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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 2014.

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 1363 objects for which orbital data are available, 454 are controlled inside their longitude slots, 704 are drifting above, below or through GEO, 182 are in a libration orbit, 11 are in highly-inclined orbits. For 12 objects the status could not be determined. Furthermore, there are 75 uncontrolled objects without orbital data (of which 69 have not been catalogued). Thus the total number of known objects in the geostationary region is 1438 .

During 2014 at least eighteen spacecraft reached end-of-life. Thirteen of them were reorbited following the IADC recommendations. Three spacecraft were reorbited too low, of which one spacecraft has the perigee below GEO. We identified two spacecraft that seem to be abandoned or could not make any reorbiting manouevre at all in 2014.

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 4.7 (Unidentified objects) and 4.9 (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	457.
65028A	Intelsat I F-1	1.	L2	27.
66053A	GGTS 1	1.	D	593.
66053B	IDCSP 1	1.	D	591.
66053C	IDCSP 2	1.	D	589.
66053D	IDCSP 3	1.	D	586.
66053E	IDCSP 4	1.	D	583.
66053F	IDCSP 5	1.	D	580.
66053G	IDCSP 6	1.	D	577.
66053H	IDCSP 7	1.	D	575.
66053J	Titan IIIC stage 3 (Transtage 11)	1.	D	573.
66110A	ATS 1	1.	D	460.
67001A	Intelsat II F-2	1.	D	458.
67003A	IDCSP 8	1.	D	597.
67003B	IDCSP 9	1.	D	596.
67003C	IDCSP 10	1.	D	595.
67003D	IDCSP 11	1.	D	594.
67003E	IDCSP 12	1.	D	592.
67003F	IDCSP 13	1.	D	585.
67003G	IDCSP 14	1.	D	582.
67003H	IDCSP 15	1.	D	578.
67026A	Intelsat II F-3	1.	L1	106.
67066A	IDCSP 16	1.	D	604.
67066B	IDCSP 17	1.	D	603.
67066C	IDCSP 18	1.	D	602.
67066D	IDCSP 19	1.	D	601.
67066E	LES 5	1.	D	600.
67066F	DODGE 1	1.	D	599.
67066G	Titan IIIC stage 3 (Transtage 14)	1.	D	598.
67094A	Intelsat II F-4	1.	L2	31.
67111A	ATS 3	1.	L2	19.
68050A	OPS 9341 (IDSCS 20)	1.	D	590.
68050B	OPS 9342 (IDSCS 21)	1.	D	588.
68050C	OPS 9343 (IDSCS 22)	1.	D	587.
68050D	OPS 9344 (IDSCS 23)	1.	D	584.
68050E	OPS 9345 (IDSCS 24)	1.	D	581.
68050F	OPS 9346 (IDSCS 25)	1.	D	579.
68050G	OPS 9347 (IDSCS 26)	1.	D	576.
68050H	OPS 9348 (IDSCS 27)	1.	D	574.
68050J	Titan IIIC stage 3 (Transtage 16)	1.	D	572.
68063A	OPS 2222 (CANYON 1)	2.	D1	70.
68063B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	9.
68081A	OV2 5	1.	D	534.
68081D	LES 6	1.	L2	25.
68081E	Titan IIIC stage 3 (Transtage 5)	1.	D	532.
68081G	Transtage 5 debris	1.	D	506.

COSPAR	NAME	TABLE	STATUS	No
68081H	Transtage 5 debris	1.	D	537.
68081J	Transtage 5 debris	1.	D	498.
68081K	Transtage 5 debris	1.	D	543.
68081L	Transtage 5 debris	1.	D	538.
68081M	Transtage 5 debris	1.	D	489.
68081N	Transtage 5 debris	1.	D	499.
68081P	Transtage 5 debris	1.	D	527.
68081Q	Transtage 5 debris	1.	D	281.
68081R	Transtage 5 debris	1.	D	486.
68081T	Transtage 5 debris	1.	D	552.
