076
D . 366	**80081F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-1.10	86.340	62.056	110.625	50	999
	23005.432176	42253.72894	0.0002119	14.5257	343.8557	294.6516	92.9385
D . 367	**75077A**	**Symphonie B**					
	26-DEC-12	-1.09	85.020	62.165	107.876	48	937
	23005.591586	42248.50795	0.0003367	13.5083	334.1554	245.8791	25.6918
D . 368	**93048B**	**Insat-IIB**					
	27-DEC-12	-1.09	85.001	20.439	149.563	51	890
	23006.409190	42245.11906	0.0015537	10.7082	47.6318	82.3977	164.1929
D . 369	**88071A**	**Gorizont 16**					
	28-DEC-12	-1.07	83.800	22.219	145.380	51	1031
	23007.533553	42251.38551	0.0012844	14.3618	15.1389	321.8694	85.6017
D . 370	**76073A**	**Comstar 2**					
	27-DEC-12	-1.06	82.936	67.481	98.391	50	1094
	23006.352350	42245.47060	0.0003077	14.7293	353.7647	62.9601	130.7438
D . 371	**84049A**	**Chinasat 5 (Spacenet 1)**					
	27-DEC-12	-1.04	80.914	62.104	99.724	52	1120
	23006.206991	42247.05456	0.0001726	13.2786	35.3050	137.2508	224.7243
D . 372	**93073E**	**Mage 1 (Meteosat 6 AKM)**					
	27-DEC-12	-1.03	80.688	-202.562	363.938	46	679
	23006.803646	42242.15836	0.0065678	13.3918	33.9498	335.9913	7.6757
D . 373	**99047B**	**Yamal-100 No. 2**					
	28-DEC-12	-1.03	80.315	69.228	91.401	52	684
	23007.144132	42247.57178	0.0002149	8.3207	54.3534	241.0048	265.3781
D . 374	**97041D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	23-DEC-12	-0.97	75.694	-1387.279	1538.668	52	739
	23002.880972	42236.52736	0.0355082	11.5554	44.0047	169.2829	354.7765
D . 375	**09010B**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-0.95	74.763	63.986	85.539	52	192
	23006.429942	42237.91875	0.0000832	2.4040	94.1221	86.8396	202.4177
D . 376	**77014A**	**Kiku-2**					
	25-DEC-12	-0.95	74.190	56.183	92.197	46	856
	23004.490914	42242.59658	0.0000744	14.1828	339.4848	181.9466	68.3668
D . 377	**90016D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-0.88	69.156	-99.887	238.199	52	926
	23006.956817	42234.24571	0.0041351	14.1791	20.9652	103.4332	300.1731

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 378	**90112D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-0.88	69.103	-43.047	181.254	52	953
	23006.176655	42235.55076	0.0029195	14.0152	24.0025	45.9487	224.6108
D . 379	**81057B**	**APPLE**					
	26-DEC-12	-0.85	66.619	-32.968	166.206	49	946
	23005.594213	42232.42877	0.0027455	14.7402	348.3722	86.8735	39.3026
D . 380	**77092J**	**Ekran 2 fragmentation debris**					
	27-DEC-12	-0.83	65.249	1.644	128.855	49	433
	23006.537049	42231.88555	0.0011840	13.7147	334.8790	136.9681	45.2416
D . 381	**03053E**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	28-DEC-12	-0.83	65.006	-843.797	973.810	51	445
	23007.265845	42230.99815	0.0225338	8.1773	55.1264	174.6961	222.4584
D . 382	**77018A**	**Palapa 2**					
	23-DEC-12	-0.83	64.906	41.386	88.426	47	921
	23002.396238	42228.39251	0.0003563	14.7605	357.9693	2.9060	122.9983
D . 383	**87084D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-0.81	63.717	-56.604	184.038	50	1015
	23006.283171	42223.65222	0.0030074	14.3936	11.9357	106.4814	174.1858
D . 384	**83028F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	-0.81	63.476	-41.327	168.278	51	1006
	23004.788657	42224.14256	0.0028084	14.8301	355.1521	83.3602	336.8780
D . 385	**98025D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-0.81	63.153	-70.922	197.228	51	712
	23007.548796	42228.36493	0.0033808	10.1460	47.1468	1.0662	112.1676
D . 386	**75038A**	**Anik A3**					
	24-DEC-12	-0.80	62.918	43.895	81.940	51	942
	23003.804201	42223.92932	0.0001484	14.7630	352.3569	19.1827	329.1392
D . 387	**92088D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-0.75	58.652	15.835	101.469	52	898
	23006.731123	42224.19995	0.0011915	12.8138	33.6934	23.8052	33.9543
D . 388	**94060D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-0.71	55.605	21.463	89.747	52	810
	23005.678889	42224.72464	0.0010301	12.8749	36.5554	11.5197	56.6147
D . 389	**94087D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	-0.70	54.794	9.374	100.213	51	822
	23006.281447	42217.66180	0.0011761	12.7619	37.4910	5.7401	200.0290
D . 390	**00032A**	**Fengyun 2B**					
	25-DEC-12	-0.67	52.207	37.383	67.032	52	636
	23004.892199	42212.15001	0.0001036	7.2652	56.9039	278.7617	0.8035
D . 391	**76066A**	**Palapa 1**					
	26-DEC-12	-0.65	51.013	32.244	69.782	52	898
	23005.702072	42211.51552	0.0005558	14.6972	353.7934	86.8590	5.5387

D .nn	COSPAR	NAME					
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D . 392	**85055A**	**Intelsat VA F-11**					
	27-DEC-12	-0.63	49.137	-5.405	103.678	52	1083
	23006.791424	42209.19845	0.0012511	14.1080	25.3845	324.1161	3.7530
D . 393	**88034D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-12	-0.61	47.352	-56.709	151.414	52	1008
	23004.849641	42208.05957	0.0026805	14.4811	13.3886	55.5145	333.0415
D . 394	**75097F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	-0.58	45.565	-50.268	141.398	52	978
	23004.279583	42206.48376	0.0024184	12.3292	327.8048	77.2925	133.2585
D . 395	**72041A**	**Intelsat IV F-5**					
	28-DEC-12	-0.58	45.463	27.570	63.355	50	973
	23007.290556	42205.07107	0.0004754	14.3512	341.7840	107.8687	140.1039
D . 396	**81114A**	**RCA Satcom IIIR**					
	21-DEC-12	-0.56	44.048	26.438	61.658	52	958
	23000.455567	42207.61635	0.0002558	14.4110	18.1532	188.3518	123.7256
D . 397	**04010F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-0.56	43.702	-82.265	169.669	52	432
	23005.577014	42208.00195	0.0026767	6.8210	64.7862	240.0560	121.1887
D . 398	**82082A**	**Anik D1**					
	26-DEC-12	-0.56	43.687	18.482	68.892	51	1013
	23005.900278	42205.50833	0.0003742	14.3418	19.0431	213.4352	319.1558
D . 399	**93003D**	**IUS second stage**					
	27-DEC-12	-0.55	43.214	-245.669	332.097	50	867
	23006.365081	42200.40644	0.0069346	12.2353	24.8760	357.6654	157.1849
D . 400	**94069D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	-0.55	43.151	-54.216	140.518	52	811
	23007.638032	42214.82372	0.0025028	13.1652	36.6770	15.2854	69.5835
D . 401	**91010F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-0.52	41.144	-26.840	109.128	50	942
	23005.158912	42210.80797	0.0018145	13.4545	27.7434	87.8599	235.6990
D . 402	**83065A**	**Galaxy I**					
	27-DEC-12	-0.52	40.521	26.400	54.641	50	1076
	23006.980463	42206.44469	0.0000200	13.8917	28.5349	103.9801	298.7443
D . 403	**77092K**	**Ekran 2 fragmentation debris**					
	27-DEC-12	-0.51	40.371	-29.924	110.666	49	327
	23006.225139	42196.92523	0.0016946	13.5740	334.4421	186.2957	157.2813
D . 404	**04043D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	-0.50	39.627	8.906	70.349	52	410
	23005.781157	42207.08939	0.0009156	7.3086	56.1950	14.5906	39.2434
D . 405	**99047E**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	-0.49	38.499	-409.408	486.407	52	639
	23005.187720	42209.41741	0.0099796	11.3663	45.1243	287.9785	241.3570

D .nn	COSPAR	NAME					
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D . 406	**91015E**	**Mage 1 (Meteosat 5 AKM)**					
	27-DEC-12	-0.49	38.359	-638.026	714.745	52	676
	23006.757917	42198.48527	0.0158411	13.5046	22.5422	100.1498	14.8813
D . 407	**81096A**	**SBS II**					
	25-DEC-12	-0.48	38.002	14.112	61.893	50	1105
	23004.917870	42203.33763	0.0005647	14.5938	7.5095	80.5551	302.3365
D . 408	**93072A**	**Gorizont 29**					
	27-DEC-12	-0.48	37.467	-12.628	87.561	52	971
	23006.159653	42208.31056	0.0009729	13.1709	33.7720	240.9874	240.1685
D . 409	**99009A**	**Arabsat 3A**					
	28-DEC-12	-0.44	35.211	14.428	55.995	51	684
	23007.342257	42199.82942	0.0004909	3.7133	67.2074	222.2351	206.4710
D . 410	**85107A**	**Raduga 17**					
	27-DEC-12	-0.41	32.215	-16.307	80.738	50	1016
	23006.893912	42197.56451	0.0013609	14.5116	4.2421	83.1569	305.8490
D . 411	**95045D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-0.40	32.202	-57.512	121.916	52	793
	23005.734618	42200.98376	0.0019086	12.4325	39.5419	288.4811	39.2464
D . 412	**79035E**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-0.38	29.978	-94.712	154.668	52	980
	23005.382650	42200.59073	0.0030963	14.1725	339.1408	107.0096	106.4663
D . 413	**00032C**	**Fengyun 2B AKM**					
	27-DEC-12	-0.37	30.466	-76.779	137.711	42	533
	23006.360023	42187.98044	0.0023060	9.9881	51.4867	270.1082	185.3407
D . 414	**83059C**	**Palapa Pacific System**					
	28-DEC-12	-0.33	26.728	4.870	48.585	52	1024
	23007.210197	42191.35899	0.0004321	14.4096	15.4516	0.5613	202.7329
D . 415	**96034A**	**Gorizont 32**					
	28-DEC-12	-0.32	26.777	-6.253	59.808	52	855
	23007.515093	42191.58334	0.0007420	12.0527	41.1165	249.9684	308.4604
D . 416	**00036D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-0.30	24.355	-59.335	108.046	52	607
	23005.510868	42186.86909	0.0019365	9.4557	50.6951	309.1274	131.1609
D . 417	**92082A**	**Gorizont 27**					
	26-DEC-12	-0.30	23.833	-32.327	79.993	52	1017
	23005.502662	42194.17797	0.0011333	13.5608	30.6127	264.5549	114.1428
D . 418	**87091D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	-0.29	5.723	-80.287	91.732	52	1016
	23005.278831	42173.95882	0.0021177	14.3771	11.2877	119.5849	175.9645
D . 419	**83098A**	**Galaxy II**					
	28-DEC-12	-0.27	22.371	-5.157	49.898	52	1116
	23007.343299	42174.96216	0.0005546	13.8371	28.9263	340.0681	168.1364

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D . 420	**92041A**	**Insat-IIA**					
	27-DEC-12	-0.25	20.264	3.320	37.207	52	964
	23006.444444	42179.03112	0.0004097	12.7055	38.8952	144.6627	142.6060
D . 421	**81102F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	-0.24	20.348	-29.170	69.865	52	990
	23005.632060	42188.08150	0.0013265	14.5522	346.6657	79.9018	23.7672
D . 422	**64047A**	**Syncom 3**					
	27-DEC-12	-0.22	19.162	8.431	29.894	50	192
	23006.051042	42176.87084	0.0002336	3.8587	295.4260	188.0871	181.4606
D . 423	**67001A**	**Intelsat II F-2**					
	26-DEC-12	-0.21	18.057	-46.647	82.761	52	668
	23005.132442	42168.82945	0.0011595	7.4279	310.7848	239.0459	168.0831
D . 424	**00029B**	**Proton-K/Briz-M fourth stage (Briz-M)**					
	28-DEC-12	0.24	-21.148	-1130.592	1088.297	52	614
	23007.146644	42129.39074	0.0272304	9.2625	48.7446	206.3522	257.4818
D . 425	**66110A**	**ATS 1**					
	26-DEC-12	0.26	-17.792	-48.341	12.757	48	917
	23005.321644	42130.43284	0.0006384	5.7480	305.2303	192.8202	94.3887
D . 426	**82103E**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	0.30	-24.647	-78.908	29.613	50	990
	23005.667431	42141.95532	0.0015333	14.4884	351.3152	57.9059	15.6484
D . 427	**81027A**	**Raduga 8**					
	28-DEC-12	0.37	-29.634	-390.438	331.170	52	1003
	23007.233090	42144.46841	0.0088830	14.6060	344.2935	127.3131	164.1225
D . 428	**85048C**	**Arabsat 1B**					
	26-DEC-12	0.50	-39.051	-100.640	22.537	52	1027
	23005.359826	42133.02423	0.0014457	14.2250	20.6678	253.3723	155.7333
D . 429	**85015A**	**Arabsat 1A**					
	27-DEC-12	0.53	-41.690	-65.702	-17.678	50	931
	23006.339097	42129.85233	0.0000347	14.3014	17.3964	30.6609	159.1287
D . 430	**69013A**	**TACSAT 1**					
	27-DEC-12	0.54	-41.927	-119.745	35.891	52	802
	23006.081910	42126.56019	0.0018338	7.6620	313.5493	199.9577	188.1602
D . 431	**89020E**	**Mage 1 (Meteosat 4 AKM)**					
	28-DEC-12	0.61	-47.911	-606.246	510.424	39	630
	23007.197315	42115.28917	0.0129366	13.6846	15.0808	118.7152	208.3221
D . 432	**03015A**	**Cosmos-2397**					
	26-DEC-12	0.71	-55.251	-241.267	130.766	52	488
	23005.841250	42110.53836	0.0041233	6.3192	57.7513	240.1199	18.6423
D . 433	**88091D**	**IUS second stage**					
	26-DEC-12	0.71	-55.610	-134.442	23.222	52	1014
	23005.561551	42103.09219	0.0016086	14.5839	18.4031	163.0245	80.8657

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D . 434	**79087C**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-12	0.73	-56.734	-223.295	109.827	53	976
	23010.769039	42109.48743	0.0041020	14.1485	340.0931	212.1696	322.4392
D . 435	**93069D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	0.76	-59.560	-86.191	-32.930	51	845
	23007.567789	42100.12782	0.0004306	13.1488	33.4456	310.2731	91.5969
D . 436	**03021A**	**Beidou 3**					
	28-DEC-12	0.79	140.000	135.000	145.000	52	491
	23007.040394	42261.68907	0.0001250	1.9721	76.6047	274.5118	68.0923
D . 437	**75123F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	0.80	-61.978	-126.102	2.146	52	1006
	23007.036424	42100.42217	0.0016718	12.3936	328.9651	74.7356	219.1749
D . 438	**95035D**	**IUS second stage**					
	27-DEC-12	0.80	-62.383	-107.280	-17.486	51	788
	23006.020058	42100.28505	0.0012786	15.3901	34.2027	33.6190	291.1790
D . 439	**90054D**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	0.84	-65.160	-132.672	2.353	51	959
	23006.298785	42103.42681	0.0015423	14.0967	22.0223	335.6791	178.2304
D . 440	**88071D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	0.99	-77.039	-156.760	2.682	50	1028
	23005.910324	42088.34115	0.0020731	14.1816	14.7583	92.8627	311.5049
D . 441	**87096D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	1.07	-82.945	-174.949	9.059	52	1037
	23006.211910	42082.87481	0.0023867	14.2823	11.9997	103.0651	199.9091
D . 442	**77048G**	**Aerojet SVM-5 (GOES 2 AKM)**					
	28-DEC-12	1.08	-84.210	-1014.353	845.933	50	694
	23007.418796	42077.10208	0.0223441	13.4424	335.1259	318.0592	85.4001
D . 443	**89081D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-12	1.21	-94.282	-215.200	26.636	52	959
	23004.813623	42072.87086	0.0028148	14.0351	18.7997	353.9807	351.1610
D . 444	**89021D**	**IUS second stage**					
	25-DEC-12	1.21	-94.356	-199.055	10.344	51	983
	23004.797361	42072.66203	0.0028314	13.5583	3.1081	62.0121	341.6602
D . 445	**85102D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	1.27	-98.912	-187.780	-10.045	52	989
	23005.246910	42068.28029	0.0021641	14.3613	4.2279	27.8281	180.3340
D . 446	**97049E**	**Mage 1 (Meteosat 7 AKM)**					
	30-DEC-12	1.34	-104.251	-418.337	209.836	53	621
	23009.933900	42061.72096	0.0077219	11.0664	44.8240	202.0483	328.5394
D . 447	**89041B**	**DFS-Kopernikus 1**					
	26-DEC-12	1.40	-108.719	-158.974	-58.464	51	951
	23005.440093	42057.62257	0.0012528	13.2382	34.0268	172.4918	140.2855

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D . 448	**74039C**	**Titan IIIC stage 3 (Transtage)**					
	27-DEC-12	1.41	-109.587	-212.065	-7.109	51	989
	23006.459491	42052.06623	0.0023289	12.6238	328.6503	201.3584	66.8321
D . 449	**88034A**	**Cosmos 1940**					
	26-DEC-12	1.41	-109.851	-194.494	-25.209	52	956
	23005.655451	42054.07020	0.0018538	14.3140	12.7719	148.3571	41.3995
D . 450	**68081R**	**Transtage 5 debris**					
	26-DEC-12	1.57	-121.484	-917.968	674.999	24	24
	23005.984132	42040.91230	0.0191358	7.7909	323.1541	260.7033	230.9245
D . 451	**04015D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	1.58	-122.685	-200.041	-45.329	52	436
	23005.669988	42038.82837	0.0017111	7.7065	55.8235	204.2156	78.8994
D . 452	**00013D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	27-DEC-12	1.76	-136.209	-170.846	-101.572	52	619
	23006.722141	42026.71586	0.0006800	10.8690	47.0316	313.9291	50.3952
D . 453	**68081M**	**Transtage 5 debris**					
	27-DEC-12	1.80	-139.573	-754.636	475.490	48	165
	23006.126539	42026.47563	0.0158979	8.5086	325.1931	298.8548	182.0961
D . 454	**74017A**	**Cosmos 637**					
	26-DEC-12	1.82	-141.225	-307.083	24.634	50	1004
	23005.570752	42023.57616	0.0037068	10.9143	324.2181	282.2236	22.9316
D . 455	**96044A**	**Italsat 2**					
	27-DEC-12	1.84	-142.778	-249.769	-35.787	51	763
	23006.262928	42020.86341	0.0025501	9.3937	50.5959	16.5671	219.8419
D . 456	**94082D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	1.89	-146.428	-265.949	-26.907	52	826
	23005.943403	42019.16188	0.0030729	12.2768	42.0116	2.9662	326.5729
D . 457	**05023H**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	1.94	-150.177	-209.531	-90.823	52	376
	23005.835185	42014.66736	0.0011670	6.6297	58.5961	213.0448	22.0130
D . 458	**87109D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	2.02	-156.697	-428.306	114.912	51	1018
	23007.074549	42006.66500	0.0064180	14.2179	12.8012	138.5213	249.5377
D . 459	**68081Z**	**Transtage 5 debris**					
	28-DEC-12	2.10	-162.500	-610.716	285.716	6	6
	23007.086597	42002.25072	0.0109988	8.2386	324.3258	265.9818	195.0501
D . 460	**90094D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	2.12	-164.121	-312.633	-15.609	52	981
	23006.827500	42001.87369	0.0037024	13.9321	22.8018	20.5593	348.3768
D . 461	**68081J**	**Transtage 5 debris**					
	17-DEC-12	2.26	-175.431	-728.693	377.831	45	250
	22996.674618	41989.86656	0.0139673	8.2775	324.3716	298.7750	353.5224

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 462	**91046D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	2.37	-183.396	-252.531	-114.262	52	951
	23006.788125	41982.24455	0.0018287	13.7446	25.4618	105.5957	5.3035
D . 463	**68081N**	**Transtage 5 debris**					
	23-DEC-12	2.39	-185.236	-1147.937	777.464	12	102
	23002.345347	41978.74051	0.0294070	8.2001	324.2329	302.6111	104.7394
D . 464	**94080A**	**Zongxing 6 (A)**					
	27-DEC-12	2.49	-193.147	-590.558	204.264	51	855
	23006.804850	41972.38758	0.0095749	13.3261	32.1250	246.7280	4.7068
D . 465	**82009F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	2.55	-197.472	-357.297	-37.647	52	997
	23005.292245	41968.01084	0.0040175	14.3452	346.8769	61.3389	146.9001
D . 466	**74017F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	2.62	-202.960	-396.712	-9.208	52	1003
	23006.099676	41962.10652	0.0044708	10.7702	323.8781	293.4347	191.6067
D . 467	**06022D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	2.64	-204.073	-423.920	15.774	51	334
	23005.146840	41958.94232	0.0049242	5.7251	60.7460	272.2060	272.1127
D . 468	**81061F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	2.64	-204.598	-222.663	-186.534	51	1027
	23006.738171	41961.05320	0.0001944	14.1850	344.6823	18.3056	342.3551
D . 469	**68081G**	**LES 6 operational debris**					
	27-DEC-12	2.74	-211.690	-698.249	274.869	52	705
	23006.120694	41953.69396	0.0116955	8.2492	324.1287	281.2759	183.4506
D . 470	**83100F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	2.80	-216.774	-301.105	-132.444	51	1015
	23006.167384	41948.40048	0.0020753	14.2639	352.2127	27.3199	196.0320
D . 471	**97065C**	**IABS**					
	24-DEC-12	2.84	-219.522	-323.283	-115.761	50	719
	23003.521620	41945.22917	0.0034186	12.3121	39.6246	10.7051	118.4565
D . 472	**92017D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	2.94	-227.087	-323.509	-130.666	51	914
	23005.660521	41936.47909	0.0020830	13.5508	27.7556	299.1659	54.2238
D . 473	**83016F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	2.97	-229.594	-287.627	-171.562	50	983
	23005.542280	41933.33658	0.0014233	14.2235	348.4234	173.1458	57.8058
D . 474	**88036E**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	3.04	-235.065	-329.655	-140.475	51	1005
	23006.349433	41930.96986	0.0024980	14.1976	9.0840	49.8606	147.3024
D . 475	**92074D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	3.13	-242.358	-333.328	-151.387	51	877
	23005.332060	41923.17171	0.0023190	13.3060	29.9615	13.4873	175.2661

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 476	**68081AB**	**Transtage 5 debris**					
	27-DEC-12	3.16	246.900	-802.500	-1296.500	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 477	**05049E**	**MSG-2 operational debris (SEVIRI cooler cover)**					
	21-DEC-12	3.23	-249.597	-284.956	-214.238	30	219
	23000.161910	41914.65491	0.0012622	4.8159	73.9523	129.3333	285.4326
D . 478	**85024D**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	3.44	-265.434	-324.323	-206.545	50	1013
	23006.511481	41897.43507	0.0016499	14.3425	357.3725	104.1312	77.0555
D . 479	**82093F**	**Proton-K/DM fourth stage (Blok-DM)**					
	29-DEC-12	3.53	-272.799	-297.324	-248.275	53	1022
	23008.755405	41892.61857	0.0006557	14.0866	348.1857	148.4122	337.7082
D . 480	**95011D**	**Star 27 (Himawari-5 AKM)**					
	27-DEC-12	3.53	-272.928	-1236.176	690.320	52	646
	23006.690787	41890.19195	0.0227705	12.5877	35.1520	236.8392	47.6957
D . 481	**84090F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	3.57	-275.516	-346.980	-204.051	52	1026
	23006.741030	41889.91533	0.0017601	14.2585	355.3460	34.9075	352.0967
D . 482	**77092G**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	3.63	-280.681	-327.007	-234.355	51	1037
	23007.075150	41883.68059	0.0011366	13.0303	332.8924	46.6201	209.0198
D . 483	**79015D**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	3.84	-296.252	-333.581	-258.923	52	993
	23007.296458	41868.27147	0.0010565	13.4943	336.8576	161.3865	133.0370
D . 484	**80104E**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	3.84	-296.786	-429.583	-163.989	52	1024
	23007.397465	41867.20089	0.0033170	13.9476	342.5653	59.1767	102.5667
D . 485	**04042C**	**Fengyun 2C AKM**					
	28-DEC-12	3.85	-296.973	-393.908	-200.038	51	401
	23007.559514	41867.44546	0.0021971	6.3597	57.1187	209.4513	118.0509
D . 486	**76023K**	**LES 8, LES 9 operational debris**					
	28-DEC-12	3.85	-297.439	-314.073	-280.805	52	995
	23007.293565	41867.81646	0.0000401	13.7153	338.9407	343.1243	136.1216
D . 487	**89053A**	**Olympus 1**					
	28-DEC-12	3.95	-304.597	-368.992	-240.202	52	1064
	23007.188669	41859.34564	0.0013852	14.0042	21.5567	209.5415	216.5280
D . 488	**86038D**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	3.96	-305.345	-393.185	-217.504	52	955
	23007.509155	41858.33619	0.0022936	14.2161	1.1923	47.2460	80.7435
D . 489	**87073D**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	4.00	-308.346	-384.592	-232.099	51	1027
	23006.699259	41856.64363	0.0018800	14.1248	6.3438	26.4607	18.1566

D .nn	COSPAR	NAME					
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D . 490	**68081P**	**Transtage 5 debris**					
	14-DEC-12	4.04	-311.570	-681.927	58.787	41	159
	22993.695775	41853.41671	0.0089397	8.0560	323.0019	285.7742	347.8630
D . 491	**84028F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	4.15	-320.429	-404.616	-236.242	52	1014
	23005.985787	41842.87419	0.0017611	14.1320	351.4059	282.7998	260.4713
D . 492	**76107F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	4.27	-329.203	-376.404	-282.002	51	1022
	23006.428403	41834.45473	0.0012085	12.4915	329.7384	61.5595	79.3600
D . 493	**68081X**	**Transtage 5 debris**					
	26-DEC-12	4.30	-331.600	-2160.500	-1497.200	19	19
	23005.887674	41832.35396	0.0437197	6.5097	327.8102	352.3797	272.3647
D . 494	**88108D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	4.47	-344.663	-406.803	-282.523	52	1034
	23007.261076	41820.69309	0.0017358	14.1252	15.2012	62.4299	184.2914
D . 495	**68081E**	**Titan IIIC stage 3 (Transtage)**					
	26-DEC-12	4.48	-345.446	-744.482	53.589	52	993
	23005.181574	41819.95236	0.0095824	8.1077	322.9740	276.9315	161.5202
D . 496	**79007A**	**Scatha**					
	27-DEC-12	4.52	-348.274	-7913.911	7217.363	49	1030
	23006.165810	41816.61856	0.1796586	18.3143	349.5913	333.9815	185.7380
D . 497	**68081A**	**OV2 5**					
	27-DEC-12	4.62	-356.253	-701.306	-11.200	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 498	**79007C**	**Scatha AKM**					
	21-DEC-12	4.74	-364.869	-7831.251	7101.514	50	323
	23000.866181	41799.61908	0.1777640	18.2475	349.6954	333.6152	298.9189
D . 499	**80060F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	4.80	-369.453	-442.879	-296.026	52	987
	23007.241134	41795.76798	0.0020039	13.7837	340.7245	138.9752	156.9846
D . 500	**68081H**	**LES 6 operational debris**					
	26-DEC-12	5.16	-397.162	-702.273	-92.051	48	501
	23005.630810	41769.26058	0.0074336	8.0104	322.4080	337.8324	359.5589
D . 501	**68081L**	**Transtage 5 debris**					
	22-DEC-12	5.58	-429.195	-720.543	-137.847	24	121
	23001.885660	41733.77650	0.0072986	7.9947	322.2587	299.4040	270.9155
D . 502	**75100F**	**Aerojet SVM-5 (GOES 1 AKM)**					
	27-DEC-12	5.97	-458.674	-1639.248	721.899	50	818
	23006.916169	41705.08137	0.0288058	12.1581	327.6567	291.0398	258.0183
D . 503	**74039A**	**ATS 6**					
	24-DEC-12	6.15	-472.017	-598.040	-345.994	50	1046
	23003.552917	41692.52311	0.0030384	11.8350	326.3469	170.1149	33.9061