68081U	Transtage 5 debris	1.	D	561.
68081W	Transtage 5 debris	1.	D	312.
68081X	Transtage 5 debris	1.	D	530.
68081Y	Transtage 5 debris	1.	D	568.
68081Z	Transtage 5 debris	1.	D	496.
68081AA	Transtage 5 debris	1.	D	550.
68081AB	Transtage 5 debris	1.	D	513.
68081AC	Transtage 5 debris	1.	D	545.
68081AD	Transtage 5 debris	1.	D	571.
68081AE	Transtage 5 debris	1.	D	546.
68081AF	Transtage 5 debris	1.	D	542.
68081AG	Transtage 5 debris	1.	D	478.
68081AH	Transtage 5 debris	1.	D	453.
68081AJ	Transtage 5 debris	1.	D	442.
68081AK	Transtage 5 debris	1.	D	463.
68116A	Intelsat III F-2	1.	D	2.
69013A	TACSAT 1	1.	D	466.
69013B	Titan IIIC stage 3 (Transtage 17)	1.	D	59.
69036A	OPS 3148 (CANYON 2)	2.	D1	43.
69036B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	3.
69045A	Intelsat III F-4	1.	D	1.
69069A	ATS 5	1.	D	311.
69069C	JPL SR-28-3 (ATS 5 AKM)	1.	D	106.
69101A	Skynet 1A	1.	L2	5.
70003A	Intelsat III F-6	1.	D	233.
70021A	NATO I	1.	L2	8.
70032A	Intelsat III F-7	1.	L1	102.
70046A	OPS 5346 (Rhyolite 1)	2.	L1	4.
70055A	Intelsat III F-8	1.	D	548.
70069A	OPS 7329 (CANYON 3)	2.	L2	5.
70069B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	10.
71006A	Intelsat IV F-2	1.	D	172.
71009A	NATO IIB	1.	L2	4.
71039A	OPS 3811 (DSP F2)	2.	D1	93.
71039B	Titan IIIC stage 3 (Transtage 20)	2.	D1	41.
71095A	OPS 9431 (DSCS II F-1)	1.	L2	9.
71095B	OPS 9432 (DSCS II F-2)	1.	L3	3.

COSPAR	NAME	TABLE	STATUS	No
71095C	Titan IIIC stage 3 (Transtage 21)	1.	D	45.
71116A	Intelsat IV F-3	1.	D	333.
72003A	Intelsat IV F-4	1.	D	369.
72010A	OPS 1570 (DSP F3)	2.	D1	52.
72010B	Titan IIIC stage 3 (Transtage 22)	2.	D1	30.
72041A	Intelsat IV F-5	1.	D	428.
72090A	Anik A1	1.	D	170.
72101A	OPS 9390 (CANYON 5)	2.	L1	2.
72101B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	6.
73013A	OPS 6063 (Rhyolite 2)	2.	L1	5.
73023A	Anik A2	1.	D	363.
73040A	OPS 6157 (DSP F4)	2.	D1	49.
73040B	Titan IIIC stage 3 (Transtage 24)	2.	D1	60.
73058A	Intelsat IV F-7	1.	D	227.
73100A	OPS 9433 (DSCS II F-3)	1.	D	62.
73100B	OPS 9434 (DSCS II F-4)	1.	D	52.
73100D	Titan IIIC stage 3 (Transtage 26)	1.	D	12.
74017A	Cosmos 637	1.	D	490.
74017F	Proton-K/DM fourth stage (Blok-DM)	1.	D	503.
74022A	Westar I	1.	D	386.
74033A	SMS 1	1.	D	141.
74039A	ATS 6	1.	D	541.
74039C	Titan IIIC stage 3 (Transtage 27)	1.	D	484.
74060A	Molniya 1-S	1.	L1	64.
74060F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	81.
74075A	Westar II	1.	D	377.
74093A	Intelsat IV F-8	1.	D	360.
74094A	Skynet 2B	1.	L1	100.
74101A	Symphonie A	1.	D	397.
75011A	SMS 2	1.	D	313.
75011F	Aerojet SVM-5 (SMS 2 AKM)	1.	D	138.
75038A	Anik A3	1.	D	419.
75042A	Intelsat IV F-1	1.	D	268.
75055A	OPS 4966 (CANYON 6)	2.	L1	7.
75055B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	8.
75077A	Symphonie B	1.	D	400.
75091A	Intelsat IVA F-1	1.	D	391.
75097A	Cosmos 775	1.	L1	70.
75097F	Proton-K/DM fourth stage (Blok-DM)	1.	D	427.
75100A	GOES 1	1.	L2	15.
75100F	Aerojet SVM-5 (GOES 1 AKM)	1.	D	539.
75117A	RCA Satcom I	1.	D	331.
75118A	OPS 3165 (DSP F5)	2.	D1	38.
75118C	Titan IIIC stage 3 (Transtage 29)	2.	D1	37.
75118D	DSP F5 operational debris (IR-telescope aperture suncover)	2.	U	1.
75123A	Raduga 1	1.	L1	22.
75123F	Proton-K/DM fourth stage (Blok-DM)	1.	D	472.

COSPAR	NAME	TABLE	STATUS	No
76004A	Hermes	1.	L2	23.
76004E	CTS JBSA	1.	L2	17.
76004F	CTS JBSA	1.	L2	16.
76010A	Intelsat IVA F-2	1.	D	344.
76017A	Marisat 1	1.	D	251.
76023A	LES 8 (RTGPP)	1.	L2	10.
76023B	LES 9 (RTGPP)	1.	L2	12.
76023F	Titan IIIC stage 3 (Transtage 30)	1.	D	111.
76023J	LES 8, LES 9 operational debris	1.	D	110.
76023K	LES 8, LES 9 operational debris	1.	D	523.
76029A	RCA Satcom II	1.	D	143.
76035A	NATO IIIA	1.	D	373.
76042A	Comstar 1A	1.	D	367.
76053A	Marisat 2	1.	D	26.
76059A	OPS 2112 (DSP F6)	2.	D1	64.
76059C	Titan IIIC stage 3 (Transtage 28)	2.	D1	35.
76059D	DSP F6 operational debris (IR-telescope aperture suncover)	2.	U	2.
76066A	Palapa 1	1.	D	424.
76073A	Comstar 2	1.	D	403.
76092A	Raduga 2	1.	L1	24.
76092F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	40.
76101A	Marisat 3	1.	D	55.
76107A	Ekran 1	1.	L1	41.
76107F	Proton-K/DM fourth stage (Blok-DM)	1.	D	529.
77005A	NATO IIIB	1.	D	19.
77007A	OPS 3151 (DSP F7)	2.	D1	95.
77007C	Titan IIIC stage 3 (Transtage 23)	2.	L2	2.
77007D	DSP F7 operational debris (IR-telescope aperture suncover)	2.	D1	33.
77014A	Kiku-2	1.	D	409.
77018A	Palapa 2	1.	D	415.
77034A	OPS 9437 (DSCS II F-7)	1.	D	36.
77034B	OPS 9438 (DSCS II F-8)	1.	D	21.
77034C	Titan IIIC stage 3 (Transtage 32)	1.	D	23.
77038A	OPS 9751 (CANYON 7)	2.	L1	6.
77038C	Atlas SLV-3A stage 2 (Agena D)	2.	D1	5.
77041A	Intelsat IVA F-4	1.	D	305.
77048A	GOES 2	1.	D	294.
77048G	Aerojet SVM-5 (GOES 2 AKM)	1.	D	477.
77065A	Himawari	1.	D	265.
77071A	Raduga 3	1.	L1	73.
77071F	Proton-K/DM fourth stage (Blok-DM)	1.	D	71.
77080A	SIRIO 1	1.	L1	25.
77092A	Ekran 2	1.	L1	47.
77092G	Proton-K/DM fourth stage (Blok-DM)	1.	D	519.