D .nn	COSPAR	NAME					
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D . 504	**68081AF**	**Transtage 5 debris**					
	28-DEC-12	6.34	-486.757	-1379.635	406.122	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 505	**68081K**	**Transtage 5 debris**					
	26-DEC-12	6.42	-492.470	-695.728	-289.211	47	179
	23005.934965	41670.72275	0.0059874	8.1302	322.2867	3.2865	250.0117
D . 506	**08066C**	**Fengyun 2E AKM (FG-36 AKM)**					
	26-DEC-12	6.55	-502.708	-655.734	-349.681	50	205
	23005.744699	41661.97717	0.0035737	0.8485	33.6727	240.8564	355.8730
D . 507	**68081AC**	**Transtage 5 debris**					
	25-DEC-12	6.93	-531.685	-1339.974	276.604	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 508	**68081AE**	**Transtage 5 debris**					
	28-DEC-12	6.96	-533.685	-1313.314	245.944	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 509	**05049F**	**MSG-2 operational debris (entry baffle cover)**					
	20-DEC-12	7.05	-540.017	-784.720	-295.314	37	202
	22999.128611	41625.38581	0.0052438	4.7690	73.9302	277.2033	297.7166
D . 510	**70055A**	**Intelsat III F-8**					
	27-DEC-12	7.16	-548.644	-1946.605	849.316	52	993
	23006.645428	41615.76081	0.0351463	5.1743	302.0615	149.3456	335.5421
D . 511	**97049A**	**Hot Bird 3**					
	25-DEC-12	7.94	-607.349	-711.452	-503.247	52	611
	23004.732940	41556.29288	0.0025077	3.3202	67.8235	276.9065	68.6879
D . 512	**68081AA**	**Transtage 5 debris**					
	27-DEC-12	8.83	-674.328	-1142.269	-206.386	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 513	**11001B**	**Fregat-SB**					
	26-DEC-12	9.08	-692.914	-1302.844	-82.984	52	103
	23005.921887	41470.78395	0.0148661	1.1077	64.5168	320.1608	353.9950
D . 514	**68081T**	**Transtage 5 debris**					
	22-DEC-12	9.18	-699.705	-1136.268	-263.143	20	20
	23001.005417	41464.35017	0.0104932	7.0132	317.2965	218.2691	223.7053
D . 515	**97029C**	**Fengyun 2A AKM**					
	27-DEC-12	9.38	-714.611	-1649.494	220.272	52	629
	23006.547118	41449.50559	0.0215968	11.6302	42.8051	297.8786	107.2464
D . 516	**87040D**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	9.88	-752.286	-814.497	-690.076	52	1012
	23004.435405	41411.93307	0.0014161	13.7341	358.0487	168.3480	107.0048
D . 517	**85007D**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-12	9.90	-753.911	-819.144	-688.678	51	1039
	23005.585891	41410.55190	0.0016085	13.5151	359.2084	149.3126	52.9226

D .nn	COSPAR	NAME					
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D . 518	**89052D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	10.04	-764.122	-891.749	-636.495	52	1001
	23005.244074	41400.75734	0.0032117	13.4124	16.2998	128.5240	193.5981
D . 519	**93072D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	10.41	-791.724	-869.026	-714.423	52	857
	23006.601181	41372.19195	0.0021307	12.5985	31.8316	27.8387	79.0584
D . 520	**84063F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-12	10.86	-825.109	-894.722	-755.496	52	1032
	23010.890498	41339.47896	0.0019768	13.4581	355.6406	111.6647	294.6014
D . 521	**87100D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	11.26	-854.604	-918.777	-790.430	52	1026
	23007.146215	41310.12575	0.0017579	13.8857	9.4738	115.9991	220.0321
D . 522	**91014D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-12	11.38	-863.168	-969.292	-757.044	52	987
	23004.514815	41301.43022	0.0027108	13.7828	22.0988	7.8112	102.3983
D . 523	**68081U**	**Transtage 5 debris**					
	23-DEC-12	11.63	-882.379	-1232.962	-531.796	17	17
	23002.539977	41281.82909	0.0080778	8.0897	319.8621	103.7162	33.9495
D . 524	**01015A**	**GSAT-1**					
	25-DEC-12	12.78	-966.619	-1901.380	-31.857	52	598
	23004.832280	41197.87687	0.0231868	8.9398	49.5359	156.9394	16.1673
D . 525	**94030D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	12.84	-971.315	-1156.401	-786.229	52	855
	23006.966539	41193.15523	0.0048606	12.3914	32.5150	47.8182	308.1534
D . 526	**08003B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	28-DEC-12	13.43	-1014.125	-1763.005	-265.246	52	234
	23007.720220	41149.70145	0.0181555	4.0486	64.6224	106.3716	69.5375
D . 527	**10002B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	27-DEC-12	13.57	-1024.412	-1834.435	-214.388	52	153
	23006.663021	41139.53237	0.0201195	2.2817	76.3596	123.5282	102.4935
D . 528	**11048B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	27-DEC-12	14.36	-1082.662	-2030.681	-134.642	52	67
	23006.113229	41081.41790	0.0231921	0.8585	71.0332	325.5145	224.8152
D . 529	**68081Y**	**Transtage 5 debris**					
	26-DEC-12	14.81	-1115.292	-1696.497	-534.088	24	24
	23005.417095	41048.64638	0.0136053	6.5501	312.9592	236.6213	66.3577
D . 530	**07058C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	28-DEC-12	14.96	-1126.030	-2119.774	-132.286	52	258
	23007.027905	41038.28364	0.0236151	4.2907	63.5695	80.1250	319.0674
D . 531	**97027B**	**Insat-IID**					
	27-DEC-12	16.26	-1220.676	-2554.831	113.479	52	753
	23006.240938	40943.28708	0.0326024	11.9069	36.3134	344.9485	212.5239

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 532	**68081AD**	**Transtage 5 debris**					
	21-DEC-12	18.54	-1384.317	-2435.350	-333.285	51	783
	23006.979560	41807.47927	0.0081988	8.0586	322.9795	283.7722	232.6755
D . 533	**68050J**	**Titan IIIC stage 3 (Transtage)**					
	26-DEC-12	19.16	-1429.219	-2128.331	-730.106	52	984
	23005.134502	40735.59529	0.0167779	2.1092	303.1067	15.4681	160.6579
D . 534	**66053J**	**Titan IIIC stage 3 (Transtage)**					
	28-DEC-12	23.21	-1715.569	-2378.228	-1052.909	52	1002
	23007.378542	40448.36815	0.0168767	1.0398	310.5052	163.2988	78.7058
D . 535	**68050H**	**OPS 9348 (IDSCS 27)**					
	27-DEC-12	23.38	-1727.353	-2044.288	-1410.419	50	442
	23006.195833	40436.95162	0.0082838	2.7444	303.5194	144.7471	137.8454
D . 536	**66053H**	**IDCSP 7**					
	21-DEC-12	23.74	-1753.195	-2089.351	-1417.040	43	409
	23000.054190	40410.79315	0.0083361	0.9815	314.6475	162.6250	251.3254
D . 537	**68050G**	**OPS 9347 (IDSCS 26)**					
	25-DEC-12	24.34	-1794.769	-2056.011	-1533.526	49	437
	23004.660972	40369.34135	0.0065584	2.6385	304.6206	145.0502	332.9065
D . 538	**66053G**	**IDCSP 6**					
	25-DEC-12	24.78	-1825.347	-2092.682	-1558.013	49	423
	23004.971852	40338.68142	0.0065263	0.8944	321.7732	160.7977	275.9068
D . 539	**67003H**	**IDCSP 15**					
	27-DEC-12	25.04	-1843.804	-2131.918	-1555.689	51	498
	23006.330174	40320.27649	0.0066915	1.3238	312.8249	34.7434	98.6865
D . 540	**68050F**	**OPS 9346 (IDSCS 25)**					
	27-DEC-12	25.25	-1858.000	-2046.828	-1669.173	52	459
	23006.518588	40306.00248	0.0050289	2.4755	304.6212	146.7335	22.3092
D . 541	**66053F**	**IDCSP 5**					
	23-DEC-12	25.64	-1885.771	-2102.084	-1669.459	41	391
	23002.036667	40277.99837	0.0051789	0.7891	326.3878	164.2767	255.2802
D . 542	**68050E**	**OPS 9345 (IDSCS 24)**					
	26-DEC-12	25.93	-1905.717	-2059.234	-1752.200	52	452
	23005.567384	40258.39319	0.0038449	2.4116	305.1183	147.0678	6.0465
D . 543	**67003G**	**IDCSP 14**					
	27-DEC-12	26.05	-1913.949	-2144.068	-1683.830	51	461
	23006.148067	40250.22454	0.0053682	1.1756	314.8356	44.5787	166.6802
D . 544	**66053E**	**IDCSP 4**					
	19-DEC-12	26.32	-1932.532	-2100.185	-1764.879	46	364
	22998.635625	40231.57153	0.0041351	0.7578	329.9851	167.9316	42.8595
D . 545	**68050D**	**OPS 9344 (IDSCS 23)**					
	26-DEC-12	26.52	-1946.073	-2049.914	-1842.232	51	448
	23005.252326	40217.89000	0.0028383	2.2993	305.3456	149.6599	119.9744

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 546	**67003F**	**IDCSP 13**					
	30-DEC-12	26.91	-1973.184	-2155.896	-1790.473	47	402
	23009.944421	40190.65031	0.0041983	1.1085	319.3867	56.4648	240.3360
D . 547	**66053D**	**IDCSP 3**					
	30-DEC-12	26.93	-1974.564	-2116.763	-1832.365	48	464
	23009.017245	40189.26504	0.0036702	0.6840	339.7553	171.8142	255.1552
D . 548	**68050C**	**OPS 9343 (IDSCS 22)**					
	26-DEC-12	26.94	-1975.337	-2052.789	-1897.886	52	479
	23005.172280	40188.85205	0.0021299	2.2379	305.5104	152.1299	148.9462
D . 549	**68050B**	**OPS 9342 (IDSCS 21)**					
	29-DEC-12	27.16	-1990.820	-2053.595	-1928.045	51	433
	23008.871100	40173.22843	0.0017529	2.2036	305.6894	153.4515	254.0192
D . 550	**66053C**	**IDCSP 2**					
	24-DEC-12	27.27	-1998.449	-2127.127	-1869.772	49	461
	23003.132569	40165.47135	0.0029804	0.6658	341.3334	176.7686	219.3589
D . 551	**68050A**	**OPS 9341 (IDSCS 20)**					
	26-DEC-12	27.29	-1999.521	-2056.124	-1942.918	52	584
	23005.437338	40164.52593	0.0014718	2.2285	306.2200	148.8866	53.9609
D . 552	**66053B**	**IDCSP 1**					
	24-DEC-12	27.49	-2013.256	-2127.961	-1898.551	51	620
	23003.162905	40150.98565	0.0027921	0.6579	344.1369	180.0979	208.3662
D . 553	**67003E**	**IDCSP 12**					
	21-DEC-12	27.61	-2021.331	-2211.764	-1830.899	48	421
	23000.138565	40143.52765	0.0037923	1.0103	322.0783	68.6124	182.9797
D . 554	**66053A**	**GGTS 1**					
	27-DEC-12	27.74	-2030.789	-2136.930	-1924.648	52	478
	23006.077234	40135.48305	0.0026300	0.6772	345.5552	192.8384	236.2539
D . 555	**67003D**	**IDCSP 11**					
	20-DEC-12	28.19	-2061.723	-2204.530	-1918.915	45	345
	22999.131597	40102.37992	0.0036443	0.9879	324.8901	82.5202	223.8150
D . 556	**67003C**	**IDCSP 10**					
	26-DEC-12	28.61	-2090.438	-2233.533	-1947.344	52	353
	23005.974664	40073.47980	0.0036653	0.9467	328.1411	90.3723	273.6329
D . 557	**67003B**	**IDCSP 9**					
	26-DEC-12	28.83	-2105.407	-2245.318	-1965.496	52	436
	23005.933785	40058.75305	0.0037740	0.9249	329.8754	95.4784	288.4237
D . 558	**67003A**	**IDCSP 8**					
	26-DEC-12	28.96	-2114.028	-2257.844	-1970.213	51	459
	23005.120903	40050.12646	0.0038833	0.8806	329.6323	97.4400	221.8774
D . 559	**67066G**	**Titan IIIC stage 3 (Transtage)**					
	26-DEC-12	31.08	-2258.742	-2570.383	-1947.101	52	1028
	23005.613657	39905.55550	0.0075979	7.8390	314.6176	215.2903	357.7984

D .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D . 560	**67066F**	**DODGE 1**					
	27-DEC-12	32.02	-2322.460	-2526.942	-2117.978	52	1006
	23006.646065	39841.88171	0.0048332	7.7531	313.7717	236.8396	344.3194
D . 561	**67066E**	**LES 5**					
	26-DEC-12	32.92	-2383.489	-2593.623	-2173.354	52	1019
	23005.928819	39780.55940	0.0051483	7.6285	313.1706	257.5750	242.5155
D . 562	**67066D**	**IDCSP 19**					
	23-DEC-12	33.66	-2433.062	-2652.312	-2213.811	49	658
	23002.215729	39731.29191	0.0053182	7.5423	312.6983	270.8213	142.3464
D . 563	**67066C**	**IDCSP 18**					
	26-DEC-12	34.24	-2472.046	-2706.443	-2237.650	50	636
	23005.094583	39692.25430	0.0058832	7.5015	312.2786	281.0899	182.6743
D . 564	**67066B**	**IDCSP 17**					
	25-DEC-12	34.64	-2498.800	-2748.303	-2249.297	51	487
	23004.681528	39665.49919	0.0062794	7.4132	312.0080	286.7743	331.4837
D . 565	**67066A**	**IDCSP 16**					
	26-DEC-12	34.85	-2512.824	-2769.897	-2255.751	51	689
	23005.880382	39651.24071	0.0064523	7.4240	311.8449	289.0859	258.5548

3.4 Objects in a libration orbit around the Eastern stable point

In the case where the object is in a libration orbit around the Eastern stable point (longitude 75 E), there are 104 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 34.

L1 .nn	**COSPAR**	**NAME**					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 1	**95054A**	**Luch 1-1**					
	26-DEC-12	740	5.0	72.5	77.5	52	859
	23005.654618	42162.92488	0.0007857	11.7401	46.7986	7.9969	75.5856
L1 . 2	**93039A**	**Galaxy IV**					
	27-DEC-12	741	6.3	71.9	78.2	51	947
	23006.639803	42162.57983	0.0008883	12.1697	41.6522	182.1536	74.8043
L1 . 3	**00036A**	**Cosmos-2371**					
	26-DEC-12	742	10.0	70.1	80.1	51	639
	23005.654884	42163.12334	0.0002567	9.4720	50.7435	30.4466	79.4089
L1 . 4	**90061A**	**Cosmos 2085**					
	25-DEC-12	742	10.2	70.0	80.2	52	989
	23004.580417	42162.42314	0.0003685	14.1002	22.4705	43.5319	79.0762
L1 . 5	**94087A**	**Raduga 32**					
	27-DEC-12	742	10.3	69.9	80.2	52	904
	23006.641319	42164.00157	0.0005898	12.7503	37.4328	124.6562	70.1067
L1 . 6	**88066A**	**Cosmos 1961**					
	27-DEC-12	742	10.5	69.8	80.3	51	1094
	23006.579086	42163.26350	0.0004773	14.3032	15.0702	32.4052	70.1986
L1 . 7	**84022A**	**Cosmos 1540**					
	28-DEC-12	742	10.9	69.6	80.5	51	897
	23007.512650	42167.91956	0.0008262	15.8436	356.9137	118.6593	75.0917
L1 . 8	**08033A**	**Cosmos-2440**					
	27-DEC-12	742	11.0	69.6	80.6	51	238
	23006.688322	42165.84284	0.0001932	1.6565	55.0663	9.0806	70.0736
L1 . 9	**91010A**	**Cosmos 2133**					
	26-DEC-12	742	11.2	69.5	80.7	51	1057
	23005.618935	42163.39216	0.0006758	13.4570	28.2173	37.9425	69.9543
L1 . 10	**81018A**	**Comstar 4**					
	26-DEC-12	742	11.2	69.5	80.7	51	1063
	23005.507280	42163.17688	0.0002677	14.6743	358.4730	0.4851	80.4741
L1 . 11	**98025A**	**Cosmos 2350**					
	25-DEC-12	743	12.2	69.0	81.1	51	724
	23004.659572	42168.52241	0.0007304	10.1322	47.1563	25.6249	75.1433
L1 . 12	**84031A**	**Cosmos 1546**					
	27-DEC-12	743	12.7	68.7	81.4	50	909
	23006.513218	42160.56039	0.0019227	14.6305	358.5081	245.2029	77.1788

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 13	**90051A**	**Insat-ID**					
	27-DEC-12	744	13.9	68.1	82.0	52	1030
	23006.655208	42164.54765	0.0014668	12.4173	40.7946	58.9451	68.5398
L1 . 14	**94069A**	**Elektro 1**					
	24-DEC-12	744	14.6	67.8	82.3	51	888
	23003.644479	42168.39230	0.0006530	13.1735	36.6400	112.4968	71.1256
L1 . 15	**82044A**	**Cosmos 1366**					
	27-DEC-12	744	14.6	67.7	82.4	50	911
	23006.514155	42167.80993	0.0005553	15.6922	351.4877	10.9810	70.0307
L1 . 16	**93062A**	**Raduga 30**					
	27-DEC-12	745	17.1	66.5	83.6	52	994
	23006.632581	42163.15361	0.0001205	13.2346	33.6062	170.2056	69.3875
L1 . 17	**83028A**	**Raduga 12**					
	28-DEC-12	747	20.0	65.0	85.0	50	982
	23007.483600	42160.99452	0.0001889	14.7962	355.0554	62.6652	83.6553
L1 . 18	**81102A**	**Raduga 10**					
	27-DEC-12	748	20.9	64.6	85.5	51	891
	23006.482245	42171.11770	0.0007843	14.6083	346.8822	92.6660	77.0222
L1 . 19	**79035A**	**Raduga 5**					
	27-DEC-12	748	21.2	64.4	85.6	50	972
	23006.486215	42169.60478	0.0004266	14.2096	339.3116	114.7580	67.9759
L1 . 20	**75123A**	**Raduga 1**					
	28-DEC-12	748	21.6	64.2	85.8	52	924
	23007.432222	42157.55927	0.0009522	12.6173	329.6199	114.8733	76.8577
L1 . 21	**84016A**	**Raduga 14**					
	26-DEC-12	750	23.2	63.4	86.6	50	882
	23005.538252	42170.82156	0.0005073	14.6180	357.9608	66.2678	68.8306
L1 . 22	**76092A**	**Raduga 2**					
	28-DEC-12	750	23.3	63.4	86.7	51	970
	23007.413935	42167.89348	0.0024829	13.1356	331.7547	247.8035	85.2448
L1 . 23	**77080A**	**SIRIO 1**					
	27-DEC-12	750	1.5	74.4	75.9	49	810
	23006.496898	42164.09408	0.0008615	14.6831	349.7508	43.5667	74.5796
L1 . 24	**06053D**	**Fengyun 2D debris**					
	26-DEC-12	750	23.7	63.1	86.9	43	173
	23005.693993	42162.67121	0.0078312	2.7821	72.8569	222.0451	86.3610
L1 . 25	**88014A**	**STTW-2**					
	27-DEC-12	753	27.2	61.4	88.6	51	1049
	23006.626933	42170.18189	0.0008007	13.9901	26.1827	49.6132	64.0720
L1 . 26	**79062A**	**Gorizont 2**					
	28-DEC-12	757	30.6	59.7	90.2	52	1005
	23007.433808	42159.28942	0.0002767	14.3954	341.4444	164.0418	88.0116
L1 . 27	**08033D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-12	758	31.5	59.2	90.7	51	236
	23004.651863	42172.79231	0.0031335	1.6214	54.4843	233.9013	84.2860

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 28	**83118F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	761	33.8	58.1	91.8	51	943
	23006.471968	42161.80678	0.0042473	14.5763	357.9581	206.6936	91.4999
L1 . 29	**97070A**	**Kupon 1**					
	27-DEC-12	766	37.7	56.0	93.8	51	728
	23006.651968	42153.85689	0.0002154	12.2525	41.1957	179.6926	69.9630
L1 . 30	**88063A**	**Insat-IC**					
	27-DEC-12	766	38.1	55.8	94.0	51	913
	23006.513681	42159.27457	0.0005473	14.4843	13.6356	39.5280	92.3847
L1 . 31	**85102A**	**Cosmos 1700**					
	27-DEC-12	768	39.2	55.3	94.5	52	995
	23006.591759	42165.47110	0.0007389	14.5289	4.6698	92.9976	55.2765
L1 . 32	**90112A**	**Raduga 26**					
	26-DEC-12	774	42.8	53.4	96.3	51	1052
	23005.570567	42177.44286	0.0005975	13.9833	23.8585	5.2591	83.0168
L1 . 33	**90054A**	**Gorizont 20**					
	25-DEC-12	775	44.0	52.8	96.9	51	1100
	23004.652581	42163.17828	0.0008335	14.1712	22.2646	81.1673	52.8846
L1 . 34	**84041A**	**Gorizont 9**					
	27-DEC-12	776	44.4	52.6	97.0	52	902
	23006.550787	42152.26148	0.0006757	14.5860	359.1092	120.4694	64.4892
L1 . 35	**87096A**	**Cosmos 1897**					
	25-DEC-12	776	44.6	52.5	97.1	52	969
	23004.613623	42155.90972	0.0004927	14.3959	12.3680	25.9869	56.9877
L1 . 36	**79087A**	**Ekran 4**					
	28-DEC-12	777	44.7	52.5	97.2	52	914
	23007.474850	42150.31806	0.0006197	14.3380	340.7714	42.6173	72.6000
L1 . 37	**76092F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	777	45.0	52.3	97.3	48	950
	23007.381921	42165.00320	0.0017772	13.1092	331.8662	58.5182	97.3342
L1 . 38	**76107A**	**Ekran 1**					
	24-DEC-12	778	45.3	52.1	97.5	51	985
	23003.397546	42159.41637	0.0064489	13.2037	332.1416	38.4186	96.1706
L1 . 39	**90011A**	**DFH-2A**					
	26-DEC-12	780	46.4	51.6	98.0	51	1079
	23005.623125	42149.93461	0.0006068	13.4614	33.5208	31.8195	73.7282
L1 . 40	**80104A**	**Ekran 6**					
	25-DEC-12	780	46.8	51.4	98.2	51	995
	23004.499734	42178.69331	0.0004074	14.5215	344.3081	311.9872	69.9729
L1 . 41	**03060D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	24-DEC-12	783	48.2	50.7	98.9	52	443
	23003.721227	42177.44034	0.0015409	8.0299	55.1621	92.4240	61.9626
L1 . 42	**92074A**	**Ekran 20**					
	25-DEC-12	785	49.2	50.2	99.4	52	1004
	23004.680382	42168.71168	0.0006052	13.4970	30.6433	67.0135	51.1954

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 43	**84016F**	**Proton-K/DM fourth stage (Blok-DM)**					
	27-DEC-12	785	49.2	50.1	99.4	52	978
	23006.588854	42164.45739	0.0040891	14.6102	358.0298	91.1575	50.0713
L1 . 44	**77092A**	**Ekran 2**					
	28-DEC-12	785	49.3	50.1	99.4	47	960
	23007.400498	42153.84092	0.0036575	13.6379	334.7163	227.6260	92.9892
L1 . 45	**79015A**	**Ekran 3**					
	27-DEC-12	786	50.0	49.7	99.8	50	990
	23006.521551	42155.72535	0.0036609	14.1021	338.7061	222.5076	54.2878
L1 . 46	**81061A**	**Ekran 7**					
	25-DEC-12	788	50.9	49.3	100.2	52	1005
	23004.423981	42158.91810	0.0002126	14.5906	345.8538	32.1578	98.9125
L1 . 47	**90116A**	**Raduga 1-2**					
	28-DEC-12	790	51.8	48.8	100.7	51	1083
	23007.526354	42172.61140	0.0007058	14.0092	23.9867	14.4090	97.1599
L1 . 48	**94008A**	**Raduga 1-3**					
	25-DEC-12	790	51.9	48.8	100.7	51	946
	23004.662280	42150.56034	0.0002573	13.1456	34.9464	29.4580	61.9751
L1 . 49	**83100A**	**Ekran 11**					
	26-DEC-12	795	54.2	47.6	101.8	52	902
	23005.453414	42152.97050	0.0002668	14.6366	353.3016	133.0116	94.7644
L1 . 50	**86010A**	**STTW-1**					
	27-DEC-12	800	56.6	46.4	102.9	50	947
	23006.498530	42177.34692	0.0004331	14.5614	9.4624	98.6258	93.6881
L1 . 51	**96058A**	**Ekspress 2**					
	27-DEC-12	801	57.1	46.1	103.2	52	818
	23006.598611	42149.25905	0.0004927	12.3100	41.0574	205.3689	89.0609
L1 . 52	**01045D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	803	57.8	45.8	103.5	52	551
	23005.691042	42182.42416	0.0025608	8.5502	55.0607	258.7312	70.3469
L1 . 53	**00049A**	**Raduga 1-5**					
	28-DEC-12	805	58.8	45.2	104.0	52	634
	23007.867778	42183.25260	0.0002514	9.3501	51.2613	356.6003	82.0671
L1 . 54	**05010F**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	27-DEC-12	805	58.9	45.2	104.1	52	394
	23006.741100	42177.59997	0.0019455	6.9071	57.8768	140.5687	54.5068
L1 . 55	**82093A**	**Ekran 9**					
	25-DEC-12	809	60.2	44.5	104.7	50	904
	23004.443056	42177.67123	0.0022353	14.5314	349.6738	229.9476	95.6374
L1 . 56	**89098A**	**Raduga 24**					
	26-DEC-12	809	60.6	44.3	104.9	51	1004
	23005.499664	42165.81004	0.0003034	14.4090	20.3870	82.7107	105.1691
L1 . 57	**94012A**	**Raduga 31**					
	25-DEC-12	810	60.9	44.1	105.1	50	880
	23004.689016	42177.06862	0.0004353	13.1157	34.8858	18.2515	52.2646

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 58	**80016A**	**Raduga 6**					
	26-DEC-12	822	65.5	41.8	107.2	51	915
	23005.563958	42170.75257	0.0004428	14.3342	341.7172	120.8040	43.2984
L1 . 59	**07018A**	**Nigcomsat 1**					
	27-DEC-12	825	66.6	41.2	107.8	52	292
	23006.728993	42184.86975	0.0005492	3.6188	67.0803	5.8431	67.7459
L1 . 60	**74060A**	**Molniya 1-S**					
	26-DEC-12	826	66.9	41.1	107.9	52	991
	23005.337708	42166.88523	0.0012401	11.5123	324.4977	114.8878	107.8562
L1 . 61	**78039A**	**Yuri**					
	26-DEC-12	828	67.7	40.7	108.3	51	938
	23005.567500	42165.03909	0.0016637	14.2777	340.2874	169.9257	40.5846
L1 . 62	**86044A**	**Gorizont 12**					
	25-DEC-12	834	69.9	39.5	109.4	51	953
	23004.472060	42176.83801	0.0003010	14.4759	6.7673	129.6221	102.4882
L1 . 63	**79105A**	**Gorizont 3**					
	26-DEC-12	835	70.0	39.4	109.5	51	935
	23005.577824	42165.53249	0.0015525	14.4391	342.6197	112.2620	39.3148
L1 . 64	**78073A**	**Raduga 4**					
	27-DEC-12	846	73.7	37.5	111.2	51	976
	23006.545405	42176.42703	0.0007512	13.9521	337.0875	239.0886	44.2687
L1 . 65	**88111A**	**STTW-3**					
	24-DEC-12	846	73.7	37.5	111.2	51	1134
	23003.671053	42145.21995	0.0007441	13.5298	32.6737	34.3715	57.5544
L1 . 66	**75097A**	**Cosmos 775**					
	26-DEC-12	863	78.6	35.0	113.5	52	996
	23005.442766	42141.15494	0.0011135	12.3193	327.7502	41.2446	73.1344
L1 . 67	**89081A**	**Gorizont 19**					
	24-DEC-12	864	78.9	34.8	113.7	50	1086
	23003.660856	42148.34573	0.0003299	14.1484	19.0953	136.4777	47.6496
L1 . 68	**99010A**	**Raduga 1-4**					
	26-DEC-12	865	79.1	34.7	113.8	51	707
	23005.777836	42160.69632	0.0002017	11.7289	51.1387	114.8797	35.4488
L1 . 69	**77071A**	**Raduga 3**					
	25-DEC-12	866	79.5	34.5	114.0	51	981
	23004.359074	42173.60148	0.0011738	13.5734	334.2059	134.1791	110.7795
L1 . 70	**81069A**	**Raduga 9**					
	25-DEC-12	866	79.6	34.4	114.0	51	916
	23004.568194	42148.26339	0.0003617	14.6038	346.2379	80.6883	47.2640
L1 . 71	**96058D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	871	81.0	33.7	114.7	51	730
	23005.521285	42162.01335	0.0010483	12.7695	37.8367	355.3885	114.7523
L1 . 72	**94002A**	**Gals 1**					
	26-DEC-12	873	81.5	33.4	114.9	51	956
	23005.567488	42182.15785	0.0010482	12.3661	40.5858	90.9002	100.9462

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 73	**01037D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	28-DEC-12	886	84.7	31.7	116.4	52	559
	23007.615370	42142.73054	0.0021539	7.7007	54.4159	317.1179	95.1810
L1 . 74	**84078F**	**Proton-K/DM fourth stage (Blok-DM)**					
	23-DEC-12	889	85.5	31.3	116.8	49	914
	23002.653623	42169.97466	0.0026327	14.5828	0.4543	74.9538	32.8623
L1 . 75	**97071B**	**Cakrawatra 1**					
	26-DEC-12	897	87.5	30.3	117.7	51	750
	23005.841759	42182.92706	0.0000076	6.5013	58.7924	262.2782	102.9958
L1 . 76	**91087A**	**Raduga 28**					
	25-DEC-12	899	87.9	30.1	117.9	51	1044
	23004.639699	42188.67496	0.0006821	13.8165	27.5402	37.0661	62.7607
L1 . 77	**89030A**	**Raduga 23**					
	26-DEC-12	911	90.6	28.6	119.2	52	1094
	23005.532072	42140.47889	0.0022218	14.1889	17.4579	66.3714	90.7408
L1 . 78	**82031A**	**Insat-IA**					
	27-DEC-12	924	93.5	27.1	120.6	48	574
	23006.591088	42148.09760	0.0019400	14.6609	349.3660	293.6737	39.9217
L1 . 79	**74060F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	932	95.1	26.2	121.3	50	877
	23004.458495	42138.32186	0.0019996	11.5060	324.3286	75.2270	65.1579
L1 . 80	**90061D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	941	96.9	25.2	122.2	51	968
	23005.493669	42147.17370	0.0035317	14.0829	22.4454	78.1484	109.7539
L1 . 81	**97021A**	**Zhongxing 6 (B)**					
	26-DEC-12	985	104.8	21.0	125.8	51	798
	23005.629653	42191.39999	0.0008817	7.9725	55.1148	356.8348	92.8332
L1 . 82	**09018A**	**Beidou DW 2 (Compass G2)**					
	27-DEC-12	1007	108.3	19.1	127.4	52	194
	23006.852211	42154.03563	0.0057533	2.1961	69.8508	168.5990	25.8986
L1 . 83	**86090D**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-12	1007	108.3	19.0	127.4	50	1007
	23007.533183	42193.77948	0.0012082	14.4676	8.4281	49.4275	79.2197
L1 . 84	**91014A**	**Raduga 27**					
	27-DEC-12	1024	110.9	17.6	128.5	52	1067
	23006.497106	42185.59643	0.0003239	14.5028	24.6784	24.9139	109.3865
L1 . 85	**04010A**	**Raduga-1**					
	26-DEC-12	1031	111.9	17.1	129.0	52	445
	23005.792639	42141.30807	0.0001522	6.8274	64.5349	38.4177	43.3835
L1 . 86	**84063A**	**Raduga 15**					
	27-DEC-12	1033	112.1	17.0	129.1	52	911
	23006.673623	42156.84053	0.0006465	14.6196	358.9846	71.3717	20.0239
L1 . 87	**96040B**	**Turksat 1C**					
	26-DEC-12	1040	113.2	16.4	129.5	52	814
	23005.622662	42188.54498	0.0003711	4.1766	65.0228	35.1946	105.1136

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 88	**77092H**	**Ekran 2 fragmentation debris**					
	25-DEC-12	1048	114.2	15.8	130.0	51	661
	23004.308981	42169.91016	0.0008815	13.5695	334.4767	146.0213	129.0969
L1 . 89	**03015F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-12	1077	117.9	13.7	131.6	52	477
	23004.857743	42163.90907	0.0010874	6.3070	57.9243	282.7947	14.1184
L1 . 90	**83089B**	**Insat-IB**					
	27-DEC-12	1078	118.1	13.6	131.7	52	984
	23006.616377	42136.46232	0.0010491	14.4674	12.9771	105.5000	54.7310
L1 . 91	**01037A**	**Cosmos-2379**					
	28-DEC-12	1103	121.0	11.9	133.0	51	580
	23007.834028	42156.38408	0.0003752	7.7366	54.2974	69.8288	16.3417
L1 . 92	**95054D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	1106	121.3	11.8	133.1	52	724
	23006.539525	42144.69633	0.0021103	11.7275	46.7837	328.8585	116.0033
L1 . 93	**93013A**	**Raduga 29**					
	27-DEC-12	1114	122.2	11.3	133.4	51	1017
	23006.767801	42152.75031	0.0006103	13.4469	31.8405	18.2292	18.8388
L1 . 94	**77108A**	**Meteosat 1**					
	27-DEC-12	1126	123.5	10.5	134.0	48	990
	23006.557743	42188.93296	0.0011889	14.0738	338.6122	330.0660	41.3434
L1 . 95	**88095A**	**Raduga 22**					
	26-DEC-12	1134	124.3	10.0	134.4	51	1118
	23005.413785	42173.30698	0.0007042	14.2782	15.7763	59.6709	131.5957
L1 . 96	**84035A**	**STW F-2**					
	27-DEC-12	1140	124.9	9.7	134.6	49	890
	23006.420938	42143.79699	0.0011960	14.4459	3.7204	66.1353	116.0292
L1 . 97	**95063D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-12	1174	128.2	7.8	135.9	50	731
	23004.813067	42162.05960	0.0044852	13.1230	35.0736	52.0307	8.0614
L1 . 98	**90102A**	**Gorizont 22**					
	31-DEC-12	1320	139.0	1.0	140.0	51	1071
	23010.757685	42174.63706	0.0001548	13.9969	23.3190	322.9850	10.0118
L1 . 99	**74094A**	**Skynet 2B**					
	26-DEC-12	1371	141.7	359.2	140.9	51	789
	23005.537616	42193.02129	0.0003864	12.8510	334.8026	58.6791	45.8836
L1 . 100	**78035A**	**Intelsat IVA F-6**					
	27-DEC-12	1432	144.5	357.3	141.7	50	932
	23006.705174	42153.94962	0.0005237	14.6523	359.1142	155.5414	8.7204
L1 . 101	**93062D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-12	1587	149.2	353.7	142.8	49	762
	23006.799063	42153.03914	0.0011105	13.2102	33.5330	325.4268	9.1451
L1 . 102	**85035B**	**Telecom 1B**					
	28-DEC-12	1642	150.3	352.7	143.0	52	993
	23007.405394	42144.89822	0.0001433	14.5526	7.0795	359.5325	123.8945

L1 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1 . 103	**92088A**	**Cosmos 2224**					
	27-DEC-12	1655	150.5	352.6	143.1	52	999
	23006.570417	42196.81850	0.0003946	12.7928	33.4064	114.9353	91.6642
L1 . 104	**67026A**	**Intelsat II F-3**					
	28-DEC-12	1700	153.5	351.3	144.8	30	478
	23007.366076	42130.53775	0.0022972	6.4362	311.0766	242.9456	82.0088

3.5 Objects in a libration orbit around the Western stable point

In the case where the object is in a libration orbit around the Western stable point (longitude 105 W), there are 40 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 34.

L2 .nn	**COSPAR**	**NAME**					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L2 . 1	**93058B**	**ACTS**					
	27-DEC-12	890	1.2	254.1	255.3	52	973
	23006.141644	42164.70857	0.0014246	12.0814	42.1949	352.0315	255.1522
L2 . 2	**88081A**	**Gstar 3**					
	26-DEC-12	900	0.3	254.5	254.8	52	1054
	23005.050995	42164.45346	0.0007691	15.6011	8.0261	45.3753	254.8007
L2 . 3	**85035A**	**Gstar 1**					
	28-DEC-12	900	0.3	254.6	254.9	52	1162
	23007.122616	42164.60652	0.0007102	13.1592	35.8318	317.1218	254.6606
L2 . 4	**71009A**	**NATO IIB**					
	26-DEC-12	900	0.9	254.2	255.1	51	965
	23005.926944	42164.46243	0.0005658	11.3138	323.7396	87.3824	254.3535
L2 . 5	**67111A**	**ATS 3**					
	26-DEC-12	900	0.3	254.6	254.9	52	1114
	23005.890104	42164.66119	0.0016909	7.5253	310.6579	85.8810	254.7647
L2 . 6	**69101A**	**Skynet 1A**					
	30-DEC-12	910	4.1	252.6	256.7	53	883
	23009.908900	42163.46925	0.0024460	9.8215	320.9250	180.6321	254.0799
L2 . 7	**78062A**	**GOES 3**					
	28-DEC-12	911	8.1	250.7	258.8	52	1159
	23007.001250	42163.45271	0.0004552	14.5438	348.5321	80.0580	251.2823
L2 . 8	**93073A**	**Solidaridad 1**					
	27-DEC-12	911	8.2	250.7	258.8	52	959
	23006.168056	42165.22832	0.0005156	10.6787	47.5717	108.4216	251.0555
L2 . 9	**70021A**	**NATO I**					
	27-DEC-12	912	10.6	249.5	260.0	52	889
	23006.935197	42166.50113	0.0004063	10.3080	324.7010	123.1362	251.3373
L2 . 10	**71095A**	**OPS 9431 (DSCS II F-1)**					
	26-DEC-12	913	13.1	248.2	261.3	52	1089
	23005.936725	42161.31236	0.0004046	11.6845	325.2969	154.8496	252.3127
L2 . 11	**76023A**	**LES 8 (RTGPP)**					
	27-DEC-12	913	14.2	247.7	261.9	51	1141
	23006.337847	42163.84628	0.0011963	12.7016	115.0169	356.2640	257.0100
L2 . 12	**93077A**	**Telstar 4A**					
	27-DEC-12	914	16.6	246.5	263.1	52	978
	23006.145509	42167.92657	0.0009441	12.8602	37.9229	10.0356	249.5371

L2 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L2 . 13	**76023B**	**LES 9 (RTGPP)**					
	27-DEC-12	920	5.0	252.5	257.5	52	1152
	23006.345891	42163.43393	0.0022052	12.6602	115.0222	14.5569	254.1831
L2 . 14	**95049A**	**Telstar 402R**					
	26-DEC-12	925	32.3	238.8	271.1	52	870
	23005.199931	42157.18239	0.0001404	8.2347	54.2699	234.5483	247.1076
L2 . 15	**85076C**	**ASC 1**					
	25-DEC-12	940	45.7	232.3	278.0	52	1096
	23004.166481	42157.48782	0.0005280	13.7364	30.3901	301.7062	236.3325
L2 . 16	**75100A**	**GOES 1**					
	26-DEC-12	943	48.4	231.0	279.4	51	1118
	23005.971319	42176.97716	0.0000817	13.8443	336.4025	143.5442	250.8962
L2 . 17	**82105A**	**Aurora I**					
	27-DEC-12	950	0.7	254.4	255.1	52	1151
	23006.078171	42164.59924	0.0002950	14.3189	18.5470	296.2744	254.4361
L2 . 18	**83041A**	**GOES 6**					
	28-DEC-12	962	60.0	225.4	285.4	52	1151
	23007.073681	42178.72417	0.0004282	14.5613	7.2524	84.9462	243.8602
L2 . 19	**95069A**	**Galaxy IIIR**					
	26-DEC-12	965	61.5	224.7	286.2	52	864
	23005.236782	42152.25728	0.0001236	7.3936	56.5365	328.3384	236.0570
L2 . 20	**81049A**	**GOES 5**					
	28-DEC-12	995	75.3	218.1	293.4	52	1090
	23007.108657	42176.36475	0.0002637	14.6429	2.3734	131.3542	226.3270
L2 . 21	**76004A**	**Hermes**					
	28-DEC-12	1006	79.6	216.1	295.7	51	1085
	23007.053484	42169.87567	0.0016701	13.4540	333.4601	129.6214	217.4611
L2 . 22	**96055A**	**EchoStar 2**					
	27-DEC-12	1031	88.2	212.1	300.2	52	809
	23006.098727	42174.64940	0.0002625	3.8846	66.2416	344.0894	294.4254
L2 . 23	**68081D**	**LES 6**					
	26-DEC-12	1038	90.2	211.1	301.3	52	1019
	23005.823715	42151.64381	0.0006594	8.7318	324.0641	297.4185	291.8280
L2 . 24	**87100A**	**Raduga 21**					
	27-DEC-12	1099	105.9	203.9	309.7	52	1158
	23006.150741	42183.19647	0.0004559	14.8070	12.4076	57.2023	222.1762
L2 . 25	**65028A**	**Intelsat I F-1**					
	25-DEC-12	1123	111.1	201.5	312.6	51	457
	23004.704109	42154.94505	0.0011285	3.6526	294.6505	190.7499	306.9877
L2 . 26	**97086A**	**HGS-1**					
	27-DEC-12	1282	135.2	190.9	326.1	52	722
	23006.114491	42184.38729	0.0044315	4.6050	79.3010	269.3688	301.2990
L2 . 27	**84078A**	**Gorizont 10**					
	27-DEC-12	1306	137.8	189.8	327.6	52	1033
	23006.036713	42134.64217	0.0001440	14.5570	0.1578	94.0210	251.0578

L2 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L2 . 28	**67094A**	**Intelsat II F-4**					
	22-DEC-12	1323	139.5	189.1	328.6	50	777
	23001.693854	42169.62077	0.0016615	6.6715	307.7918	190.7191	326.4241
L2 . 29	**90016A**	**Raduga 25**					
	27-DEC-12	1325	139.7	189.0	328.7	51	1107
	23006.246366	42152.92764	0.0004101	14.1177	20.6627	66.9688	195.9100
L2 . 30	**82103A**	**Gorizont 6**					
	24-DEC-12	1338	141.0	188.5	329.5	51	989
	23003.818032	42155.60880	0.0004293	14.5270	351.3599	101.2972	323.1912
L2 . 31	**85070A**	**Raduga 16**					
	25-DEC-12	1349	142.0	188.1	330.1	52	986
	23004.833333	42160.01331	0.0002552	14.5409	3.1512	82.0001	328.4597
L2 . 32	**80081A**	**Raduga 7**					
	27-DEC-12	1455	150.2	185.0	335.2	52	971
	23006.172269	42160.97266	0.0007564	14.3585	343.3091	171.9519	185.2689
L2 . 33	**94038A**	**Cosmos 2282**					
	26-DEC-12	1486	152.1	184.4	336.5	50	935
	23005.037257	42190.73287	0.0010336	12.0938	37.7692	354.2843	289.4025
L2 . 34	**92059A**	**Cosmos 2209**					
	26-DEC-12	1494	152.6	184.2	336.8	52	993
	23005.882755	42161.74091	0.0002045	13.6907	29.4377	101.8424	335.9149
L2 . 35	**85016A**	**Cosmos 1629**					
	27-DEC-12	1500	152.9	184.1	337.0	51	989
	23006.124074	42190.50096	0.0006710	14.5994	1.3411	92.9502	220.7649
L2 . 36	**87091A**	**Cosmos 1894**					
	25-DEC-12	1511	153.5	183.9	337.4	50	1101
	23004.837014	42170.40147	0.0001195	14.3668	11.1487	131.0210	335.1098
L2 . 37	**80004A**	**OPS 6393 (FLTSATCOM F3)**					
	25-DEC-12	1541	155.0	183.4	338.5	50	1067
	23004.786933	42171.80704	0.0028222	13.2849	349.6373	111.5692	331.9721
L2 . 38	**89101A**	**Cosmos 2054**					
	26-DEC-12	1671	160.1	182.0	342.1	52	1083
	23005.284606	42160.20865	0.0002559	14.1276	20.1923	16.6912	182.5835
L2 . 39	**94082A**	**Luch 1**					
	27-DEC-12	1856	163.9	181.3	345.2	52	909
	23006.899340	42161.20501	0.0005533	12.3701	42.1283	44.5523	341.6484
L2 . 40	**94060A**	**Cosmos 2291**					
	27-DEC-12	2373	167.0	181.0	348.0	52	910
	23006.204745	42193.09458	0.0006849	12.8485	36.2715	61.1654	226.5548

3.6 Objects in a libration orbit around both stable points

In the case where the object is in a libration orbit around both stable points, there are 17 objects identified.

It is important to note that this category is special and only a smaller number of objects is concerned. It is a borderline case, just between a libration around one stable point and a drift around the Earth. Thus, some perturbations which could be neglected in the other cases have a strong influence here. The main consequence is that this category is more sensitive to errors in the measurements than the others and the libration period may have a low accuracy.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 34.

L3 .nn	**COSPAR**	**NAME**					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L3 . 1	**82044F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-12	2936	334.9	174.6	149.5	51	915
	23004.685382	42152.06763	0.0018608	15.6423	351.2065	61.0628	10.0781
L3 . 2	**97083A**	**Intelsat 804**					
	26-DEC-12	2937	335.3	174.4	149.7	52	754
	23005.410671	42166.43524	0.0003672	7.0445	57.4866	247.8562	174.1945
L3 . 3	**71095B**	**OPS 9432 (DSCS II F-2)**					
	21-DEC-12	2937	335.4	174.4	149.8	47	973
	23000.072454	42189.85465	0.0002031	11.6322	325.6378	10.3559	209.5317
L3 . 4	**91054D**	**IUS second stage**					
	26-DEC-12	2937	334.1	175.0	149.1	52	851
	23005.467963	42188.05764	0.0033087	15.4370	23.2064	215.3112	119.1786
L3 . 5	**91064A**	**Cosmos 2155**					
	30-DEC-12	2941	332.9	175.6	148.6	52	1052
	23009.777593	42151.60459	0.0001271	13.9420	25.7888	10.0247	6.2907
L3 . 6	**77092L**	**Ekran 2 fragmentation debris**					
	27-DEC-12	2945	337.5	173.3	150.8	34	48
	23006.018472	42133.87767	0.0120587	13.5968	334.4370	291.3082	230.6170
L3 . 7	**97041A**	**Cosmos 2345**					
	26-DEC-12	2996	329.0	177.6	146.6	50	759
	23005.283854	42188.71819	0.0162702	11.5210	43.7893	169.4217	206.7417
L3 . 8	**12012D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-12	3014	328.3	178.0	146.3	41	41
	23005.519155	42174.87044	0.0011372	1.7571	286.9499	348.1442	5.3864
L3 . 9	**94030A**	**Gorizont 30**					
	28-DEC-12	3034	343.8	170.1	153.9	52	950
	23007.437060	42172.20081	0.0001564	13.0518	34.8425	71.7405	140.2376
L3 . 10	**90094A**	**Gorizont 21**					
	26-DEC-12	3063	327.0	178.7	145.7	52	1104
	23005.307951	42164.71193	0.0005134	14.0721	23.1701	122.8828	177.1711
L3 . 11	**00029A**	**Gorizont 33**					
	27-DEC-12	3089	326.5	178.9	145.4	52	638
	23006.295174	42142.57320	0.0002420	9.5027	49.9615	20.1787	207.4955

L3 .nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L3 . 12	**85007A**	**Gorizont 11**					
	26-DEC-12	3585	323.0	180.7	143.7	51	1007
	23005.641910	42139.38634	0.0003762	14.5053	1.8914	71.5582	35.3325
L3 . 13	**94067D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	26-DEC-12	3586	323.0	180.7	143.7	50	813
	23005.591389	42130.77388	0.0008704	13.5011	31.8441	13.0445	83.4956
L3 . 14	**91079A**	**Cosmos 2172**					
	25-DEC-12	3765	322.7	180.9	143.6	52	1007
	23004.513727	42136.86898	0.0003147	13.8407	26.9290	275.1317	107.5412
L3 . 15	**87084A**	**Cosmos 1888**					
	26-DEC-12	3781	322.7	180.9	143.6	52	1122
	23005.866956	42177.88052	0.0003906	14.3241	11.5620	81.4696	323.7710
L3 . 16	**95045A**	**Cosmos 2319**					
	26-DEC-12	3861	322.6	181.0	143.5	52	870
	23005.909560	42171.45087	0.0005587	12.4274	39.3576	89.2055	336.1851
L3 . 17	**86027A**	**Cosmos 1738**					
	27-DEC-12	3920	322.5	181.0	143.5	49	1042
	23006.717465	42151.66454	0.0013737	15.0383	5.8492	3.6953	11.0076

The longitude histories of objects in this category are plotted in Fig 3.1 to 3.17.