77092H	Ekran 2 fragmentation debris	1.	L1	88.
77092J	Ekran 2 fragmentation debris	1.	D	413.
77092K	Ekran 2 fragmentation debris	1.	D	436.
77108A	Meteosat 1	1.	L1	95.

COSPAR	NAME	TABLE	STATUS	No
77108D	Mage 1 (Meteosat 1 AKM)	1.	D	76.
77114A	OPS 4258 (AQUACADE 3)	2.	L2	3.
77118A	Sakura	1.	D	184.
78002A	Intelsat IVA F-3	1.	D	389.
78012A	IUE	4.	I	2.
78016A	OPS 6391 (FLTSATCOM F1)	2.	D1	74.
78035A	Intelsat IVA F-6	1.	L1	101.
78038A	OPS 8790 (AQUACADE 4)	2.	D1	40.
78039A	Yuri	1.	L1	65.
78044A	OTS 2	1.	D	225.
78058A	OPS 9454 (VORTEX 1) (CHALET 1)	2.	D1	46.
78058B	Titan IIIC stage 3 (Transtage 33)	2.	D1	56.
78062A	GOES 3	1.	L2	6.
78062D	Aerojet SVM-5 (GOES 3 AKM)	1.	D	310.
78068A	Comstar 3	1.	D	247.
78071A	ESA GEOS 2	1.	D	288.
78073A	Raduga 4	1.	L1	68.
78073F	Proton-K/DM fourth stage (Blok-DM)	1.	D	53.
78106A	NATO IIIC	1.	D	130.
78113A	OPS 9441 (DSCS II F-11)	1.	D	9.
78113B	OPS 9442 (DSCS II F-12)	1.	D	122.
78113D	Titan IIIC stage 3 (Transtage 36)	1.	D	8.
78116A	Anik B1	1.	D	365.
79007A	Scatha	1.	D	533.
79007C	Scatha AKM	1.	D	535.
79015A	Ekran 3	1.	L1	48.
79015D	Proton-K/DM fourth stage (Blok-DM)	1.	D	520.
79035A	Raduga 5	1.	L1	21.
79035E	Proton-K/DM fourth stage (Blok-DM)	1.	D	446.
79038A	OPS 6392 (FLTSATCOM F2)	1.	D	134.
79053A	OPS 7484 (DSP F8)	2.	D1	85.
79053C	Titan IIIC stage 3 (Transtage 31)	2.	D1	66.
79053D	DSP F8 operational debris (IR-telescope aperture suncover)	2.	U	3.
79062A	Gorizont 2	1.	L1	29.
79062D	Proton-K/DM fourth stage (Blok-DM)	1.	D	65.
79072A	Westar III	1.	D	396.
79086A	OPS 1948 (VORTEX 2) (CHALET 2)	2.	D1	45.
79086C	Titan IIIC stage 3 (Transtage 34)	2.	D1	55.
79087A	Ekran 4	1.	L1	39.
79087C	Proton-K/DM fourth stage (Blok-DM)	1.	D	470.
79098A	OPS 9443 (DSCS II F-13)	1.	D	24.
79098B	OPS 9444 (DSCS II F-14)	1.	D	117.
79098C	Titan IIIC stage 3 (Transtage 37)	1.	D	20.
79105A	Gorizont 3	1.	L1	67.
79105E	Proton-K/DM fourth stage (Blok-DM)	1.	D	149.
80004A	OPS 6393 (FLTSATCOM F3)	1.	L2	39.
80016A	Raduga 6	1.	L1	62.

COSPAR	NAME	TABLE	STATUS	No
80016D	Proton-K/DM fourth stage (Blok-DM)	1.	D	60.
80049A	Gorizont 4	1.	D	145.
80049F	Proton-K/DM fourth stage (Blok-DM)	1.	D	85.
80060A	Ekran 5	2.	L3	2.
80060F	Proton-K/DM fourth stage (Blok-DM)	1.	D	536.