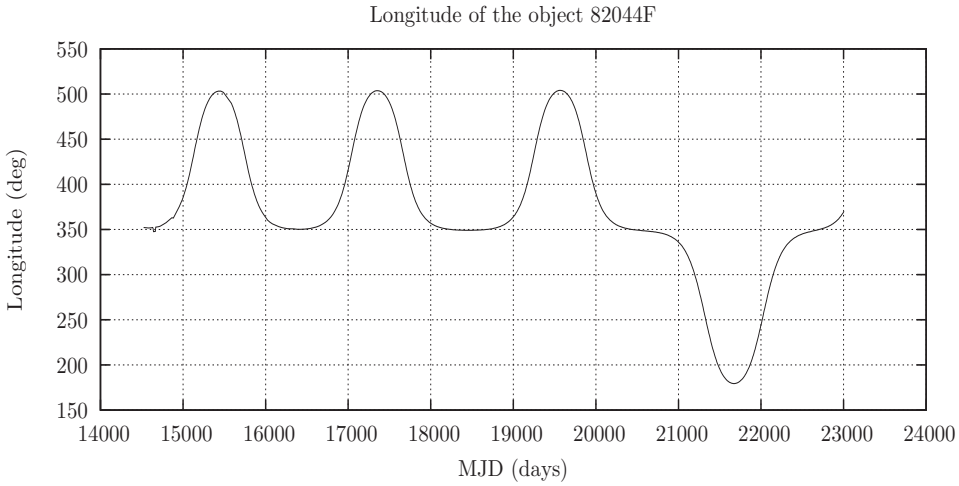

Figure 3.1: Longitude history of 82044F

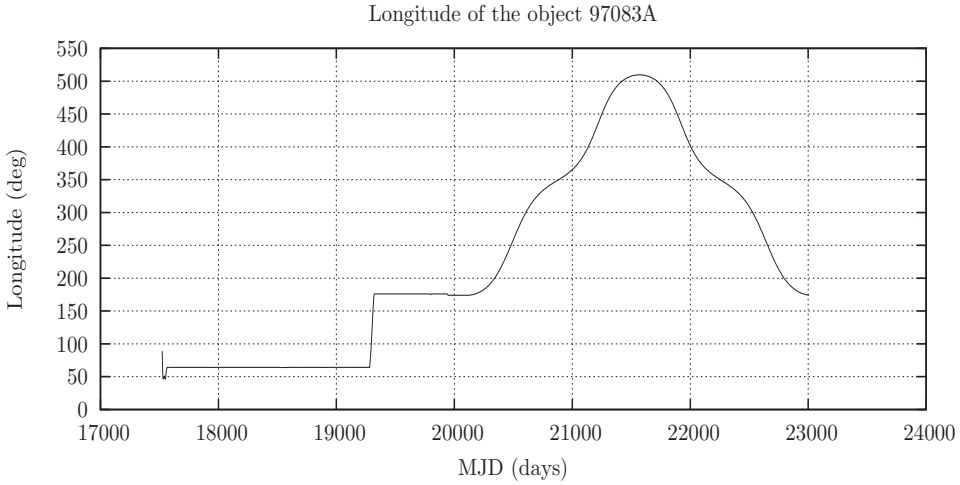

Figure 3.2: Longitude history of 97083A

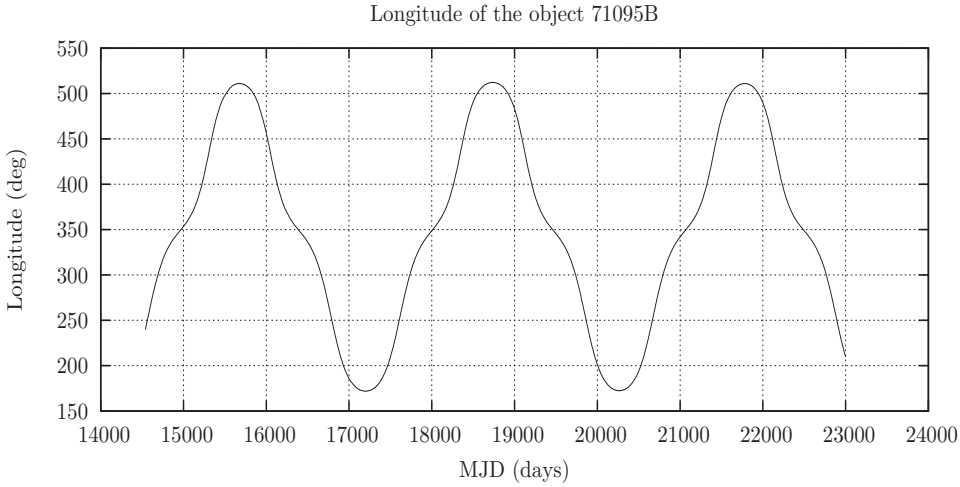

Figure 3.3: Longitude history of 71095B

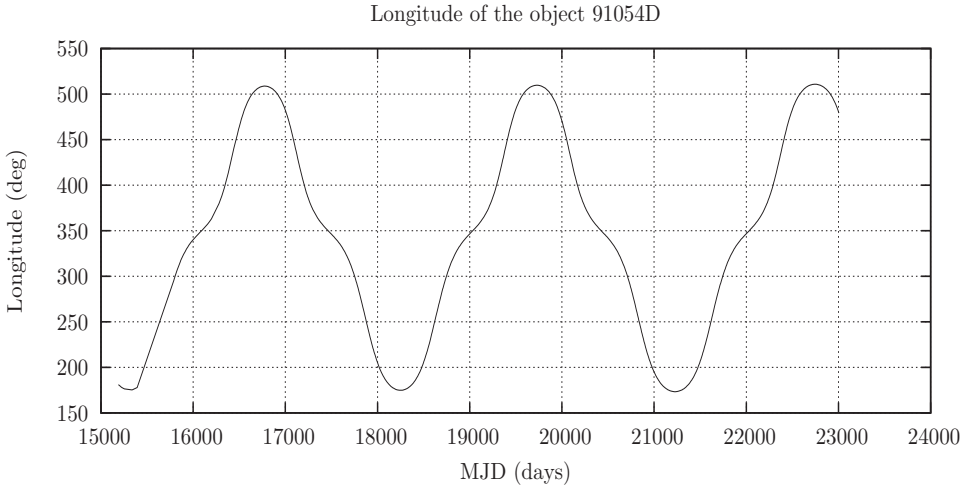

Figure 3.4: Longitude history of 91054D

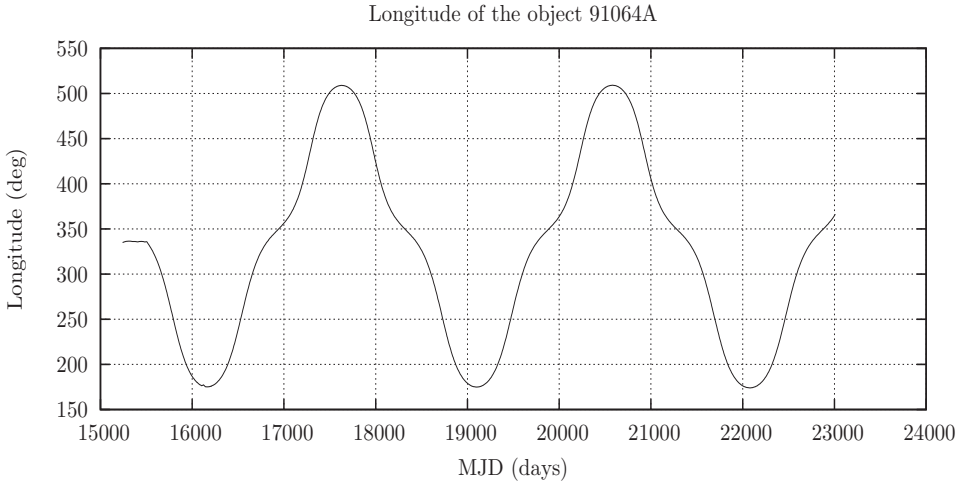

Figure 3.5: Longitude history of 91064A

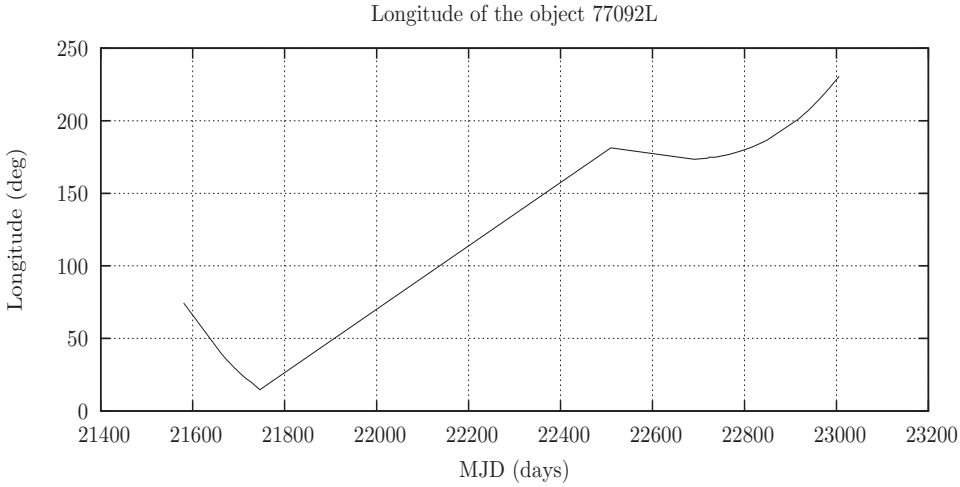

Figure 3.6: Longitude history of 77092L

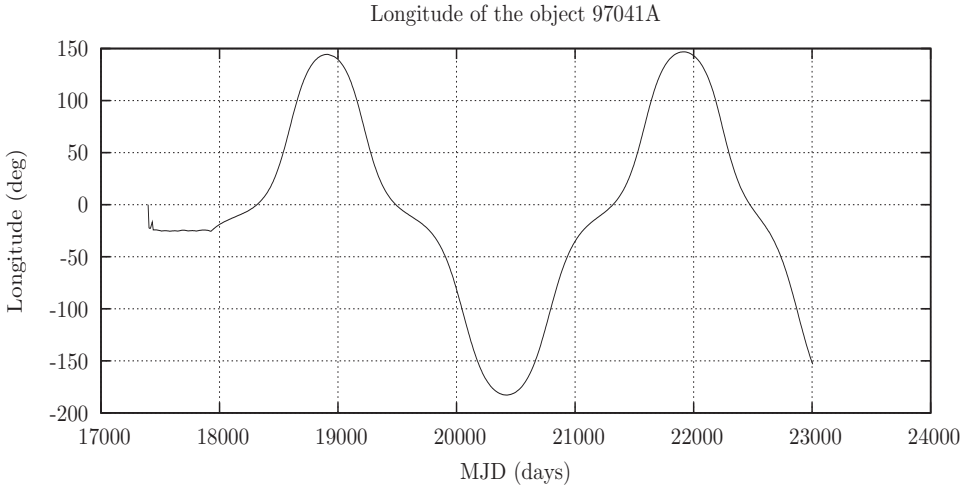

Figure 3.7: Longitude history of 97041A

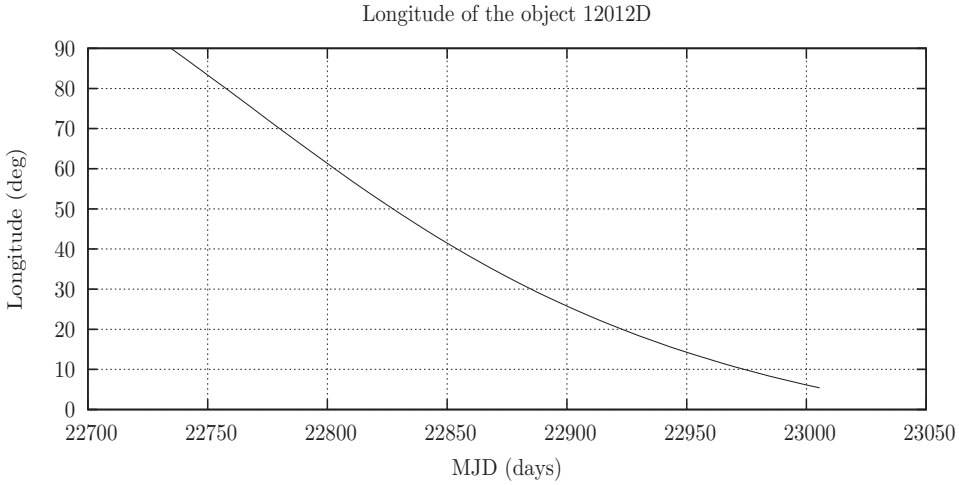

Figure 3.8: Longitude history of 12012D

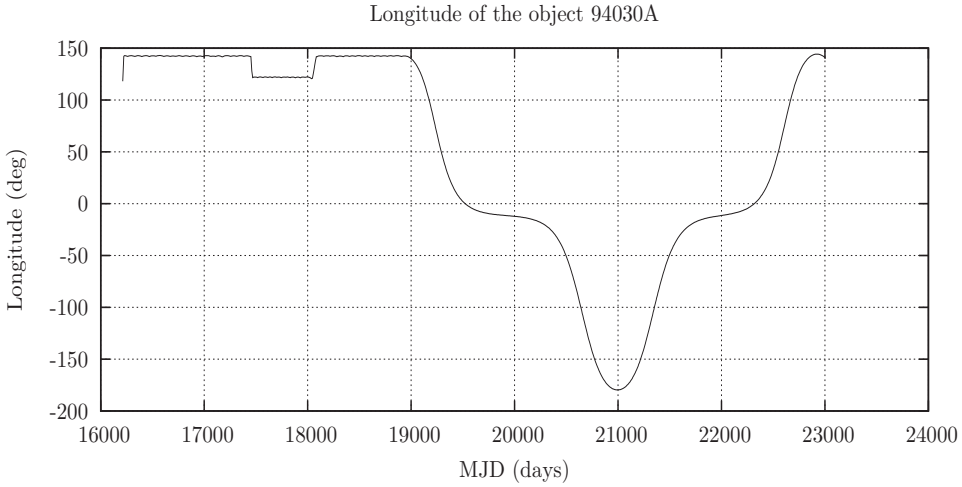

Figure 3.9: Longitude history of 94030A

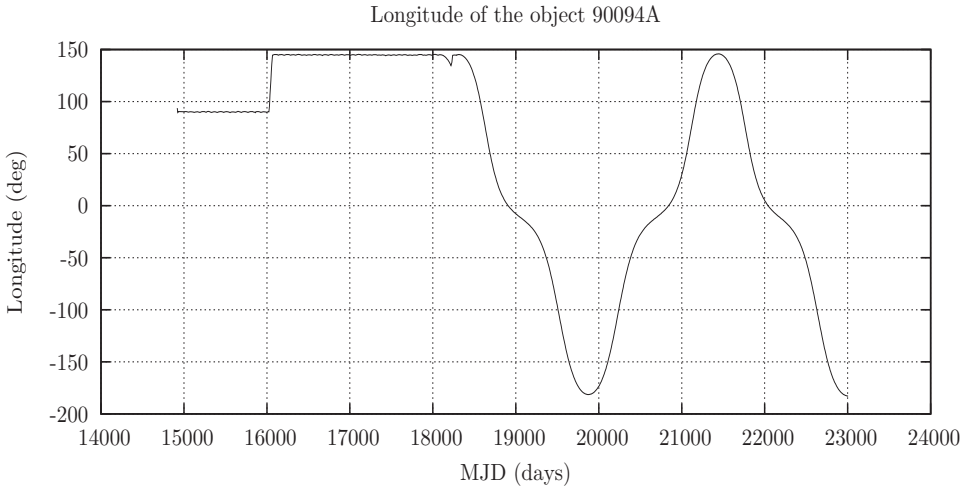

Figure 3.10: Longitude history of 90094A

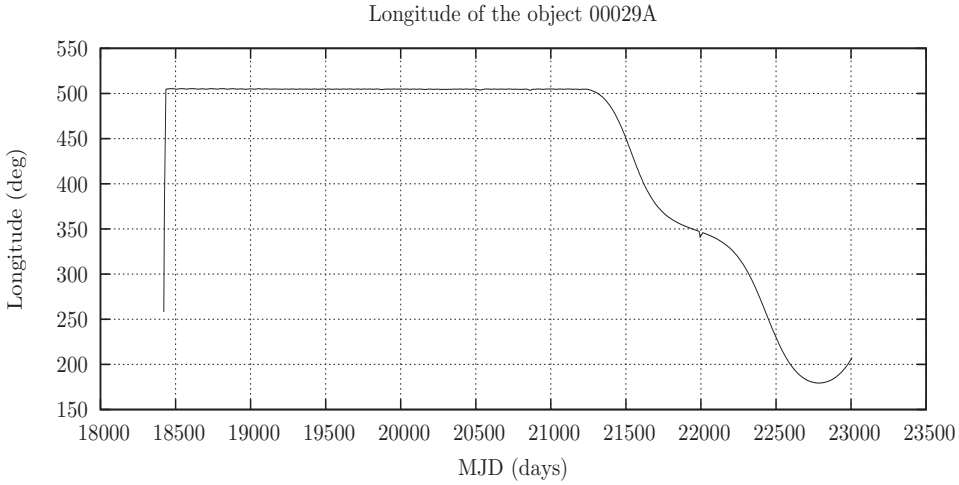

Figure 3.11: Longitude history of 00029A

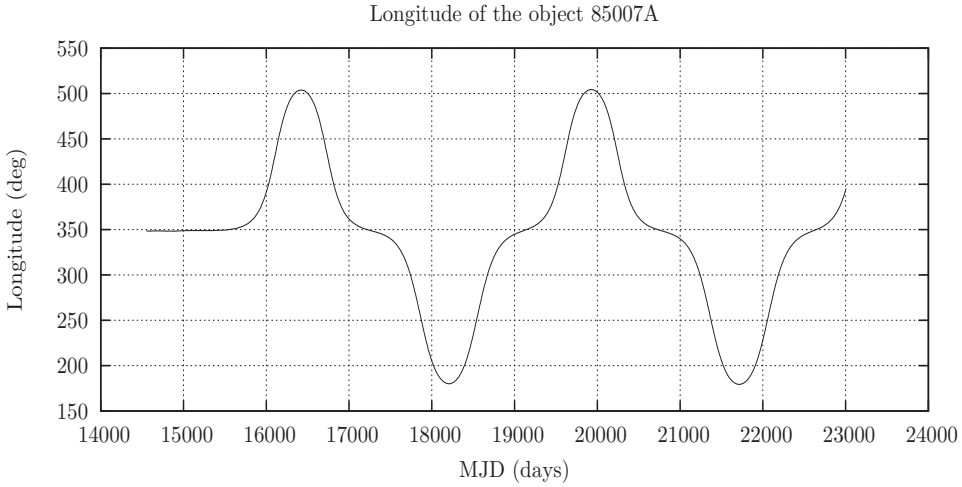

Figure 3.12: Longitude history of 85007A

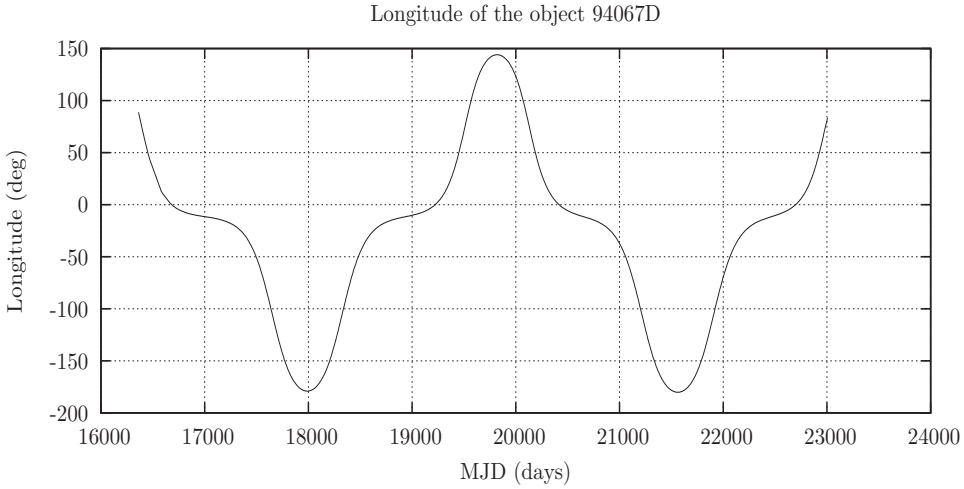

Figure 3.13: Longitude history of 94067D

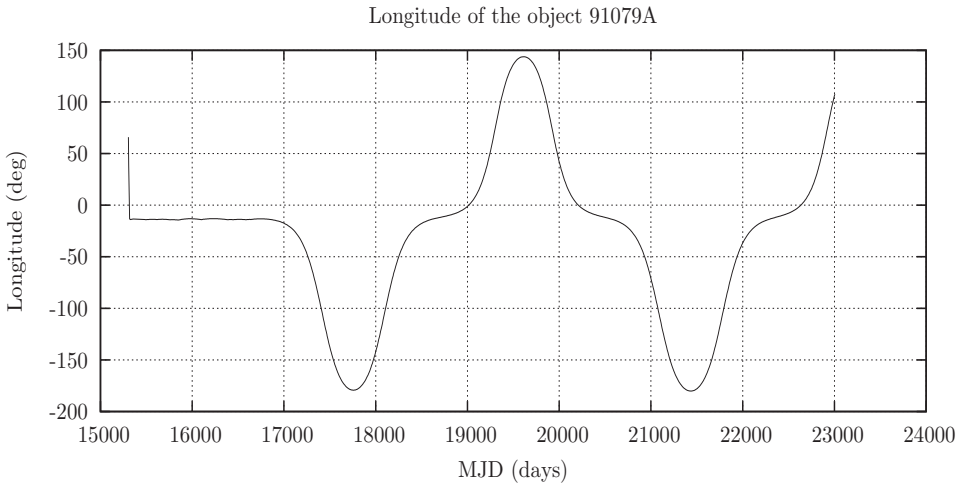

Figure 3.14: Longitude history of 91079A

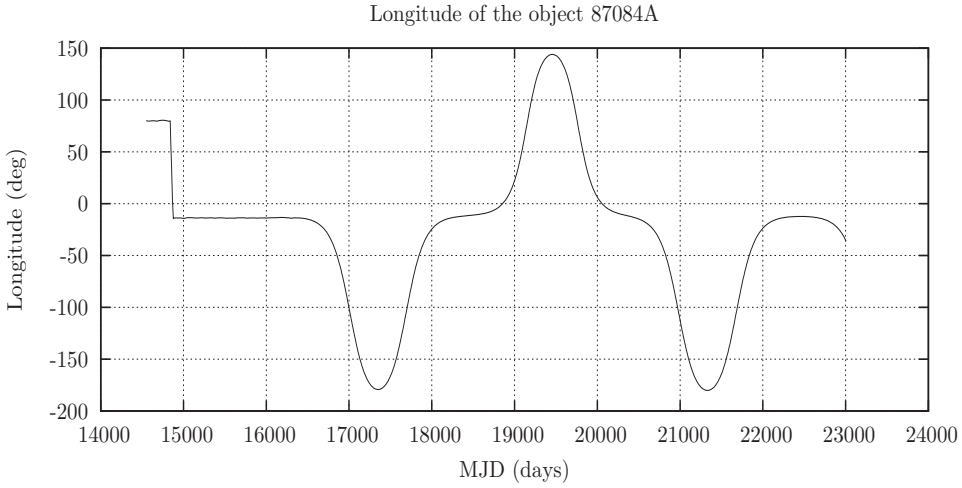

Figure 3.15: Longitude history of 87084A

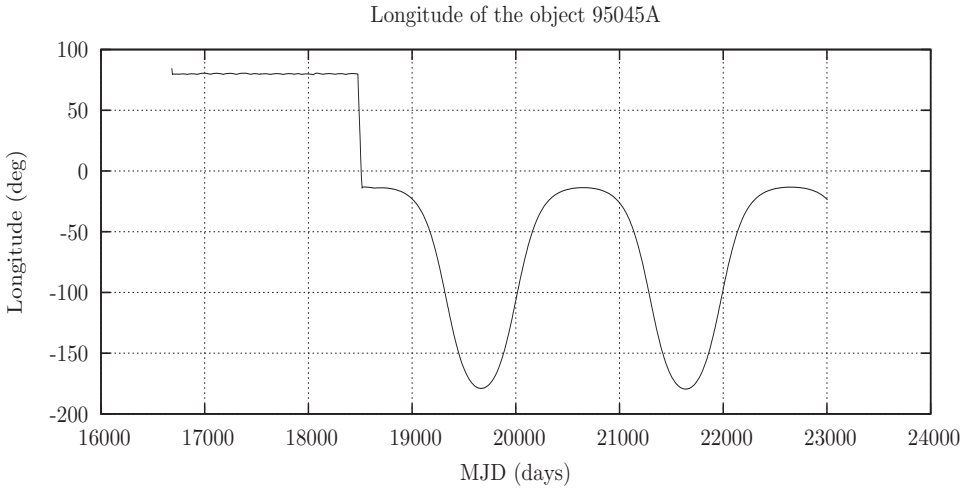

Figure 3.16: Longitude history of 95045A

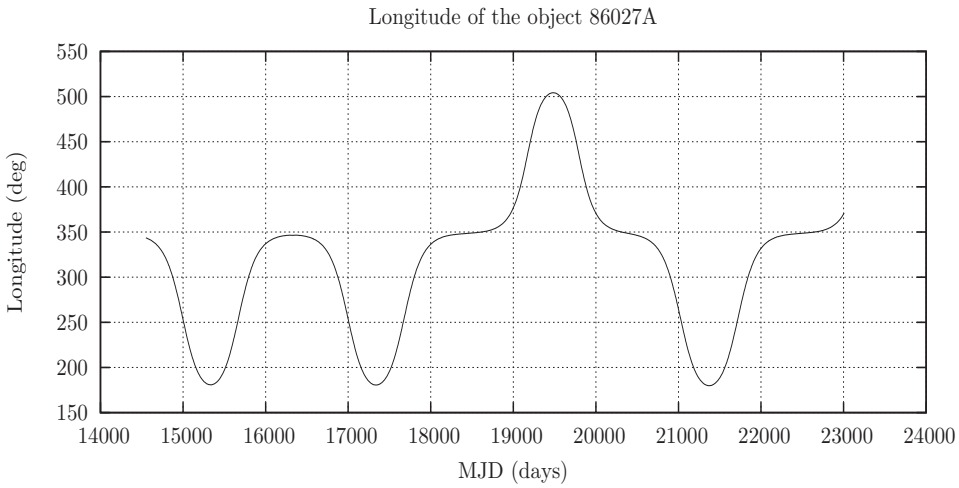

Figure 3.17: Longitude history of 86027A

4 Table 2: Objects without Two-Line-Element data

This table contains all objects for which the TLEs were not updated during the last six months or for which no TLEs are available at all.

They are ordered according to the following criteria:

1. Status C1, then according to the ascending order of longitude of station keeping.
2. Status C2, then according to the ascending order of longitude of station keeping.
3. Status C, then according to the COSPAR identifier.
4. Status D, then according to the ascending order of the semi-major axis.
5. Status L1, then according to the ascending order of the longitude.
6. Status L2, then according to the ascending order of the longitude.
7. Status L3, then according to the ascending order of the longitude.
8. Status Ind, then according to the ascending order of the longitude.
9. Status UI (unidentified objects), then according to their UI number.
10. Status U (uncontrolled objects), then according to the COSPAR identifier.
11. Status UU (uncontrolled uncatalogued objects), then according to the COSPAR identifier.

The objects listed in chapters 4.1 to 4.8 were observed repeatedly by ground based telescopes. They were listed in issues 7 to 13 as 'Unidentified objects'. During the years 2011-2012 most of them were correlated to a launch thanks to the excellent work of satellite analysts and amateur observers. But for the objects in chapter 4.8 their origin is not yet determined with the required reliability.

Orbits were established by processing of optical measurements and propagation to Jan 1, 2013 00:00:00 UTC except a few cases when the orbit was propagated to UTC midnight closest to the last obtained measurement. For most of the orbits this time point is within the orbit determination time interval but for some of them it is outside due to visibility constraints of the participating optical facilities.

The numerical integration model used in the data processing is taking into account the Earth gravity field (16x16, EGM-96), the Moon and the Sun gravity (DE-405 ephemeris) and solar radiation pressure (diffuse Lamberthian sphere model).

All objects are usually relatively bright as a rule (brighter than 15th magnitude at favorable phase angles) and have no significant short term variations in brightness. Though there are a few exceptions.

The listed orbits are produced from measurements obtained in 2012. They are a joint product of the wide cooperation of organizations including:

- Center on collection, processing and analysis of information on space debris at the Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences (KIAM RAS, Moscow, Russia),
- International scientific observation facilities network (ISON) coordinated by KIAM RAS and including the following observatories:

- Ussuriysk Astrophysical Observatory of the Far East branch of the RAS (Gornotayozhnoye, Russia),
- Terskol observatory of the Institute for Astronomy of the RAS (INASAN) (North Caucasus, Russia),
- Ulugbek Astronomical Observatory (Kitab facilitiy, Uzbekistan),
- Observation facilities operated by the Astronomical Scientific Center "Proekt-tekhnika", JSC:
  - Blagoveshchensk (Amur region, Russia),
  - Milkovo (Kamchatka peninsula, Russia),
  - Artem (Primorsky region, Russia),
  - Kislovodsk observatory (Karachaevo-Cherkesskaya Republic, Russia),
- Andrushivka Observatory (Ukraine),
- National observatory of Bolivia (Tarija),
- Observation facility of the PGU (Tiraspol),
- Gissar and Sanglok observatories of the Institute for Astrophysics of Tajikistan,
- Odessa State University Astronomical Observatory (Mayaki, Ukraine),
- Derenovka observation facility of the Space research laboratory of the Physics faculty of Uzhgorod national university (Zakarpats'ka region,Ukraine),
- Chuguyev observation facility of the Astronomy scientific and research institute of Kharkov national university (Kharkov region, Ukraine),
- Cosalá observation facility of the The Autonomous University of Sinaloa (Universidad Autónoma de Sinaloa, UAS), Mexico,
- Khureltogoot observatory of the The Research Centre of Astronomy and Geophysics of the Mongolian Academy of Sciences

- Astronomical Institute of the University of Bern, partner of ISON, operating the Zimmerwald observatory (Switzerland) and, for space debris observation, the ESA 1m telescope at the optical ground station (OGS), Izaña, Tenerife, Spain,
- Joint Italian-Russian telescope FIRST at Collepardo observation facility (Italy),
- Telescope Fabra ROA Montsec (TFRM) operated by the Reial Acadèmia de Ciències i Arts de Barcelona - Observatori Fabra, the Real Instituto y Observatorio de la Armada (ROA) and the Departament d'Astronomia i Meteorologia, Universitat de Barcelona, Spain,

The following symbols are used:

- TYPE - type of orbital motion performed by the object as determined from 5 years observations:
  - C1 - maintains longitude and near-zero inclination,
  - C2 - maintains longitude only,
  - C3 - maintains longitude and a non-zero inclination,
  - C4 - maintains a drift orbit inside the GEO protected zone,
  - D1 - drifts along GEO under natural perturbations influence only,

  - D2 - drifts along GEO under natural perturbations and accelerations produced by on-board energy sources,
  - L1 - librates around Eastern stable point,
  - L2 - librates around Western stable point,
  - L3 - librates around both stable points
  - Ind - indeterminate status
- COSPAR - the COSPAR identifier
- NAME - the object's common name
- UInnn - number of object (used by KIAM before identification)
- YYYYMMDD HHMMSS.SS - date and time of given set of elements, UTC
- t_{osc} - osculating period, min
- H_p - perigee height, km
- H_a - apogee heigh, km
- λ - geodetic longitude at closest ascending node preceding date and time of given set of elements, degrees East
- i - inclination, degrees
- Ω - right ascension of ascending node, degrees
- ω - argument of perigee, degrees
- a - semimajor axis, km
- e - eccentricity
- u - argument of latitude, degrees

The osculating orbital elements are given in the standard Earth equator J2000 reference frame.

4.1 Satellites under longitude and inclination control (E-W and N-S control)

In the case where the satellite is under longitude and inclination control, there are 5 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

C1 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
C1 . 1	**09047A**	**USA 207 (PAN)**				
UI158	20130104	00:00:00.0	1436.1853	35760.3	35816.4	042.514
	00.1689	053.7934	216.4608	42166.462	0.0006654	092.2032
C1 . 2	**09017A**	**USA 204 (WGS F2)**				
UI156	20130101	00:00:00.0	1436.1990	35787.8	35789.4	060.187
	00.0960	077.0273	001.5136	42166.731	0.0000189	083.7962
C1 . 3	**12003A**	**USA 233 (WGS F-4)**				
UI169	20130101	00:00:00.0	1436.1183	35786.1	35787.9	088.393
	00.0990	074.3772	210.3469	42165.151	0.0000215	114.6497
C1 . 4	**07046A**	**USA 195 (WGS F1)**				
UI152	20130101	00:00:00.0	1436.1796	35784.3	35792.2	175.018
	00.1024	075.8190	231.9889	42166.350	0.0000934	199.8111
C1 . 5	**09068A**	**USA 211 (WGS F3)**				
UI159	20130101	00:00:00.0	1436.1457	35786.4	35788.7	348.055
	00.1099	075.7007	211.4442	42165.686	0.0000272	012.9943

4.2 Satellites under longitude control (only E-W control)

In the case where the satellite is only under longitude control, there are 48 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

C2 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
C2 . 1	**97008A**	**USA 130 (DSP F18)**				
UI125	20130101	00:00:00.0	1436.3788	35788.1	35796.2	020.770
	10.6044	048.3960	007.9671	42170.250	0.0000956	073.0114
C2 . 2	**96026A**	**USA 118 (MERCURY 2)**				
UI073	20130101	00:00:00.0	1435.3257	33574.8	37968.4	024.304
	09.0521	010.9483	208.9247	42149.635	0.0521185	105.2121
C2 . 3	**93056A**	**USA 95 (UFO F2)**				
UI069	20130101	00:00:00.0	1436.0849	35771.7	35802.1	029.066
	08.9702	037.4762	264.1539	42164.497	0.0003602	092.1836
C2 . 4	**02001A**	**USA 164 (Milstar-2 F3)**				
UI063	20130101	00:00:00.0	1436.1994	35781.1	35796.2	029.968
	05.2974	046.4756	223.6242	42166.737	0.0001791	084.0989
C2 . 5	**09001A**	**USA 202**				
UI155	20130101	00:00:00.0	1436.1888	35760.7	35816.1	044.033
	03.3589	017.4058	015.4041	42166.530	0.0006579	127.3479
C2 . 6	**94054A**	**USA 105 (MERCURY 1)**				
UI008	20130101	00:00:00.0	1436.2522	35666.6	35913.5	048.741
	08.6048	051.1185	102.1276	42167.771	0.0029277	098.5588
C2 . 7	**12034A**	**USA 237 (NROL-15)**				
UI173	20130101	00:00:00.0	1436.2111	35603.9	35973.8	049.852
	03.1617	300.6470	322.7787	42166.967	0.0043851	209.0626
C2 . 8	**00065A**	**USA 153 (DSCS III B-11)(DSCS III F12)**				
UI105	20130101	00:00:00.0	1436.2372	35783.1	35795.5	056.739
	03.1251	069.0530	187.8145	42167.477	0.0001471	088.2982
C2 . 9	**03041A**	**USA 171 (Advanced ORION 3)**				
UI118	20130101	00:00:00.0	1436.1686	35558.0	36018.0	067.983
	06.1055	093.0951	180.9846	42166.135	0.0054545	074.9119
C2 . 10	**04004A**	**USA 176 (DSP F22)**				
UI108	20130101	00:00:00.0	1436.2391	35786.5	35792.5	069.647
	05.0175	059.1155	090.7592	42167.515	0.0000710	111.1712
C2 . 11	**03057A**	**USA 174 (UFO F11)**				
UI117	20130101	00:00:00.0	1436.1020	35773.5	35800.0	071.581
	03.2280	029.0962	264.0361	42164.832	0.0003146	143.0561
C2 . 12	**99063A**	**USA 146 (UFO F10)**				
UI065	20130101	00:00:00.0	1436.1594	35779.4	35796.5	072.336
	04.6001	045.3913	250.6371	42165.954	0.0002025	127.5371
C2 . 13	**90097B**	**USA 67 (SDS 2 F2)(QUASAR 2)**				
UI092	20130101	00:00:00.0	1436.1309	35257.8	36316.8	075.226
	15.6834	022.2290	177.5583	42165.398	0.0125579	153.1034

C2 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
C2 . 14	**85010B**	**USA 8 (MAGNUM 1)**				
UI097	20130101	00:00:00.0	1436.1937	35578.4	36002.3	082.154
	17.5573	008.0984	281.4333	42166.626	0.0050260	173.5692
C2 . 15	**92037A**	**USA 82 (DSCS III B-12)(DSCS III F6)**				
UI123	20130101	00:00:00.0	1436.1225	35773.2	35801.2	088.302
	09.4440	051.5262	202.0994	42165.232	0.0003317	137.3640
C2 . 16	**89090B**	**USA 48 (MAGNUM 2)**				
UI136	20130101	00:00:00.0	1436.0694	34626.0	36947.1	089.473
	16.5574	036.3728	328.0827	42164.194	0.0275249	151.8890
C2 . 17	**00080A**	**USA 155 (SDS 3 F2)**				
UI007	20130101	00:00:00.0	1436.1086	35776.7	35797.2	092.118
	05.6799	046.5772	230.3060	42164.961	0.0002436	146.1288
C2 . 18	**11019A**	**USA 230 (SBIRS-GEO 1)**				
UI166	20130101	00:00:00.0	1436.1008	35775.5	35798.2	094.050
	05.7165	320.5489	289.0931	42164.807	0.0002691	234.0827
C2 . 19	**10063A**	**USA 223 (NROL-32)**				
UI160	20130101	00:00:00.0	1436.1128	35592.3	35981.5	095.805
	05.2190	252.8005	004.8418	42165.044	0.0046159	303.2167
C2 . 20	**86096A**	**USA 20 (FLTSATCOM F7)**				
UI134	20130101	00:00:00.0	1436.2722	35682.3	35900.1	099.384
	13.7685	024.1144	101.8185	42168.164	0.0025825	176.4609
C4 . 21	**06024A**	**USA 187 (MITEx OSC satellite)**				
UI149	20130101	00:00:00.0	1433.7557	35737.6	35743.9	099.637
	00.0713	009.9543	023.2440	42118.893	0.0000754	190.6368
C2 . 22	**01033A**	**USA 159 (DSP F21)**				
UI001	20130101	00:00:00.0	1436.0055	35781.0	35788.6	103.519
	07.1640	054.0936	196.8569	42162.942	0.0000901	150.0629
C2 . 23	**00001A**	**USA 148 (DSCS III B-08)(DSCS III F11)**				
UI104	20130101	00:00:00.0	1436.1422	35781.7	35793.3	103.794
	03.7962	067.2188	205.2136	42165.619	0.0001365	137.1886
C2 . 24	**95022A**	**USA 110 (Advanced ORION 1)**				
UI128	20130101	00:00:00.0	1436.0854	35438.0	36135.2	126.976
	11.2287	060.5676	032.2855	42164.506	0.0082679	168.2130
C2 . 25	**95038A**	**USA 113 (DSCS III B-07)(DSCS III F9)**				
UI115	20130101	00:00:00.0	1436.1642	35782.7	35793.2	149.666
	07.7798	055.8643	189.9686	42166.049	0.0001248	194.4288
C2 . 26	**01009A**	**USA 157 (Milstar-2 F2)**				
UI112	20130101	00:00:00.0	1436.1459	35775.5	35799.9	152.130
	05.9338	047.6319	230.2832	42165.691	0.0002890	205.0886
C2 . 27	**98016A**	**USA 138 (UFO F8)**				
UI111	20130101	00:00:00.0	1436.1331	35768.7	35806.3	171.340
	05.2882	047.1047	251.3180	42165.440	0.0004456	224.7961
C2 . 28	**12009A**	**USA 234 (MUOS)**				
UI170	20130101	00:00:00.0	1436.1713	35569.1	36007.0	183.027
	04.7904	326.5955	183.2555	42166.188	0.0051923	317.4445

C2 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
C2 . 29	**00024A**	**USA 149 (DSP F20)**				
UI004	20130101	00:00:00.0	1435.9613	35767.7	35801.0	195.360
	08.1581	051.5501	269.5859	42162.078	0.0003945	244.4053
C2 . 30	**95060A**	**USA 115 (Milstar DFS-2)**				
UI124	20130101	00:00:00.0	1436.2201	35776.1	35803.2	210.031
	10.2685	047.7809	251.0031	42167.143	0.0003213	262.8366
C2 . 31	**91080B**	**USA 75 (DSP F16)**				
UI133	20130101	00:00:00.0	1435.9997	35779.3	35792.1	214.889
	13.7121	031.4364	292.9720	42162.830	0.0001519	284.0894
C2 . 32	**01046A**	**USA 162 (SDS 3 F3)**				
UI151	20130101	00:00:00.0	1436.2260	35774.7	35804.0	218.983
	06.1740	075.6529	289.1961	42167.259	0.0003471	243.8795
C2 . 33	**03008A**	**USA 167 (DSCS III A-3)(DSCS III F13)**				
UI106	20130101	00:00:00.0	1436.2269	35777.3	35801.0	224.617
	01.4783	075.9293	216.4670	42167.276	0.0002817	249.3002
C2 . 34	**97065A**	**USA 134 (DSCS III B-13)(DSCS III F10)**				
UI110	20130101	00:00:00.0	1436.2244	35776.1	35802.4	229.923
	06.1894	059.7207	233.1448	42167.227	0.0003112	270.8076
C2 . 35	**12019A**	**USA 235 (AEHF 2)**				
UI171	20130101	00:00:00.0	1436.1900	35776.3	35800.6	239.986
	03.2833	312.9107	336.9422	42166.555	0.0002883	027.7271
C2 . 36	**93074A**	**USA 97 (DSCS III B-10)(DSCS III F8)**				
UI066	20130101	00:00:00.0	1436.1034	35769.8	35804.5	248.178
	08.1149	055.2167	253.3980	42164.859	0.0004116	293.5807
C2 . 37	**95057A**	**USA 114 (UFO F6)**				
UI119	20130101	00:00:00.0	1436.1422	35784.7	35790.9	254.754
	07.0069	041.3748	075.9499	42165.619	0.0000733	314.0054
C2 . 38	**95003A**	**USA 108 (UFO F4)**				
UI121	20130101	00:00:00.0	1436.0721	35766.7	35806.3	260.204
	07.6599	040.3769	263.3602	42164.247	0.0004698	320.4597
C2 . 39	**03012A**	**USA 169 (Milstar-2 F4)**				
UI109	20130101	00:00:00.0	1436.1125	35770.7	35803.3	270.106
	04.4791	068.2545	224.8777	42165.037	0.0003868	302.4959
C2 . 40	**10039A**	**USA 214 (AEHF SV-1)**				
UI167	20130101	00:00:00.0	1436.1092	35779.4	35794.3	291.036
	03.3659	274.7042	351.2726	42164.973	0.0001759	116.9839
C2 . 41	**03040A**	**USA 170 (DSCS III B-6)(DSCS III F14)**				
UI107	20130101	00:00:00.0	1436.0347	35780.0	35790.7	307.765
	00.5240	079.3055	218.5579	42163.515	0.0001271	329.1130
C2 . 42	**94084A**	**USA 107 (DSP F17)**				
UI131	20130101	00:00:00.0	1436.1773	35782.7	35795.3	310.560
	12.2924	041.1951	291.7073	42166.306	0.0001489	010.0071
C2 . 43	**94009A**	**USA 99 (Milstar DFS-1)**				
UI142	20130101	00:00:00.0	1436.0238	35775.3	35795.0	320.901
	09.0520	091.9546	173.6304	42163.300	0.0002342	329.6120

C2 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
C2 . 44	**12033A**	**USA 236 (SDS 3 F7, NROL-38)**				
UI172	20130101	00:00:00.0	1436.1727	35783.2	35793.1	329.638
	04.4802	272.2722	041.1193	42166.215	0.0001176	158.0172
C2 . 45	**98029A**	**USA 139 (Advanced ORION 2)**				
UI074	20130101	00:00:00.0	1436.1080	35643.2	35930.8	334.218
	08.8544	006.9144	218.5581	42164.950	0.0034112	067.5094
C2 . 46	**96042A**	**USA 127 (UFO F7)**				
UI116	20130101	00:00:00.0	1436.2215	35773.6	35805.0	337.159
	06.2009	042.2198	256.8138	42167.170	0.0003727	035.5641
C2 . 47	**89077A**	**USA 46 (FLTSATCOM F8)**				
UI130	20130101	00:00:00.0	1436.1181	35779.6	35795.0	344.638
	11.5048	031.5496	324.7540	42165.146	0.0001817	053.7367
C2 . 48	**11011A**	**USA 227 (NROL 27)**				
UI165	20130101	00:00:00.0	1436.1407	35780.5	35794.5	350.007
	04.8064	350.2045	318.2086	42165.590	0.0001667	100.4382

4.3 Objects in a drift orbit

In the case where the object is in a drift orbit, there are 94 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

D1 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 1	**92006C**	**IABS**				
UI132	20130101	00:00:00.0	1299.8499	30544.7	35607.7	085.083
	10.9614	013.9051	303.3196	39453.813	0.0641635	177.6970
D1 . 2	**10063B**	**Delta-4 second stage**				
UI161	20130101	00:00:00.0	1384.0868	33820.8	35703.9	094.607
	05.3196	251.5694	169.6455	41140.453	0.0228860	316.9993
D1 . 3	**06024C**	**USA 189 (NRL Upper Stage/Satellite)**				
UI140	20130101	00:00:00.0	1384.4874	34756.1	34784.5	178.284
	05.3369	060.1920	038.0271	41148.391	0.0003450	226.9012
D1 . 4	**69036B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI012	20130101	00:00:00.0	1386.6179	30730.1	38895.3	030.485
	06.1093	089.3888	093.9684	41190.594	0.0991159	046.6582
D1 . 5	**12034B**	**DELTA 4 R/B**				
UI174	20130101	00:00:00.0	1396.1058	34240.1	35760.2	221.390
	03.2347	300.4220	199.5670	41378.276	0.0183694	021.4442
D1 . 6	**77038C**	**Atlas SLV-3A stage 2 (Agena D)**				
UI082	20130101	00:00:00.0	1407.1121	28999.4	41436.3	068.670
	11.0912	000.9796	056.4116	41595.464	0.1494987	197.0596
D1 . 7	**72101B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI059	20130101	00:00:00.0	1407.3971	29896.6	40549.3	136.940
	18.3541	320.7232	359.2136	41601.080	0.1280341	267.6509
D1 . 8	**93046C**	**IABS**				
UI028	20130101	00:00:00.0	1410.0851	34915.7	35636.1	350.429
	13.6193	025.3012	001.0743	41654.035	0.0086480	067.9082
D1 . 9	**75055B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI103	20130101	00:00:00.0	1410.5334	29758.2	40812.7	148.557
	19.4929	326.1607	326.3386	41662.861	0.1326667	268.1470
D1 . 10	**68063B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI055	20130101	00:00:00.0	1414.9923	30774.3	39973.0	333.274
	14.0211	335.5815	108.1105	41750.618	0.1101624	113.1046
D1 . 11	**70069B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI145	20130101	00:00:00.0	1415.8982	29898.0	40882.8	345.500
	14.5038	270.0277	343.4315	41768.436	0.1314966	172.1683
D1 . 12	**92037C**	**IABS**				
UI085	20130101	00:00:00.0	1416.7651	35312.6	35503.4	210.029
	13.8542	021.5666	311.1412	41785.482	0.0022830	292.7641
D1 . 13	**81025C**	**Titan IIIC stage 3 (Transtage)**				
UI040	20130101	00:00:00.0	1421.0146	35276.7	35705.0	259.768
	14.0826	349.6541	180.0649	41868.996	0.0051156	010.7596

D1 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 14	**89046D**	**IUS second stage**				
UI080	20130101	00:00:00.0	1421.5645	35324.4	35680.6	338.815
	13.3176	024.0289	239.7067	41879.797	0.0042517	055.6064
D1 . 15	**91080D**	**IUS second stage**				
UI078	20130101	00:00:00.0	1421.8316	35429.5	35585.3	059.387
	13.5179	030.7835	219.0384	41885.042	0.0018601	130.1914
D1 . 16	**95038C**	**IABS**				
UI022	20130101	00:00:00.0	1421.9793	35453.0	35566.6	070.653
	13.2447	033.3413	176.7109	41887.942	0.0013566	139.2341
D1 . 17	**82019B**	**Titan IIIC stage 3 (Transtage)**				
UI039	20130101	00:00:00.0	1422.0976	35452.7	35571.9	109.677
	14.5208	352.8538	019.7928	41890.265	0.0014225	219.6014
D1 . 18	**89069D**	**Titan 34D stage 3 (Transtage)**				
UI088	20130101	00:00:00.0	1422.3941	35240.5	35796.1	350.996
	14.1639	014.4586	212.7367	41896.087	0.0066309	076.9766
D1 . 19	**87097B**	**Titan 34D stage 3 (Transtage)**				
UI029	20130101	00:00:00.0	1422.4087	35487.4	35551.1	131.580
	13.1183	016.9647	106.0840	41896.374	0.0007602	217.4886
D1 . 20	**94084D**	**IUS second stage**				
UI019	20130101	00:00:00.0	1423.1862	35514.0	35553.0	243.856
	12.1565	040.7262	008.9008	41911.642	0.0004655	306.4820
D1 . 21	**00065C**	**IABS**				
UI011	20130101	00:00:00.0	1423.1988	35303.3	35764.6	057.304
	10.4981	047.2517	146.5229	41911.888	0.0055028	111.6855
D1 . 22	**00001C**	**IABS**				
UI015	20130101	00:00:00.0	1423.2105	35482.7	35586.7	233.786
	10.9754	045.9644	257.3994	41912.117	0.0012402	291.0088
D1 . 23	**84037B**	**Titan 34D stage 3 (Transtage)**				
UI095	20130101	00:00:00.0	1423.5445	35418.6	35662.5	158.847
	14.5888	000.0097	183.1224	41918.675	0.0029099	262.0713
D1 . 24	**84129B**	**Titan 34D stage 3 (Transtage)**				
UI032	20130101	00:00:00.0	1423.6207	35514.3	35572.6	211.093
	15.1751	006.1639	080.6820	41920.171	0.0006952	308.2626
D1 . 25	**03008C**	**IABS (Apogee Boost Subsystem)**				
UI006	20130101	00:00:00.0	1424.1639	35501.9	35604.3	004.549
	08.5924	053.3505	110.8846	41930.834	0.0012205	052.2853
D1 . 26	**85092E**	**IUS second stage**				
UI033	20130101	00:00:00.0	1424.5177	35309.1	35811.7	298.127
	15.1348	004.8856	046.5660	41937.778	0.0059916	034.5118
D1 . 27	**03041B**	**Titan IVB stage 3 (Centaur)**				
UI072	20130101	00:00:00.0	1427.9779	35459.7	35795.5	000.273
	06.1335	107.1811	318.6596	42005.663	0.0039972	355.7106
D1 . 28	**85010D**	**IUS second stage**				
UI047	20130101	00:00:00.0	1428.3745	35524.5	35747.0	315.871
	17.6364	008.8324	151.9587	42013.439	0.0026474	047.7856

D1 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 29	**03040C**	**IABS (Apogee Boost Subsystem)**				
UI002	20130101	00:00:00.0	1429.3022	35606.6	35700.4	267.956
	08.1865	054.2607	185.2046	42031.629	0.0011150	315.9102
D1 . 30	**72010B**	**Titan IIIC stage 3 (Transtage)**				
UI038	20130101	00:00:00.0	1430.5802	35425.2	35932.0	020.473
	09.4262	318.9806	019.4954	42056.679	0.0060258	163.3942
D1 . 31	**77007D**	**OPS 3151 operational debris (Telescope aperture suncover)**				
UI100	20130101	00:00:00.0	1431.4823	34620.3	36772.2	113.645
	12.8963	329.0133	349.7543	42074.358	0.0255728	242.7303
D1 . 32	**95060B**	**Titan IVA stage 3 (Centaur)**				
UI016	20130101	00:00:00.0	1431.5304	35554.5	35841.4	306.045
	11.3700	045.2347	081.8908	42075.300	0.0034090	001.4583
D1 . 33	**94009B**	**Titan IVA stage 3 (Centaur)**				
UI014	20130101	00:00:00.0	1431.6045	35653.3	35745.0	320.710
	09.0434	082.3624	087.0449	42076.752	0.0010893	340.0518
D1 . 34	**03012B**	**Titan IVB stage 3 (Centaur)**				
UI064	20130101	00:00:00.0	1431.8769	35620.2	35787.7	166.908
	05.0683	048.2438	167.8206	42082.090	0.0019896	220.1765
D1 . 35	**95022B**	**Titan IVA stage 3 (Centaur)**				
UI021	20130101	00:00:00.0	1431.9384	35669.5	35742.1	090.451
	13.0665	063.7982	230.8929	42083.294	0.0008622	127.4883
D1 . 36	**75118C**	**Titan IIIC stage 3 (Transtage)**				
UI050	20130101	00:00:00.0	1432.1050	35646.9	35771.6	064.054
	12.1963	327.5759	070.1303	42086.560	0.0014812	197.9590
D1 . 37	**76059C**	**Titan IIIC stage 3 (Transtage)**				
UI054	20130101	00:00:00.0	1432.1988	35649.8	35772.7	198.031
	12.5723	328.9882	101.9500	42088.397	0.0014606	330.6133
D1 . 38	**75118A**	**OPS 3165 (DSP F5)**				
UI052	20130101	00:00:00.0	1432.9472	35613.5	35837.4	090.333
	12.2312	327.5060	228.4086	42103.057	0.0026582	223.7024
D1 . 39	**78038A**	**OPS 8790 (AQUACADE 4)**				
UI091	20130101	00:00:00.0	1433.3193	35666.3	35798.1	337.028
	10.6551	342.7520	177.5783	42110.346	0.0015649	094.9293
D1 . 40	**01009B**	**Titan IVB stage 3 (Centaur)**				
UI003	20130101	00:00:00.0	1433.3445	35654.6	35810.9	023.047
	07.7745	049.3077	013.9300	42110.840	0.0018555	074.7592
D1 . 41	**71039B**	**Titan IIIC stage 3 (Transtage)**				
UI093	20130101	00:00:00.0	1433.6650	35606.0	35872.0	060.023
	08.7625	316.3921	345.3849	42117.118	0.0031582	204.2967
D1 . 42	**80060G**	**Ekran 5 debris**				
UI137	20130101	00:00:00.0	1434.2256	35688.9	35811.1	072.114
	14.1490	340.3116	190.1503	42128.095	0.0014514	192.6691
D1 . 43	**69036A**	**OPS 3148 (CANYON 2)**				
UI070	20130101	00:00:00.0	1434.3383	31894.8	39609.6	028.458
	03.8217	102.5221	036.5127	42130.302	0.0915596	031.6973

D1 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 44	**02001B**	**Titan IVB stage 3 (Centaur)**				
UI013	20130101	00:00:00.0	1437.0617	35567.8	36043.3	186.008
	03.6614	039.1855	033.6256	42183.615	0.0056360	247.2905
D1 . 45	**79086A**	**OPS 1948 (VORTEX 2) (CHALET 2)**				
UI023	20130101	00:00:00.0	1437.7927	30679.0	40960.6	227.764
	06.8610	355.8972	359.1756	42197.919	0.1218263	324.5617
D1 . 46	**78058A**	**OPS 9454 (VORTEX 1) (CHALET 1)**				
UI009	20130101	00:00:00.0	1438.6637	29902.0	41771.9	103.287
	05.6627	036.5547	312.1687	42214.958	0.1405895	150.3642
D1 . 47	**90095D**	**IUS second stage**				
UI081	20130101	00:00:00.0	1440.8161	35582.1	36176.7	164.941
	14.0463	029.1001	322.2713	42257.053	0.0070357	234.4071
D1 . 48	**01033D**	**IUS second stage**				
UI061	20130101	00:00:00.0	1441.6119	35875.3	35914.3	029.320
	07.2012	054.1575	279.2963	42272.612	0.0004622	075.4813
D1 . 49	**04004D**	**IUS second stage**				
UI062	20130101	00:00:00.0	1442.7571	35898.8	35935.1	050.605
	05.0559	059.4075	310.7150	42294.997	0.0004287	091.4075
D1 . 50	**73040A**	**OPS 6157 (DSP F4)**				
UI048	20130101	00:00:00.0	1442.7724	35902.2	35933.1	069.910
	11.1032	321.2771	230.8046	42295.296	0.0003657	208.2535
D1 . 51	**72010A**	**OPS 1570 (DSP F3)**				
UI144	20130101	00:00:00.0	1443.2126	35898.2	35954.1	314.642
	09.9491	320.4018	232.5843	42303.898	0.0006613	094.3021
D1 . 52	**00024E**	**DSP F20 Aperture Cover**				
UI005	20130101	00:00:00.0	1444.2160	34941.7	36949.5	299.316
	08.5366	051.5242	227.2922	42323.504	0.0237200	346.8313
D1 . 53	**00024D**	**IUS second stage**				
UI067	20130101	00:00:00.0	1444.3622	35911.1	35985.6	247.659
	08.2220	051.7741	029.9423	42326.359	0.0008794	294.7734
D1 . 54	**79086C**	**Titan IIIC stage 3 (Transtage)**				
UI024	20130101	00:00:00.0	1444.7398	30348.9	41562.7	059.816
	07.1191	353.9959	054.8676	42333.736	0.1324450	188.8776
D1 . 55	**78058B**	**Titan IIIC stage 3 (Transtage)**				
UI010	20130101	00:00:00.0	1445.3016	29589.6	42343.6	121.436
	05.4129	032.4083	027.4561	42344.711	0.1505965	198.6460
D1 . 56	**81107C**	**Titan IIIC stage 3 (Transtage)**				
UI076	20130101	00:00:00.0	1445.7602	31828.5	40122.9	289.828
	07.7421	351.2551	042.6679	42353.667	0.0979174	046.9368
D1 . 57	**94054B**	**Titan IVA stage 3 (Centaur)**				
UI017	20130101	00:00:00.0	1446.0811	35479.6	36484.8	018.253
	10.9055	031.8271	228.2036	42359.935	0.0118651	084.6315
D1 . 58	**96026B**	**Titan IVA stage 3 (Centaur)**				
UI075	20130101	00:00:00.0	1446.2882	34025.3	37947.4	358.240
	09.3276	002.6513	291.1084	42363.978	0.0462903	092.4215