80060G	Ekran 5 debris	2.	D1	42.
80074A	GOES 4	1.	D	259.
80081A	Raduga 7	1.	L2	34.
80081F	Proton-K/DM fourth stage (Blok-DM)	1.	D	399.
80087A	OPS 6394 (FLTSATCOM F4)	2.	D1	76.
80091A	SBS I	1.	D	366.
80098A	Intelsat V F-2	1.	D	178.
80104A	Ekran 6	1.	L1	43.
80104E	Proton-K/DM fourth stage (Blok-DM)	1.	D	521.
81018A	Comstar 4	1.	L1	12.
81025A	OPS 7350 (DSP F9)	2.	D1	81.
81025C	Titan IIIC stage 3 (Transtage 40)	2.	D1	12.
81027A	Raduga 8	1.	D	462.
81027F	Proton-K/DM fourth stage (Blok-DM)	1.	D	64.
81049A	GOES 5	1.	L2	22.
81050A	Intelsat V F-1	1.	D	174.
81057A	Meteosat 2	1.	D	153.
81057B	APPLE	1.	D	412.
81057F	Mage 1 (Meteosat 2 AKM)	1.	D	286.
81061A	Ekran 7	1.	L1	49.
81061F	Proton-K/DM fourth stage (Blok-DM)	1.	D	505.
81069A	Raduga 9	1.	L1	74.
81069F	Proton-K/DM fourth stage (Blok-DM)	1.	D	69.
81073A	FLTSATCOM F5	1.	D	139.
81076A	Himawari-2	1.	D	321.
81096A	SBS II	1.	D	440.
81102A	Raduga 10	1.	L1	20.
81102F	Proton-K/DM fourth stage (Blok-DM)	1.	D	456.
81107A	OPS 4029 (VORTEX 3)	2.	L2	4.
81107C	Titan IIIC stage 3 (Transtage 39)	2.	D1	57.
81114A	RCA Satcom IIIR	1.	D	429.
81119A	Intelsat V F-3	1.	D	309.
81122A	Marecs A	1.	D	14.
82004A	RCA Satcom IV	1.	D	327.
82009A	Ekran 8	1.	D	394.
82009F	Proton-K/DM fourth stage (Blok-DM)	1.	D	502.
82014A	Westar IV	1.	D	356.
82017A	Intelsat V F-4	1.	D	257.
82019A	OPS 8701 (DSP F10)	2.	D1	91.
82019B	Titan IIIC stage 3 (Transtage 38)	2.	D1	16.
82020A	Gorizont 5	1.	D	132.
82020F	Proton-K/DM fourth stage (Blok-DM)	1.	D	147.
82031A	Insat-IA	1.	L1	80.

COSPAR	NAME	TABLE	STATUS	No
82044A	Cosmos 1366	1.	L1	17.
82044F	Proton-K/DM fourth stage (Blok-DM)	1.	L3	2.
82058A	Westar V	1.	D	254.
82082A	Anik D1	1.	D	431.
82093A	Ekran 9	1.	L1	58.
82093F	Proton-K/DM fourth stage (Blok-DM)	1.	D	516.
82097A	Intelsat V F-5	1.	D	119.
82103A	Gorizont 6	1.	L2	32.
82103E	Proton-K/DM fourth stage (Blok-DM)	1.	D	461.
82105A	Aurora I	1.	L2	18.
82106A	DSCS II F-16	1.	D	15.
82106B	DSCS III A-01	2.	D1	94.
82106D	IUS second stage	1.	D	289.
82110B	SBS III	1.	D	392.
82110C	Anik C3	1.	D	388.
82113A	Raduga 11	1.	D	70.
82113F	Proton-K/DM fourth stage (Blok-DM)	1.	D	54.
83006A	Sakura 2A	1.	D	299.
83016A	Ekran 10	1.	D	13.
83016F	Proton-K/DM fourth stage (Blok-DM)	1.	D	510.
83026B	TDRS-1	1.	D	156.