D1 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 59	**73040B**	**Titan IIIC stage 3 (Transtage)**				
UI049	20130101	00:00:00.0	1446.3452	35870.6	36104.9	169.072
	11.2915	321.7917	283.6919	42365.092	0.0027646	305.5439
D1 . 60	**97008E**	**USA 130 operational debris (Telescope aperture suncover)**				
UI164	20130101	00:00:00.0	1446.7285	35890.0	36099.7	185.411
	10.8247	048.5490	133.0534	42372.576	0.0024747	236.2370
D1 . 61	**89090D**	**IUS second stage**				
UI090	20130101	00:00:00.0	1446.9246	34609.6	37388.1	317.161
	16.6756	036.8372	324.1322	42376.405	0.0327838	021.7825
D1 . 62	**97008D**	**IUS second stage**				
UI071	20130101	00:00:00.0	1447.3156	35893.5	36119.3	018.311
	10.7111	048.7419	053.6073	42384.040	0.0026637	069.9966
D1 . 63	**76059A**	**OPS 2112 (DSP F6)**				
UI056	20130101	00:00:00.0	1447.7470	35981.9	36048.9	070.367
	13.1283	330.8950	087.6241	42392.460	0.0007903	198.6744
D1 . 64	**84009C**	**Titan 34D stage 3 (Transtage)**				
UI025	20130101	00:00:00.0	1448.1136	31862.1	40180.9	062.655
	08.1356	357.5421	016.9691	42399.618	0.0980997	172.4374
D1 . 65	**79053C**	**Titan IIIC stage 3 (Transtage)**				
UI051	20130101	00:00:00.0	1448.1434	35768.6	36275.9	076.938
	14.8733	346.5510	158.2903	42400.198	0.0059825	190.0501
D1 . 66	**89035C**	**Titan 34D stage 3 (Transtage)**				
UI020	20130101	00:00:00.0	1448.2337	31756.6	40291.5	184.440
	07.5337	013.3765	312.1621	42401.961	0.1006428	251.6281
D1 . 67	**85092C**	**USA 12 (DSCS III B-05)**				
UI077	20130101	00:00:00.0	1449.7461	36038.9	36068.4	324.750
	13.6068	033.6593	030.4392	42431.477	0.0003469	031.4543
D1 . 68	**90095E**	**USA 65 operational debris (telescope aperture cover)**				
UI143	20120101	00:00:00.0	1450.3835	35702.9	36428.7	081.644
	13.6963	032.1723	124.2235	42443.913	0.0085501	024.4917
D1 . 69	**93074B**	**IABS**				
UI084	20130101	00:00:00.0	1450.8872	36047.3	36106.0	204.720
	14.1763	028.2583	295.3863	42453.739	0.0006907	274.1731
D1 . 70	**68063A**	**OPS 2222 (CANYON 1)**				
UI102	20130101	00:00:00.0	1450.9950	32108.1	40050.2	336.204
	15.0616	340.8232	089.8322	42455.842	0.0935335	109.0402
D1 . 71	**89069B**	**USA 44 (DSCS III A-02)**				
UI126	20130101	00:00:00.0	1452.8870	36100.3	36130.4	225.220
	10.7923	048.4319	265.6014	42492.741	0.0003533	274.1837
D1 . 72	**93046A**	**USA 93 (DSCS III B-09)(DSCS III F7)**				
UI120	20130101	00:00:00.0	1453.8616	36115.4	36152.0	194.779
	08.3597	055.0309	333.9908	42511.741	0.0004307	237.3774
D1 . 73	**92006A**	**USA 78 (DSCS III B-14)**				
UI127	20130101	00:00:00.0	1454.0450	36118.6	36156.9	248.547
	11.1354	047.3700	238.9596	42515.316	0.0004501	298.0874

D1 .nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 74	**78016A**	**OPS 6391 (FLTSATCOM F1)**				
UI101	20130101	00:00:00.0	1454.5832	36125.2	36171.5	245.661
	15.3653	345.4343	137.1542	42525.807	0.0005446	356.2778
D1 . 75	**85092B**	**USA 11 (DSCS III B-04)**				
UI079	20130101	00:00:00.0	1454.6766	36123.8	36175.4	162.724
	13.8012	032.0502	340.6970	42527.626	0.0006065	228.2692
D1 . 76	**80087A**	**OPS 6394 (FLTSATCOM F4)**				
UI096	20130101	00:00:00.0	1455.3393	36153.8	36171.4	212.886
	15.0183	352.5708	021.6776	42540.541	0.0002078	316.6944
D1 . 77	**06024B**	**USA 188 (MITEx Lockheed satellite)**				
UI148	20130101	00:00:00.0	1456.3084	36147.4	36215.1	256.597
	02.8499	070.1668	006.5761	42559.426	0.0007953	283.0019
D1 . 78	**84129A**	**USA 7 (DSP F12)**				
UI034	20130101	00:00:00.0	1456.7621	36179.3	36202.8	228.899
	15.8164	008.7026	050.1906	42568.264	0.0002755	316.2737
D1 . 79	**01020A**	**USA 158 (GeoLITE)**				
UI114	20130101	00:00:00.0	1456.9128	36109.9	36276.2	178.528
	03.6291	053.2296	004.5623	42571.199	0.0019529	222.5874
D1 . 80	**81025A**	**OPS 7350 (DSP F9)**				
UI045	20130101	00:00:00.0	1457.1667	36124.2	36273.0	217.410
	15.0732	352.9194	141.2921	42576.145	0.0017473	320.5526
D1 . 81	**89046A**	**USA 39 (DSP F14)**				
UI150	20130101	00:00:00.0	1457.2456	36188.0	36211.5	186.306
	13.6647	024.5835	025.0956	42577.682	0.0002760	258.5392
D1 . 82	**95027A**	**USA 111 (UFO F5)**				
UI122	20130101	00:00:00.0	1458.2247	36208.5	36229.6	292.937
	08.0319	040.1860	272.5422	42596.751	0.0002480	348.0224
D1 . 83	**79053A**	**OPS 7484 (DSP F8)**				
UI053	20130101	00:00:00.0	1458.2688	36183.0	36257.4	156.156
	15.0939	347.4938	135.7841	42597.610	0.0008727	265.3514
D1 . 84	**84037A**	**OPS 7641 (DSP F11)**				
UI037	20130101	00:00:00.0	1459.2444	36204.5	36274.8	112.701
	15.5169	002.7885	118.1816	42616.608	0.0008254	207.3884
D1 . 85	**89069A**	**USA 43 (DSCS II F-15)**				
UI087	20130101	00:00:00.0	1460.3193	36192.0	36328.6	095.109
	14.5526	021.0133	123.4093	42637.533	0.0016017	172.1270
D1 . 86	**90095A**	**USA 65 (DSP F15)**				
UI083	20130101	00:00:00.0	1463.5164	36294.7	36348.9	006.909
	14.0831	028.6947	338.4553	42699.742	0.0006350	077.4220
D1 . 87	**87097A**	**USA 28 (DSP F13)**				
UI030	20130101	00:00:00.0	1463.7177	36227.4	36424.6	037.575
	13.7000	019.3673	142.2522	42703.656	0.0023089	116.6525
D1 . 88	**82019A**	**OPS 8701 (DSP F10)**				
UI046	20130101	00:00:00.0	1466.5848	36368.7	36396.6	178.196
	15.6745	356.8875	108.6686	42759.403	0.0003262	276.1265

D1 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D1 . 89	**98058A**	**USA 140 (UFO F9)**				
UI113	20130101	00:00:00.0	1466.7594	36329.7	36440.0	279.429
	05.7606	041.8115	292.2999	42762.797	0.0012894	331.1373
D1 . 90	**71039A**	**OPS 3811 (DSP F2)**				
UI042	20130101	00:00:00.0	1467.0825	36324.0	36459.0	355.284
	10.1048	321.3366	249.7307	42769.076	0.0015782	131.4147
D1 . 91	**82106B**	**DSCS III A-01**				
UI135	20130101	00:00:00.0	1471.9303	36400.4	36572.3	145.812
	14.7571	016.9509	068.3751	42863.242	0.0020052	224.2189
D1 . 92	**77007A**	**OPS 3151 (DSP F7)**				
UI057	20130101	00:00:00.0	1476.4779	36246.5	36902.7	343.083
	14.0596	336.2074	267.4270	42951.481	0.0076395	103.4568
D1 . 93	**09001B**	**Delta 4 second stage**				
UI154	20130101	00:00:00.0	1499.0987	35924.8	38097.0	173.771
	03.3560	018.8591	357.9584	43389.069	0.0250320	242.1062
D1 . 94	**07054B**	**Delta 4 second stage**				
UI147	20130101	00:00:00.0	1502.1472	35924.6	38214.8	029.159
	00.6994	117.6242	345.0553	43447.872	0.0263555	012.2324

4.4 Objects in a libration orbit around the Eastern stable point

In the case where the object is in a libration orbit around the Eastern stable point (longitude 75 E), there are 8 objects.

For explanation symbols, see definition at the beginning of Chapter 4 on page 124.

L1 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
L1 . 1	**75055A**	**OPS 4966 (CANYON 6)**				
UI060	20130101	00:00:00.0	1435.5497	30311.5	41245.5	030.643
	20.4102	330.3823	267.0773	42154.020	0.1296916	134.4110
L1 . 2	**70046A**	**OPS 5346 (Rhyolite 1)**				
UI035	20130101	00:00:00.0	1436.4107	35755.4	35830.9	068.388
	08.3330	313.7467	098.0800	42170.873	0.0008947	215.4239
L1 . 3	**73013A**	**OPS 6063 (Rhyolite 2)**				
UI043	20130101	00:00:00.0	1436.1760	35683.8	35893.3	073.827
	10.5261	322.4861	132.4131	42166.280	0.0024840	212.4576
L1 . 4	**77038A**	**OPS 9751 (CANYON 7)**				
UI086	20130101	00:00:00.0	1435.6970	30577.1	40980.5	085.896
	11.5929	002.5743	008.6138	42156.905	0.1233888	186.5181
L1 . 5	**07054A**	**USA 197 (DSP F23)**				
UI141	20130101	00:00:00.0	1434.8824	35758.0	35767.7	111.166
	00.7762	101.8973	330.4731	42140.956	0.0001148	110.0036
L1 . 6	**98029B**	**Titan IVB stage 3 (Centaur)**				
UI027	20130101	00:00:00.0	1436.5204	35577.8	36013.1	134.591
	10.4171	005.9997	062.6226	42173.020	0.0051604	229.8166
L1 . 7	**72101A**	**OPS 9390 (CANYON 5)**				
UI138	20130101	00:00:00.0	1435.5724	30159.7	41396.2	144.605
	19.4030	325.2496	304.7039	42154.464	0.1332774	257.8303
L1 . 8	**70032A**	**Intelsat III F-7**				
UI036	20130101	00:00:00.0	1436.0675	35782.2	35790.1	357.049
	08.3168	312.2839	148.8299	42164.157	0.0000930	145.4122

4.5 Objects in a libration orbit around the Western stable point

In the case where the object is in a libration orbit around the Western stable point (longitude 105 W), there are 5 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

L2 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
L2 . 1	**94035A**	**USA 104 (UFO F3)**				
UI068	20130101	00:00:00.0	1435.4228	35765.7	35781.8	133.803
	08.8600	041.8110	308.9779	42151.536	0.0001910	192.6835
L2 . 2	**70069A**	**OPS 7329 (CANYON 3)**				
UI157	20130101	00:00:00.0	1435.9947	32227.2	39345.3	191.338
	16.1923	281.3750	268.5868	42162.732	0.0844126	010.5103
L2 . 3	**81107A**	**OPS 4029 (VORTEX 3)**				
UI129	20130101	00:00:00.0	1436.2132	31899.9	39678.5	207.453
	07.7587	359.1034	292.4583	42167.009	0.0922349	300.9086
L2 . 4	**77114A**	**OPS 4258 (AQUACADE 3)**				
UI146	20130101	00:00:00.0	1437.4487	35743.4	35885.8	217.681
	18.8986	343.5888	236.0304	42191.188	0.0016879	334.4437
L2 . 5	**77007C**	**Titan IIIC stage 3 (Transtage)**				
UI162	20130101	00:00:00.0	1435.1524	35718.4	35820.0	265.622
	13.0735	331.4287	263.4819	42146.243	0.0012059	034.8238

4.6 Objects in a libration orbit around both stable points

In the case where the object is in a libration orbit around both stable points, there is 1 object identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

L3 .nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
L3 . 1	**80060A**	**Ekran 5**				
UI098	20130101	00:00:00.0	1436.1232	35730.7	35845.6	144.200
	14.2288	340.4822	065.2777	42165.247	0.0013621	264.4400

4.7 Satellites with indeterminate status

In this list there are 2 objects for which no TLEs are available and from the KIAM data it is unclear whether they are controlled.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

Ind.nn	**COSPAR**	**NAME**				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
Ind. 1	**89035A**	**USA 37 (VORTEX 6)**				
UI018	20130101	00:00:00.0	1433.9894	31594.8	39896.4	076.085
	07.2397	014.2161	242.8999	42123.470	0.0985379	141.152
Ind. 2	**84009A**	**OPS 0441 (VORTEX 4)**				
UI026	20130101	00:00:00.0	1436.6567	31380.3	40215.2	341.569
	07.9139	355.8924	311.9876	42175.689	0.1047391	086.817

4.8 Unidentified uncatalogued objects

In this list there are 6 objects which were observed repeatedly by ground-based telescopes, but which were not finally correlated to a specific launch (i.e. their origin is not determined yet with the required reliability).

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 124.

UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
TYPE	i	Ω	ω	a	e	u
UI031	20130101	00:00:00.0	1413.1222	34420.3	36251.5	328.715
D1	06.3525	316.4028	238.8008	41713.823	0.0219501	110.6210
UI041	20130101	00:00:00.0	1435.3684	35576.5	35970.4	051.879
L1	14.3077	349.9762	248.8267	42150.472	0.0046729	161.5891
UI044	20130101	00:00:00.0	1436.9652	35612.5	35995.3	064.883
L1	14.5842	349.6675	332.3650	42181.727	0.0045372	175.3041
UI058	20130101	00:00:00.0	1526.6724	37402.5	37682.6	237.280
D1	17.3461	350.7851	307.3954	43919.503	0.0031886	326.3632
UI139	20130101	00:00:00.0	1435.7891	35595.1	35966.7	284.498
L2	14.1942	023.9110	148.3546	42158.707	0.0044066	001.2197
UI168	20130101	00:00:00.0	1437.8933	35195.3	36448.3	032.657
D1	13.9207	015.3230	004.5084	42199.887	0.0148461	119.5078

4.9 Uncontrolled uncatalogued objects

In this list there are 5 objects for which no orbital elements are available and which are no longer controlled according to information provided by KIAM.

U .nn	COSPAR	NAME	TYPE
U . 1	75118D	OPS 3165 operational debris (Telescope aperture suncover)	Debris
U . 2	76059D	OPS 2112 operational debris (Telescope aperture suncover)	Debris
U . 3	79053D	OPS 7484 operational debris (Telescope aperture suncover)	Debris
U . 4	89046E	USA 39 operational debris (Telescope aperture suncover)	Debris
U . 5	01033E	USA 159 operational debris (Telescope aperture suncover)	Debris

For the following objects several years old TLEs are available. For an explanation of the symbols, see the definitions at the beginning of Chapter 3 on page 34.

D.nn	COSPAR	NAME					
	Date	$\overline{\lambda}$	$\overline{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
D.	**67003J**	**Titan IIIC stage 3 (Transtage)**					
	19-JUL-95	28.86	-2107.470	-2225.921	-1989.020	0	3
	16635.000000	40057.05212	0.0029345	11.3730	343.9923	194.5544	69.2907

L1.nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
L1.	**68081C**	**OV5 4**					
	19-JUL-95	1688	151.1	352.1	143.2	0	2
	16635.000000	42172.17641	0.0006806	13.5815	11.0544	79.3747	139.5031

4.10 Uncontrolled uncatalogued objects

In this list there are 73 objects which are known to have been released from satellites in GEO, but which have not been catalogued by USSTRATCOM. The list of objects has been compiled by Vladimir Agapov (KIAM) and Jonathan McDowell (Harvard-Smithsonian Center for Astrophysics).

UU.nn	COSPAR	NAME	TYPE
UU. 1	71039	OPS 3811 debris (Telescope aperture suncover)	Debris
UU. 2	72010	OPS 1570 debris (Telescope aperture suncover)	Debris
UU. 3	73040	OPS 6157 debris (Telescope aperture suncover)	Debris
UU. 4	75011	SMS 2 debris (VISSR cover)	Debris
UU. 5	75100	GOES 1 debris (VISSR cover)	Debris
UU. 6	76004	Hermes debris (CTS JBSA)	Debris
UU. 7	76004	Hermes debris (CTS JBSA)	Debris
UU. 8	77048	GOES 2 debris (VISSR cover)	Debris
UU. 9	77065	Himawari debris (VISSR cover)	Debris
UU. 10	77065	Star 27 (Himawari AKM)	Rocket Body
UU. 11	77108	Meteosat 1 debris (MVIRI cover)	Debris
UU. 12	77108	Meteosat 1 debris (MVIRI cooler cover)	Debris
UU. 13	78062	GOES 3 debris (VISSR cover)	Debris
UU. 14	80074	GOES 4 debris (VAS cover)	Debris
UU. 15	81025	OPS 7350 debris (Telescope aperture suncover)	Debris
UU. 16	81049	GOES 5 debris (VAS cover)	Debris
UU. 17	81057	Meteosat 2 debris (MVIRI cover)	Debris
UU. 18	81057	Meteosat 2 debris (MVIRI cooler cover)	Debris
UU. 19	81076	Himawari-2 debris (VISSR cover)	Debris
UU. 20	81076	Star 27 (Himawari-2 AKM)	Rocket Body
UU. 21	81114	Satcom IIIR debris (Array restraint cable)	Debris
UU. 22	82004	Satcom IV debris (Array restraint cable)	Debris
UU. 23	82019	OPS 8701 debris (Telescope aperture suncover)	Debris
UU. 24	82105	Aurora I debris (Array restraint cable)	Debris
UU. 25	83030	Satcom IR debris (Array restraint cable)	Debris
UU. 26	83041	GOES 6 debris (VAS cover)	Debris
UU. 27	83094	Satcom IIR debris (Array restraint cable)	Debris
UU. 28	84037	OPS 7641 debris (Telescope aperture suncover)	Debris
UU. 29	84049	Spacenet 1 debris (Array restraint cable)	Debris
UU. 30	84080	Himawari-3 debris (VISSR cover)	Debris
UU. 31	84114	Spacenet 2 debris (Array restraint cable)	Debris
UU. 32	84129	USA 7 debris (Telescope aperture suncover)	Debris
UU. 33	85035	Gstar 1 debris (Array restraint cable)	Debris
UU. 34	85076	ASC 1 debris (Array restraint cable)	Debris
UU. 35	86026	Gstar 2 debris (Array restraint cable)	Debris
UU. 36	87022	GOES 7 debris (VAS cover)	Debris
UU. 37	87097	USA 28 debris (Telescope aperture suncover)	Debris
UU. 38	88018	Spacenet 3R debris (Array restraint cable)	Debris
UU. 39	88051	Meteosat 3 debris (MVIRI cover)	Debris
UU. 40	88051	Meteosat 3 debris (MVIRI cooler cover)	Debris
UU. 41	88051	Mage 1 (Meteosat 3 AKM)	Rocket Body
UU. 42	88051	PAS 1 debris (Array restraint cable)	Debris

UU.nn	COSPAR	NAME	TYPE
UU. 43	89020	Meteosat 4 debris (MVIRI cover)	Debris
UU. 44	89020	Meteosat 4 debris (MVIRI cooler cover)	Debris
UU. 45	89070	Himawari-4 debris (VISSR cover)	Debris
UU. 46	90100	Satcom C-1 debris (Array restraint cable)	Debris
UU. 47	90100	Gstar 4 debris (Array restraint cable)	Debris
UU. 48	91015	Meteosat 5 debris (MVIRI cover)	Debris
UU. 49	91015	Meteosat 5 debris (MVIRI cooler cover)	Debris
UU. 50	91028	Spacenet 4 debris (Array restraint cable)	Debris
UU. 51	91037	Aurora II debris (Array restraint cable)	Debris
UU. 52	91080	USA 75 debris (Telescope aperture suncover)	Debris
UU. 53	92057	Satcom C-4 debris (Array restraint cable)	Debris
UU. 54	92060	Satcom C-3 debris (Array restraint cable)	Debris
UU. 55	93073	Meteosat 6 debris (MVIRI cover)	Debris
UU. 56	93073	Meteosat 6 debris (MVIRI cooler cover)	Debris
UU. 57	94040	BS-3N debris (Array restraint cable)	Debris
UU. 58	94084	USA 107 debris (Telescope aperture suncover)	Debris
UU. 59	95011	Himawari-5 debris (VISSR cover)	Debris
UU. 60	96003	Koreasat 2 debris (Array restraint cable)	Debris
UU. 61	97029	FengYun 2A debris (VISSR cover?)	Debris
UU. 62	97049	Meteosat 7 debris (MVIRI cover)	Debris
UU. 63	97049	Meteosat 7 debris (MVIRI cooler cover)	Debris
UU. 64	00032	FengYun 2B debris (VISSR cover?)	Debris
UU. 65	02040	Meteosat 8 debris (cooler cover)	Debris
UU. 66	02040	Meteosat 8 debris (entry baffle cover)	Debris
UU. 67	04004	USA 176 debris (Telescope aperture suncover)	Debris
UU. 68	04042	FengYun 2C debris (VISSR cover?)	Debris
UU. 69	07054	USA 197 debris (Telescope aperture suncover)	Debris
UU. 70	08066	FengYun 2E debris (VISSR cover?)	Debris
UU. 71	12002	FengYun 2F debris (VISSR cover?)	Debris
UU. 72	12035	Meteosat 10 debris (cooler cover)	Debris
UU. 73	12035	Meteosat 10 debris (entry baffle cover)	Debris

5 Table 3: Objects in highly inclined orbits

This table contains all the objects in highly inclined orbits that meet the applied classification scheme.

The 9 objects are ordered according to their COSPAR designation.

For an explanation of the symbols, see the definitions at the beginning of Chapter 3 on page 34.

I .nn	**COSPAR**	**NAME**					
	Date					N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
I . 1	**63031A**	**Syncom 2**					
	24-DEC-12					48	236
	23003.580231	42166.47057	0.0007502	35.4884	8.3579	94.0321	66.0935
I . 2	**78012A**	**IUE**					
	27-DEC-12					49	1015
	23006.151563	42222.45526	0.1481347	43.9404	358.2847	178.6176	208.1847
I . 3	**10005A**	**Solar Dynamics Observatory**					
	28-DEC-12					52	152
	23007.401597	42164.65138	0.0000643	27.8273	170.4232	279.1815	258.3049
I . 4	**10036A**	**Beidou DW 5**					
	28-DEC-12					52	127
	23007.222188	42163.19903	0.0029227	54.6236	209.7290	178.4096	120.4515
I . 5	**10045A**	**Michibiki**					
	27-DEC-12					51	119
	23006.767523	42161.64113	0.0749115	40.6601	183.0836	270.0549	136.3350
I . 6	**10068A**	**Beidou DW 7**					
	28-DEC-12					52	107
	23007.612303	42157.89302	0.0022936	54.7922	330.0416	194.8696	118.4059
I . 7	**11013A**	**Beidou DW 8**					
	27-DEC-12					52	91
	23006.976389	42171.65812	0.0026231	55.9403	90.0644	178.7813	117.0949
I . 8	**11038A**	**Beidou DW 9**					
	26-DEC-12					52	76
	23005.813796	42164.33937	0.0020143	54.9434	211.8635	172.1003	96.0769
I . 9	**11073A**	**Beidou DW 10**					
	27-DEC-12					52	58
	23006.966586	42165.72061	0.0020116	54.9094	329.4568	190.8283	94.4449

6 Table 4: Objects of indeterminate status

This table contains all the objects of which the status cannot be determined by our software. The main reason for the difficulty to classify an object is that there are not enough TLEs available or that the status has recently changed (satellite newly launched or recently manoeuvred). Indeed, at least 5 TLEs with the same status are needed to determine the category in which the object falls. Some bad measurements can also cause the failure to classify an object correctly. The 20 objects are ordered according to their COSPAR designation.

Note that the numbering continues from Section 4.7.

For an explanation of the symbols, see the definitions at the beginning of Chapter 3 on page 34.

Ind.nn	**COSPAR**	**NAME**					
	Date					N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
Ind. 3	**94034A**	**Intelsat VII F-2**					
	27-DEC-12					52	907
	23006.103009	42164.08455	0.0002818	1.2689	76.4112	203.2330	33.0013
Ind. 4	**95023A**	**Intelsat VIIA F-1**					
	27-DEC-12					52	874
	23006.614039	42132.05332	0.0004487	1.2021	76.0243	174.0014	141.7907
Ind. 5	**95055A**	**Astra 1E**					
	27-DEC-12					42	672
	23006.745567	42052.34442	0.0002768	2.2464	73.1373	192.9888	98.4070
Ind. 6	**97046A**	**PAS 5**					
	27-DEC-12					52	756
	23006.777824	42201.58048	0.0003338	0.2179	79.1346	187.0708	143.3695
Ind. 7	**99018A**	**Eutelsat W3**					
	28-DEC-12					52	694
	23007.744873	42103.18687	0.0003032	0.1245	80.2147	93.6073	27.9645
Ind. 8	**99056A**	**DirecTV-1R**					
	27-DEC-12					52	674
	23006.633183	42163.97410	0.0001797	0.5130	75.9510	139.3971	55.8278
Ind. 9	**00043A**	**PAS 9**					
	28-DEC-12					52	634
	23007.140289	42141.62358	0.0001846	0.2031	80.7674	196.5091	313.8006
Ind. 10	**01019A**	**PAS 10**					
	28-DEC-12					52	585
	23007.175544	42165.72538	0.0000701	0.0441	59.7926	3.5392	47.5421
Ind. 11	**09033A**	**GOES 14**					
	28-DEC-12					52	184
	23007.290347	42188.46862	0.0000116	0.1407	261.3279	50.5795	267.5123
Ind. 12	**11054A**	**QuetzSat-1**					
	28-DEC-12					52	67
	23007.385150	42203.96197	0.0000320	0.0700	275.8835	321.1037	290.1122
Ind. 13	**11074B**	**Luch-5A**					
	28-DEC-12					49	53
	23007.260081	42165.40269	0.0012728	4.0810	262.1685	351.4452	167.0388

Ind.nn	COSPAR	NAME					
	Date					N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
Ind. 14	**12061A**	**Luch-5B**					
	27-DEC-12					5	5
	23006.242350	42165.42652	0.0003676	0.2456	140.1388	231.0018	343.8683
Ind. 15	**12061B**	**Yamal-300K**					
	28-DEC-12					5	5
	23007.169873	42166.61019	0.0002647	0.0789	135.2630	202.6842	90.0261
Ind. 16	**12067A**	**Zhongxing 12**					
	28-DEC-12					4	4
	23007.499329	42283.89147	0.0000562	0.0726	242.1570	17.8490	73.2340
Ind. 17	**12069A**	**Eutelsat 70B**					
	28-DEC-12					4	4
	23007.177384	42164.09408	0.0000242	0.0763	109.9390	3.5810	50.9885
Ind. 18	**12070A**	**Yamal-402**					
	28-DEC-12					3	3
	23007.179769	42164.97741	0.0000589	0.0614	278.3754	49.5430	54.9066
Ind. 19	**12075A**	**Skynet 5D**					
	28-DEC-12					2	2
	23007.826516	42089.44072	0.0046421	0.2255	246.1965	189.2883	24.4311
Ind. 20	**12075B**	**Mexsat Bicentenario**					
	28-DEC-12					2	2
	23007.751123	42064.29651	0.0025086	0.0828	225.8057	184.6778	243.8513

The longitude histories of objects in this category are plotted in Figures 6.1 to 6.18.

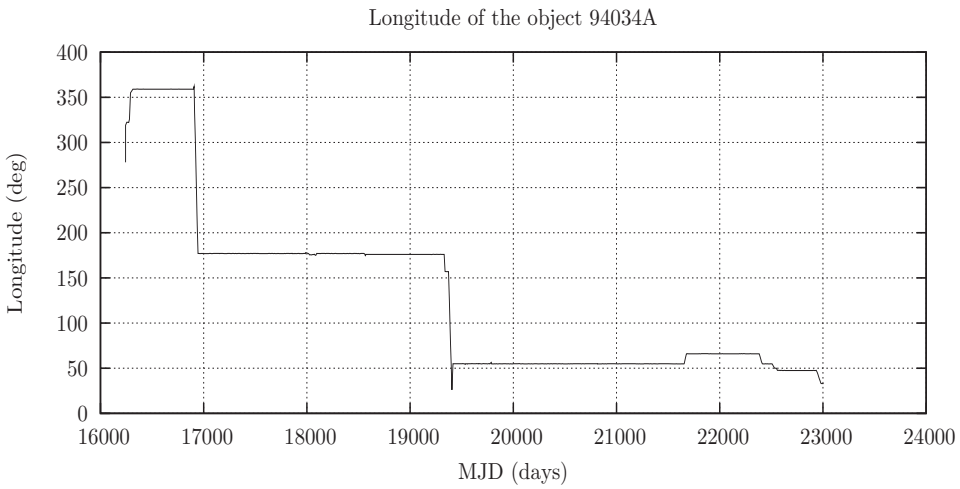

Figure 6.1: Longitude history of 94034A

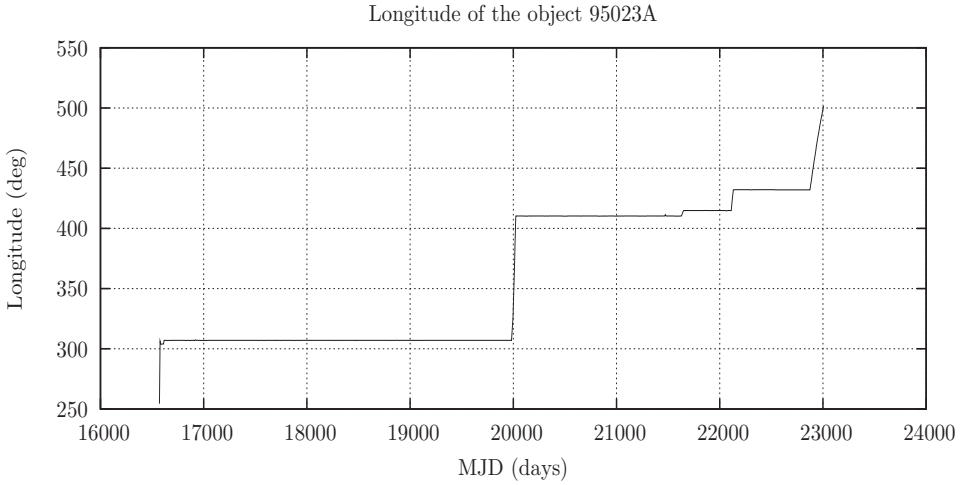

Figure 6.2: Longitude history of 95023A

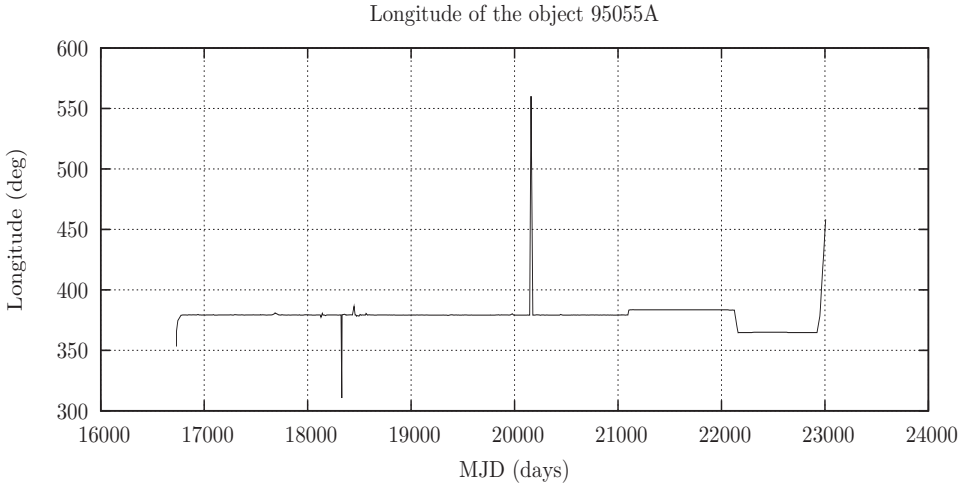

Figure 6.3: Longitude history of 95055A

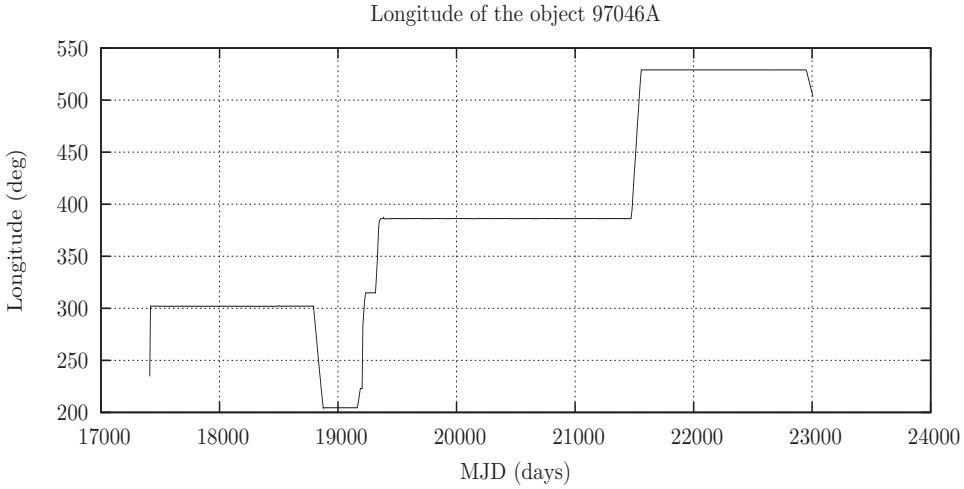

Figure 6.4: Longitude history of 97046A

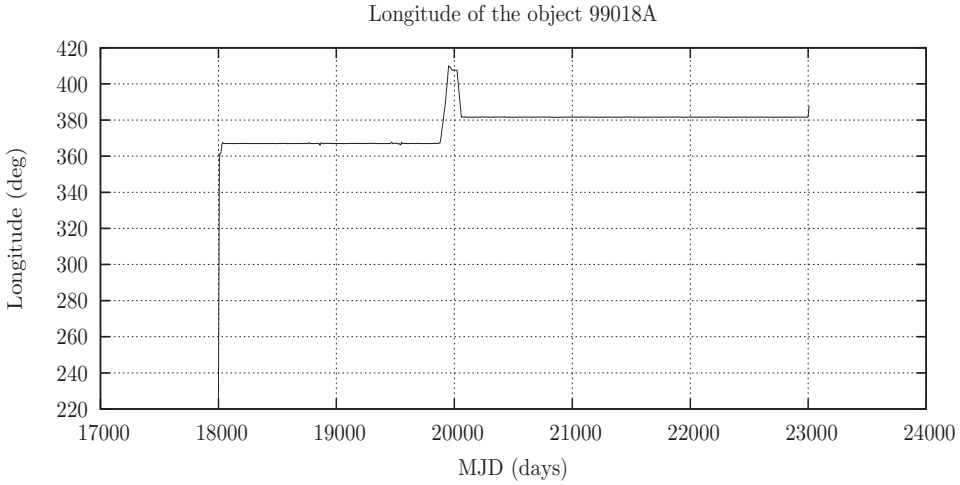

Figure 6.5: Longitude history of 99018A

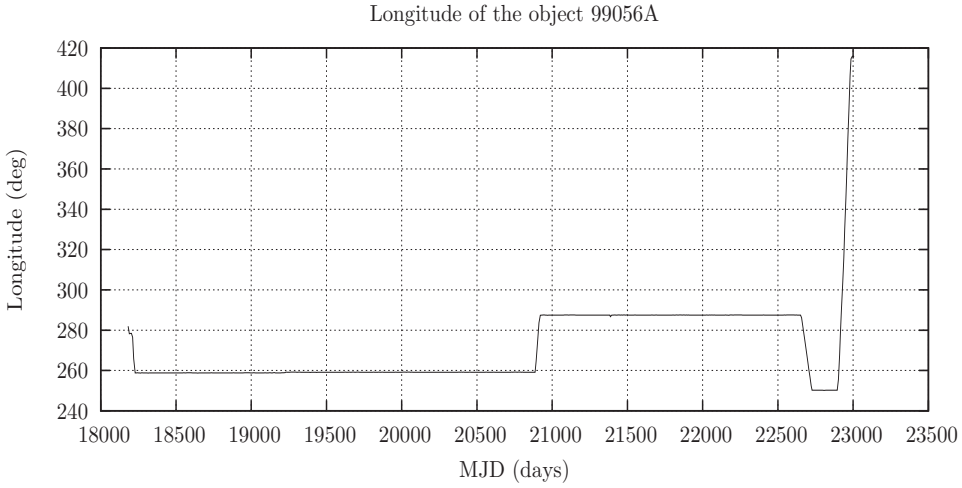

Figure 6.6: Longitude history of 99056A

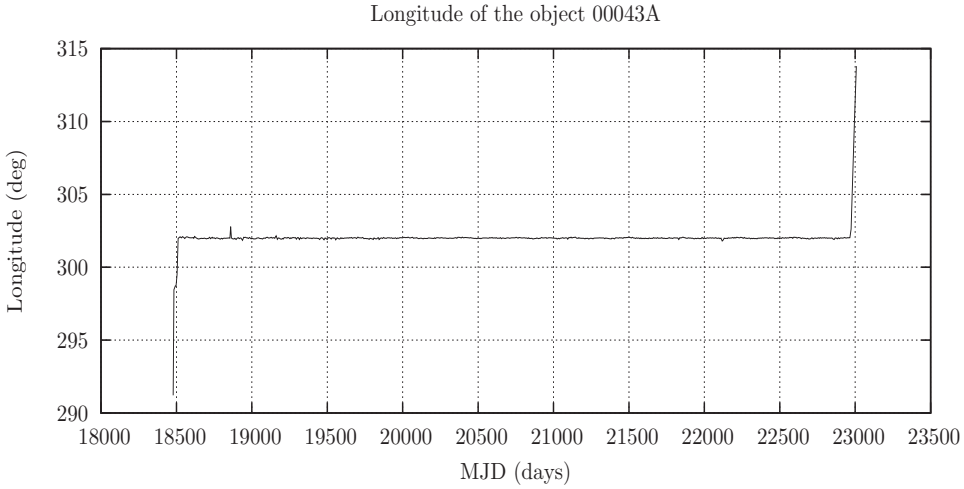

Figure 6.7: Longitude history of 00043A

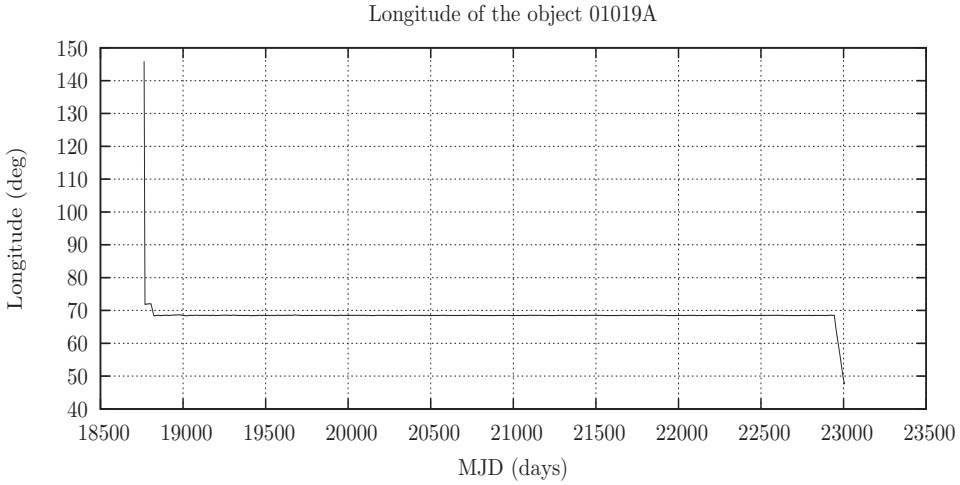

Figure 6.8: Longitude history of 01019A

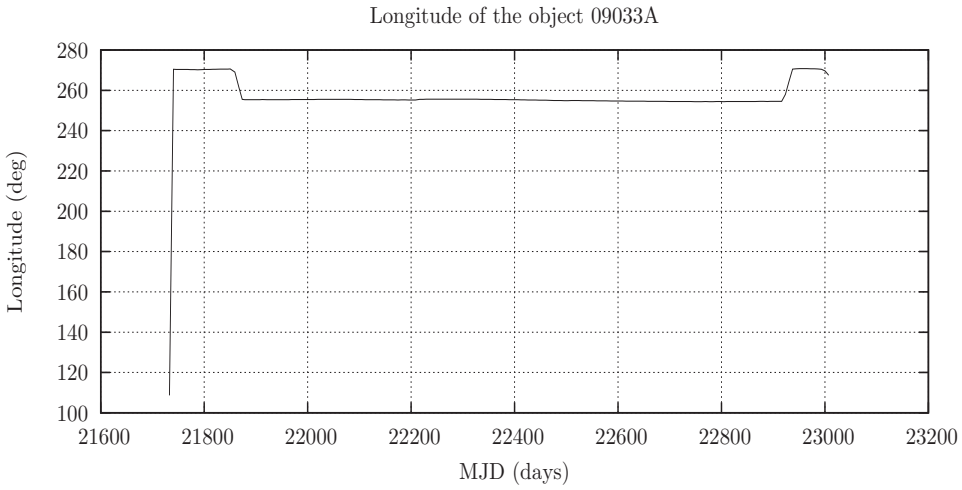

Figure 6.9: Longitude history of 09033A

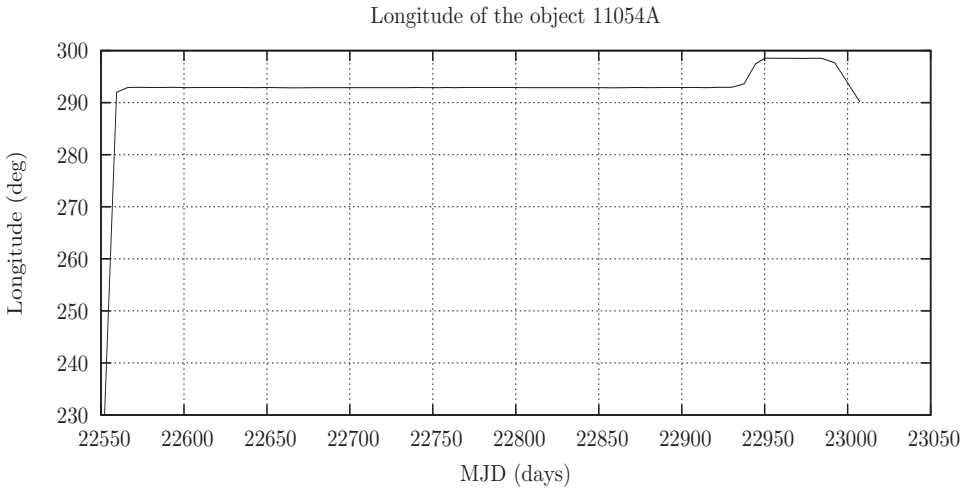

Figure 6.10: Longitude history of 11054A

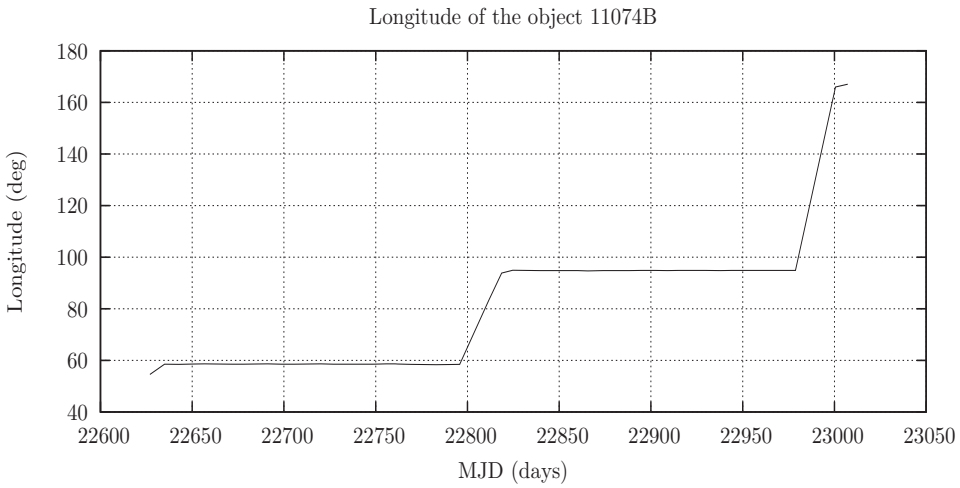

Figure 6.11: Longitude history of 11074B

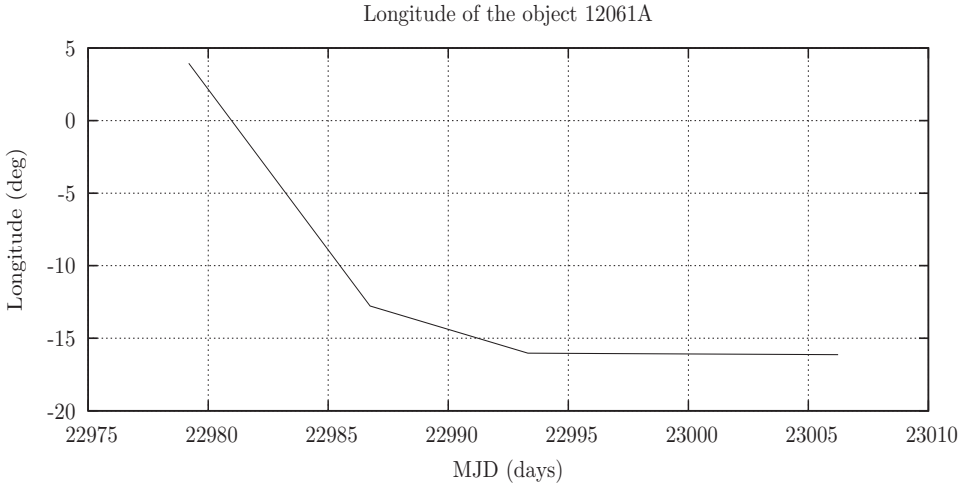

Figure 6.12: Longitude history of 12061A

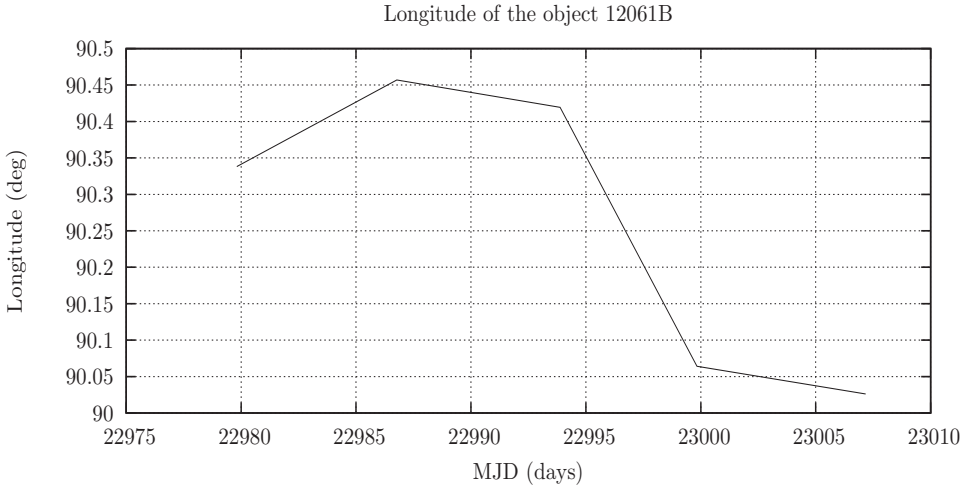

Figure 6.13: Longitude history of 12061B

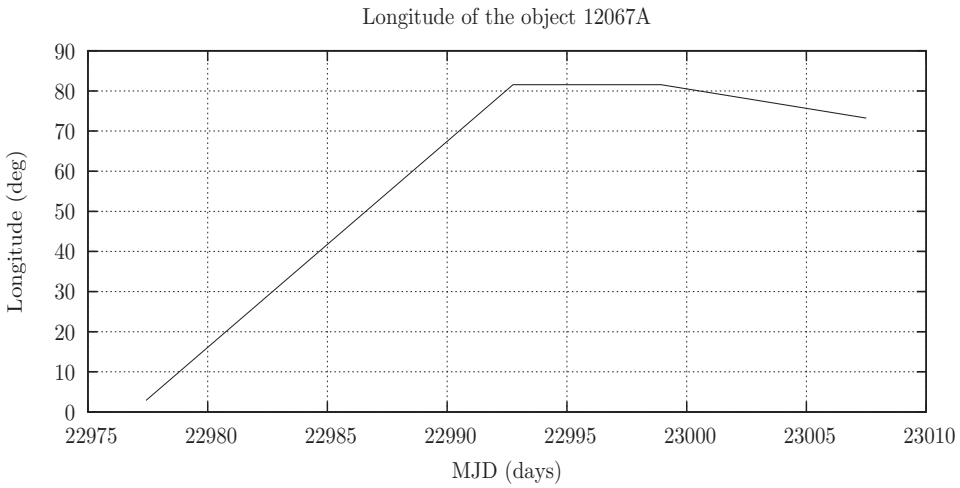

Figure 6.14: Longitude history of 12067A

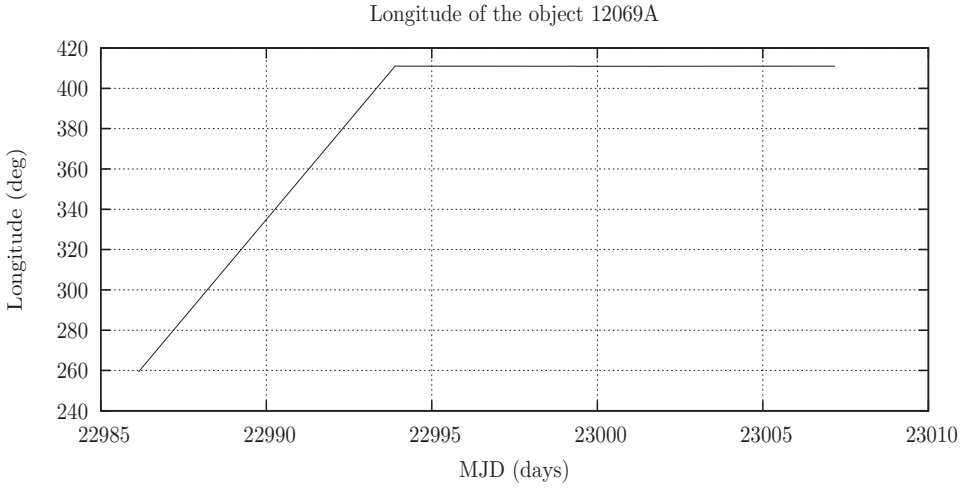

Figure 6.15: Longitude history of 12069A

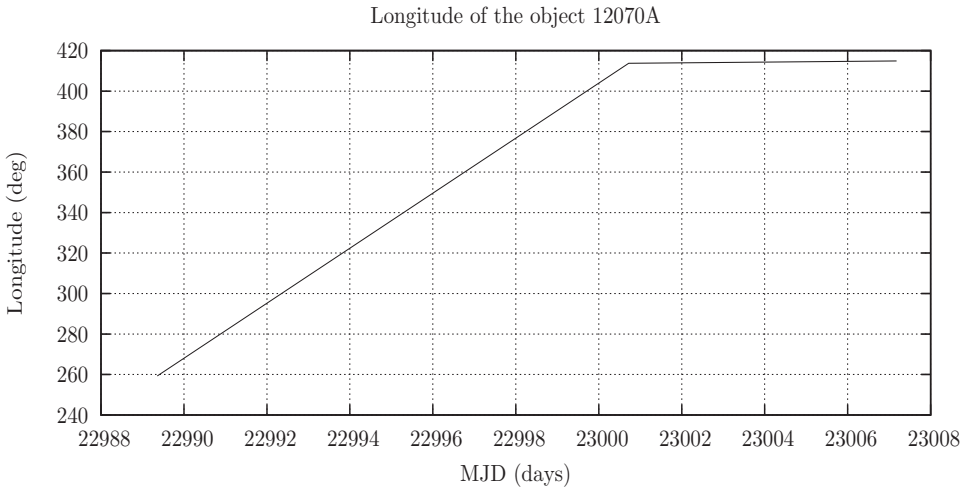

Figure 6.16: Longitude history of 12070A

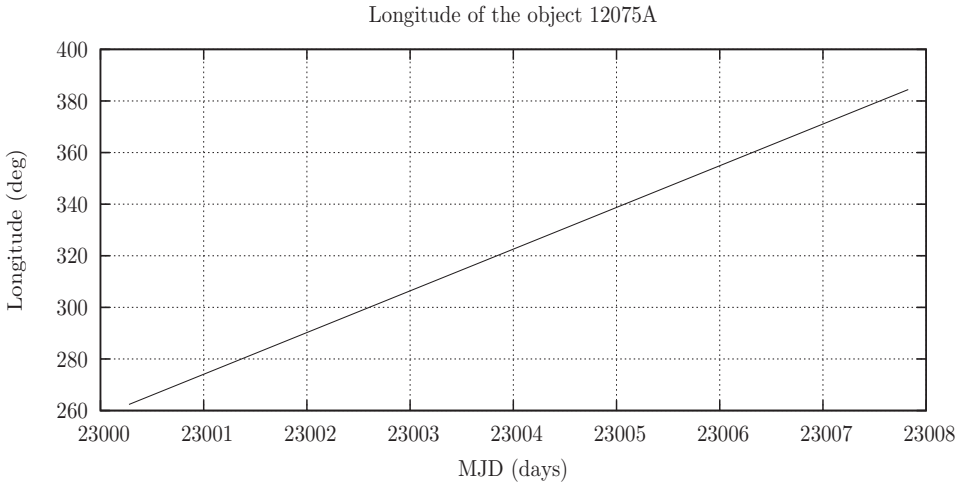

Figure 6.17: Longitude history of 12075A

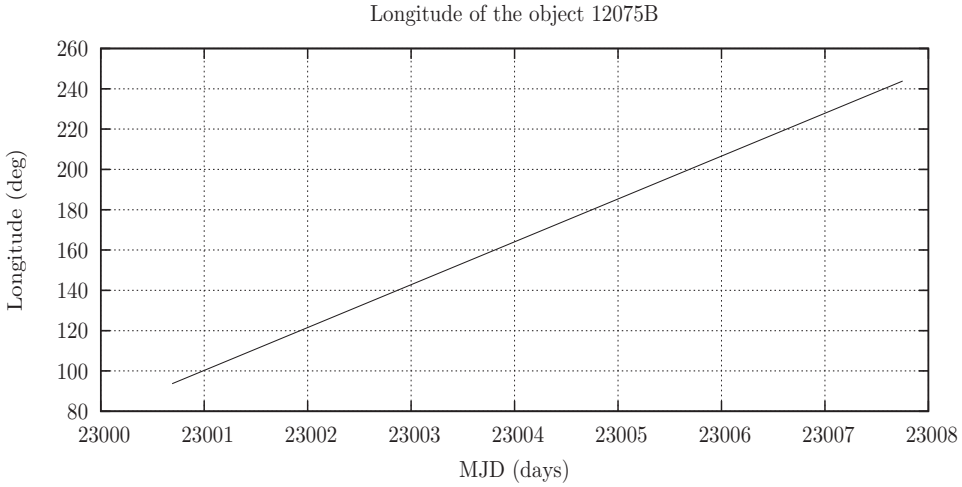

Figure 6.18: Longitude history of 12075B

7 Figures

The previous tables are now illustrated by seven graphs. They give a global view of the situation near the GEO protected region and the distribution of the objects in each category.

- Figure 7.1: Number of objects in each category
- Figure 7.2: Number of objects under control, in drift orbit or in libration orbit according to the launch year
- Figure 7.3: Distribution of the longitude of the satellites (with TLEs) under control
- Figure 7.4: Distribution and altitude range of the objects (with TLEs) in drift orbit
- Figure 7.5: Zoom in the distribution and altitude range of the objects (with TLEs) in drift orbit
- Figure 7.6: Distribution of the perigee mean deviation from the geostationary altitude for the objects (with TLEs) in drift orbit
- Figure 7.7: Number of objects (with TLEs) librating through a given longitude

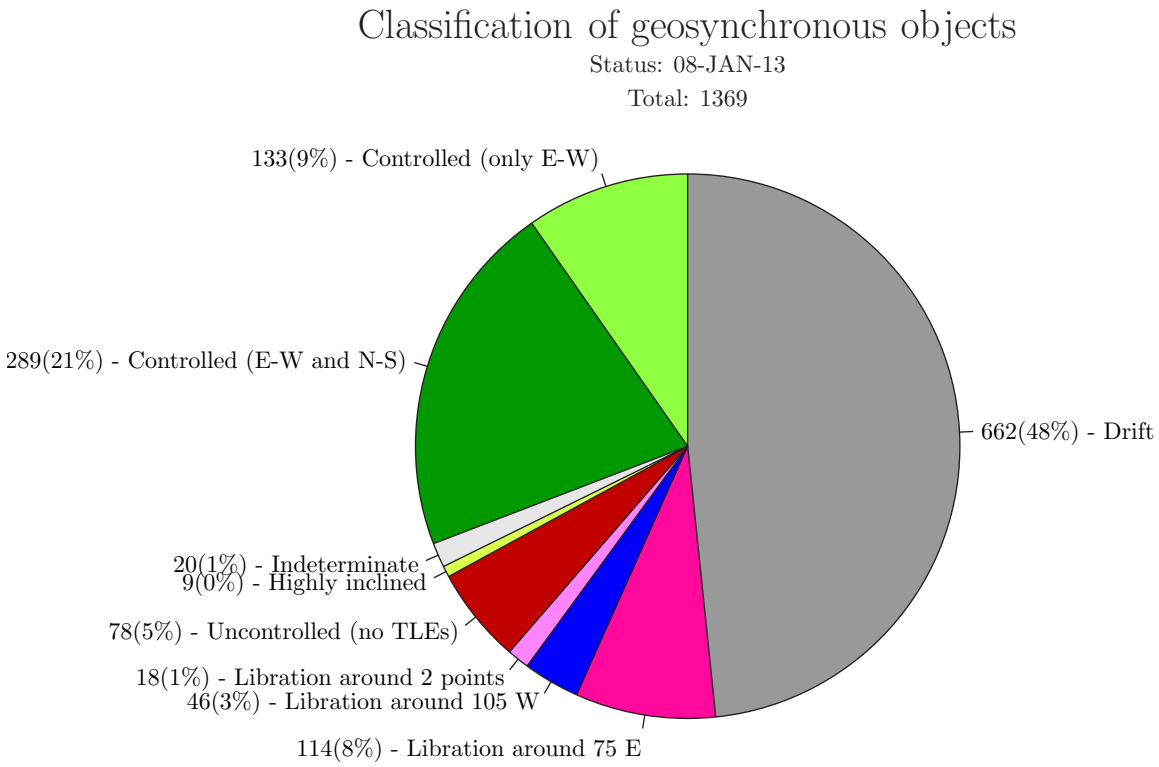

Figure 7.1:
Number of objects in each category

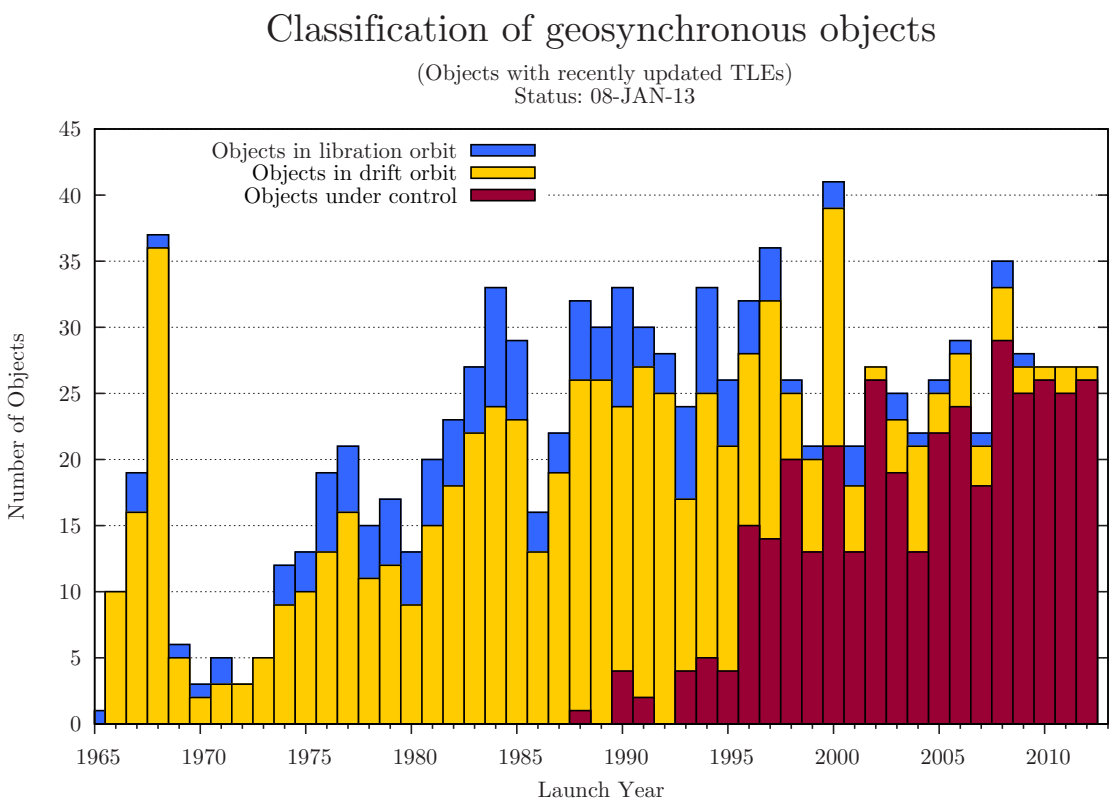

Figure 7.2:
Number of objects in each category according to the launch year.

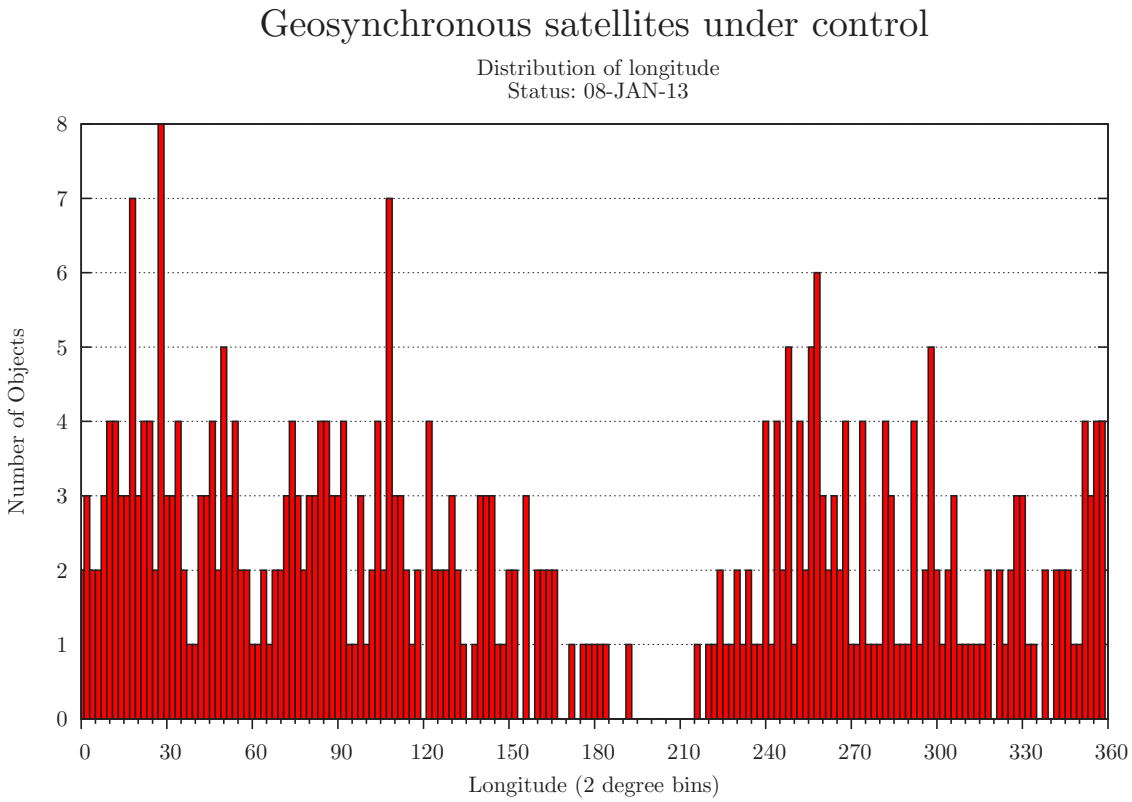

Figure 7.3:
Distribution of the longitude of the 350 satellites under control (with updated TLEs).

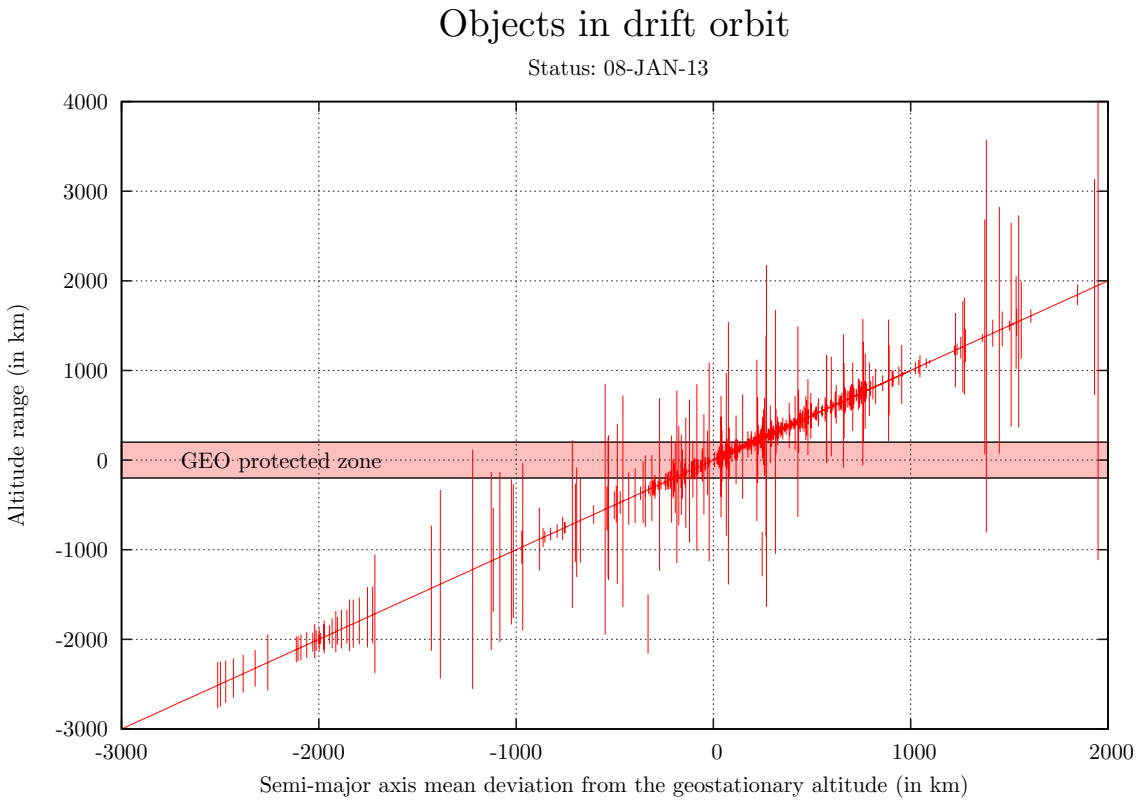

Figure 7.4:
Distribution and altitude range of the objects in drift orbit.

This figure illustrates the distribution of the objects in drift orbit. Each vertical line represents one object.

The horizontal axis gives the semi-major axis mean deviation from the geostationary altitude, which is inversely proportional to the mean drift rate of the object.

The vertical axis gives the perigee and apogee mean deviation from the geostationary altitude. The altitude of the object librates between these two values. One can see that if the eccentricity is large, the object can go through the geostationary altitude.

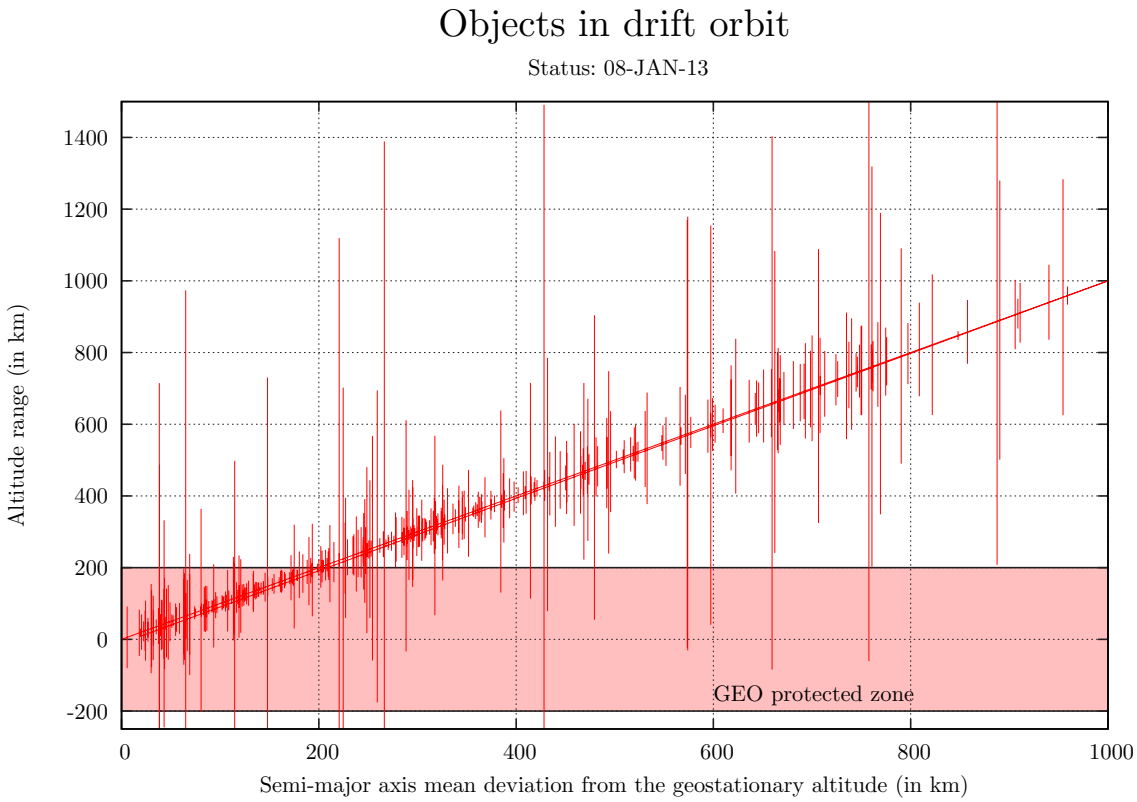

Figure 7.5:
Zoom in the distribution and altitude range of the objects in drift orbit.

This figure is a zoom of the previous figure. This area is important because, according to the IADC recommendations, a satellite should be reorbited at its end-of-life to a graveyard orbit with a perigee altitude which is about 300 km above the GEO ring.

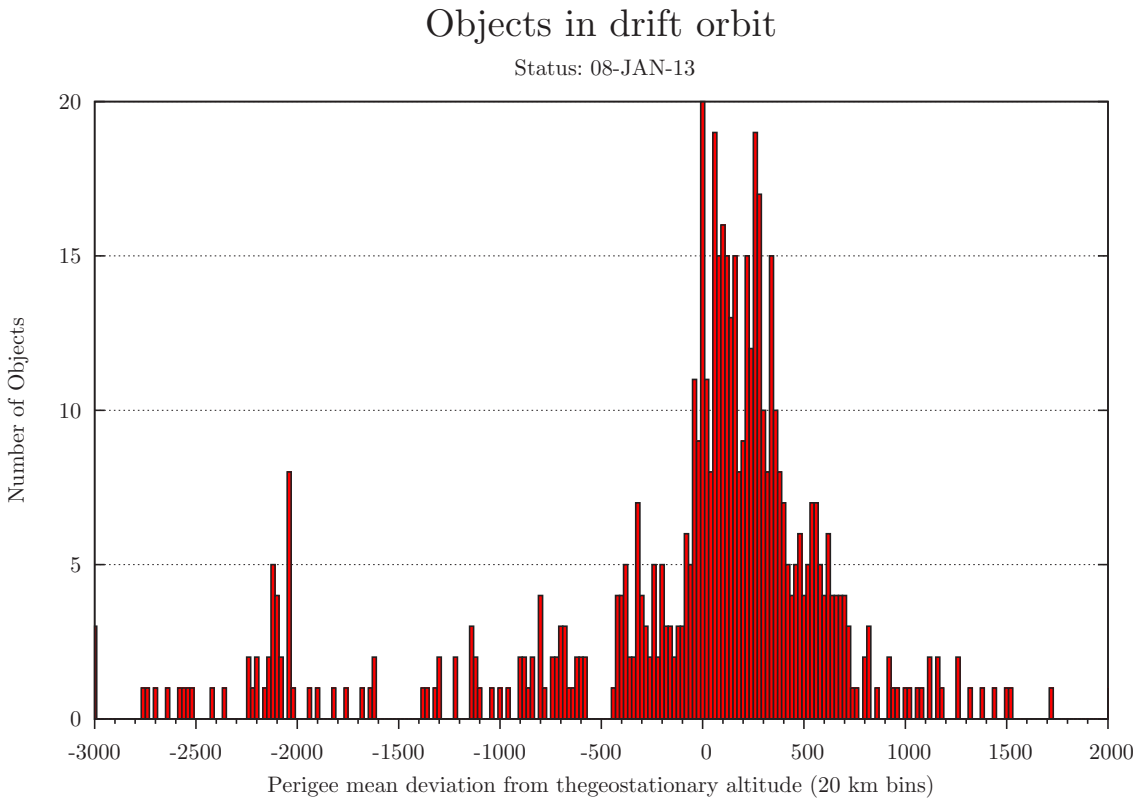

Figure 7.6:
Distribution of the perigee mean deviation from the geostationary altitude.

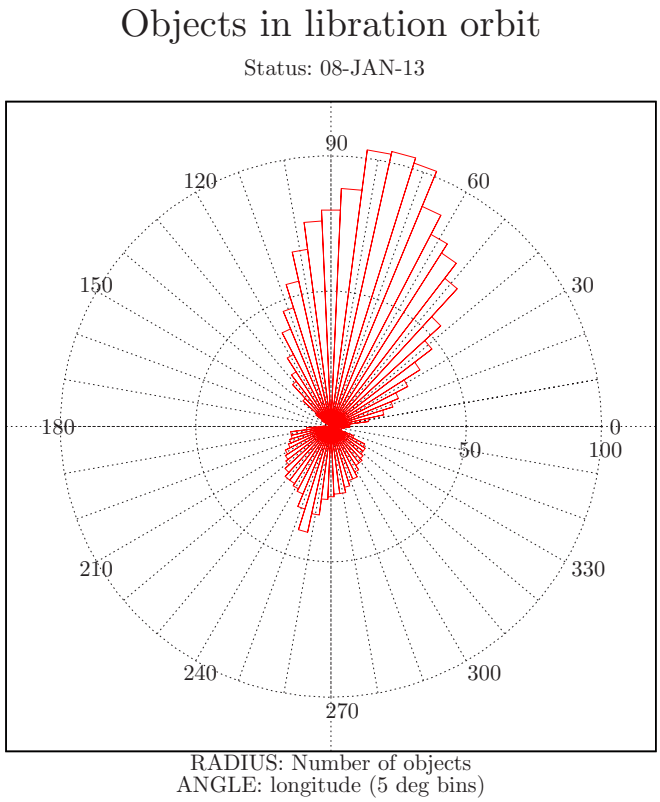

Figure 7.7:
Distribution of the objects in libration orbit in 5-deg bins of geographic longitude.

This figure illustrates the distribution of the objects in a libration orbit (objects with updated TLEs only). For every interval of 5 degrees, the number of objects librating through this longitude interval is given. For instance, an object librating between 64 deg E and 86 deg E is counted in the 5 intervals 62.5-67.5, 67.5-72.5, 72.5-77.5, 77.5-82.5 and 82.5-87.5.

For the same reason, all the objects classified as librating around the Eastern stable point or around the 2 stable points are counted in the interval 72.5-77.5, because they all go through the longitude 75 deg E. Thus, the number of objects at 75 deg E shown in this figure is equal to the sum of the objects in the L1 and L3 categories.

8 Summary

All geostationary or near-geostationary objects catalogued in ESA's DISCOS Database (Database and Information System Characterising Objects in Space) are listed in this document. An object is considered as geostationary or near-geostationary if it meets the following criteria:

- eccentricity smaller than 0.2,
- mean motion between 0.9 and 1.1 revolution per sideral day, corresponding to a semi-major axis between 42164 - 2500 km and 42164 + 3150 km,
- inclination lower than 70 degree.

1122 objects met these criteria as of 31 December 2012. 247 more objects are also known to be in this orbital region. For 169 of them KIAM provided orbital elements; 163 objects can be correlated with a launch and 6 are tracked objects that cannot be correlated with a launch. Thus, the total number of known objects in the geostationary region is 1369 .

They can be classified as follows:

- 422 are controlled (289 under longitude and inclination control),
- 662 are in a drift orbit,
- 178 are in a libration orbit,
- 5 are uncontrolled with no recent orbital elements available,
- 73 are uncatalogued objects which can, however, be associated with a launch,
- 9 are in highly-inclined orbits,
- 20 could not be classified.

Compared with the past issue of February 2012 the following changes can be observed: There were 41 new objects (39 payloads, 1 rocket body, and 1 mission-related object) launched into or near GEO in 2012.

Fifteen objects (68081Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF) were newly catalogued, of which one object (R) was already listed as unidentified object. Seven objects were added to the list of uncontrolled uncatalogued objects. UI163 was correlated with 10006B, but does not meet our applied filter criteria. 90097D was deleted from the list of uncontrolled objects. Thus the total number of objects increased by 60.

At least 14 spacecraft reached end of life as far as can be inferred from the orbital elements stored in DISCOS, from data provided by KIAM, or declared by spacecraft operators. Only 9 were reorbited more than 250 km above GEO and complied with the IADC reorbiting guidelines:

- Intelsat VI F-2 (89087A, INTELSAT, 336 km $\times$ 382 km),
- Inmarsat 2-F4 (92021B, INMARSAT, 635 km $\times$ 697 km),
- AsiaSat 2 (95064A, HONG KONG, 247 km $\times$ 299 km),

- AMOS 1/Intelsat 24 (96030B, ISRAEL/INTELSAT, 867 km × 950 km),
- Telecom 2D (96044B, FRANCE, 449 km × 591 km),
- Apstar 2R (97062A, CHINA, 257 km × 345 km),
- Zhongxing-22 (00003A, CHINA, 835 km × 860 km),
- Eutelsat W1 (00052A, EUTELSAT, 564 km × 631 km).

One spacecraft listed in Table 2 was reorbited in 2012 and complied with the IADC reorbiting guidelines:

- USA 111 (UFO F5) (95027A, USA, 422 km × 443 km).

AsiaSat 2 was reorbited so that it might marginally touch the protected zone around GEO in a long-term forecast.

Four spacecraft were reorbited too low:

- GOES 7 (87022A, USA, 121 km × 89 km),
- Palapa C1 (96006A, INDONESIA, 156 km × 227 km),
- Insat 2E (99016A, INDIA, 149 km × 198 km),
- Beidou 3 (03021C, CHINA, 135 km × 145 km).

Beidou 3 began decommissioning at the end of 2012 and completed it early 2013.

At least one spacecraft seems to be abandoned and has started librating around the libration point L1:

- Cakrawatra 1 (97071B, INDONESIA).

One rocket body and one apogee kick-motor (AKM) were left violating the IADC guidelines (Fengyun 2F AKM (12002C, CHINA) in a drift orbit with the perigee 18 km above and the apogee 480 km above GEO; and a Proton-K/DM-2 fourth stage (12012D, RUSSIA), currently with the perigee 38 km below the GEO and the apogee 58 km above the GEO), probably in a librating orbit.

We set the previously unclear status of Cosmos-2240 (08033A, RUSSIA) to L1, and of Gorizont 32 (96034A, RUSSIA) to drifting (in a -6 km × 60km orbit). Raduga-1 (04010A, RUSSIA) is in an L1-type orbit, and seems also to have reached end-of-life already before 2012.

In the previous versions of this report Gstar 1 (85035A) was reported as controlled (C2). In fact, Gstar 1 was decommissioned already in 1997 and is librating around L2 with a very small amplitude of only 0.3 deg.

This analysis has shown that in 2012, fifteen years after the IADC guidelines were established, there are still satellites that were not or could not be properly reorbited.

9 References

1. Samsom P., "Classification of Geostationary Objects", ESOC - MAS WP 420, 1999.

2. Jehn, R., and Hernández, C., "Reorbiting statistics of geostationary objects in the years 1997 - 2001", in: Proceedings of the Third European Conference on Space Debris, 19 - 21 March 2001, Darmstadt, Germany, edited by H. Sawaya-Lacoste, ESA SP-473, 2001.

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