83028A	Raduga 12	1.	L1	19.
83028F	Proton-K/DM fourth stage (Blok-DM)	1.	D	417.
83030A	RCA Satcom IR	1.	D	378.
83041A	GOES 6	1.	L2	20.
83047A	Intelsat V F-6	1.	D	234.
83058A	Eutelsat I F-1 (ECS 1)	1.	D	176.
83059B	Anik C2	1.	D	220.
83059C	Palapa Pacific System	1.	D	448.
83065A	Galaxy I	1.	D	435.
83066A	Gorizont 7	1.	D	116.
83066F	Proton-K/DM fourth stage (Blok-DM)	1.	D	58.
83077A	Arabsat 1D-R	1.	D	314.
83081A	Sakura 2B	1.	D	168.
83088A	Raduga 13	1.	D	105.
83088F	Proton-K/DM fourth stage (Blok-DM)	1.	D	57.
83089B	Insat-IB	1.	L1	90.
83094A	RCA Satcom IIR	1.	D	301.
83098A	Galaxy II	1.	D	454.
83100A	Ekran 11	1.	L1	52.
83100F	Proton-K/DM fourth stage (Blok-DM)	1.	D	507.
83105A	Intelsat V F-7	1.	D	345.
83118A	Gorizont 8	1.	D	112.
83118F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	31.
84005A	Yuri 2A	1.	D	206.
84009A	OPS 0441 (VORTEX 4)	2.	L3	1.
84009C	Titan 34D stage 3 (Transtage D-10)	2.	D1	65.
84016A	Raduga 14	1.	L1	23.

COSPAR	NAME	TABLE	STATUS	No
84016F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	46.
84022A	Cosmos 1540	1.	L1	9.
84022F	Proton-K/DM fourth stage (Blok-DM)	1.	D	380.
84023A	Intelsat V F-8	1.	D	46.
84028A	Ekran 12	1.	D	31.
84028F	Proton-K/DM fourth stage (Blok-DM)	1.	D	528.
84031A	Cosmos 1546	1.	L1	14.
84031F	Proton-K/DM fourth stage (Blok-DM)	1.	D	302.
84035A	STW F-2	1.	L1	97.
84037A	OPS 7641 (DSP F11)	2.	D1	86.
84037B	Titan 34D stage 3 (Transtage D-11)	2.	D1	23.
84041A	Gorizont 9	1.	L1	37.
84041D	Proton-K/DM fourth stage (Blok-DM)	1.	D	144.
84049A	Chinasat 5 (Spacenet 1)	1.	D	404.
84063A	Raduga 15	1.	L1	85.
84063F	Proton-K/DM fourth stage (Blok-DM)	1.	D	558.
84078A	Gorizont 10	1.	L2	29.
84078F	Proton-K/DM fourth stage (Blok-DM)	1.	L1	79.
84080A	Himawari-3	1.	D	370.
84080E	Star 27 (Himawari-3 AKM)	1.	D	352.
84081A	Eutelsat I F-2 (ECS 2)	1.	D	165.
84081B	Telecom 1A	1.	D	118.
84090A	Ekran 13	1.	D	29.
84090F	Proton-K/DM fourth stage (Blok-DM)	1.	D	518.
84093B	SBS IV	1.	D	160.
84093C	Leasat 2	1.	D	50.
84093D	Telstar 3C	1.	D	358.
84101A	Galaxy III	1.	D	372.
84113B	Arabsat 1D	1.	D	181.
84113C	Leasat 1	1.	D	135.
84114A	Spacenet 2	1.	D	353.
84114B	Marecs B2	1.	D	27.
84115A	NATO IIID	1.	D	11.
84129A	USA 7 (DSP F12)	2.	D1	79.
84129B	Titan 34D stage 3 (Transtage D-13)	2.	D1	22.
85007A	Gorizont 11	1.	L3	13.
85007D	Proton-K/DM fourth stage (Blok-DM)	1.	D	555.
85010B	USA 8 (MAGNUM 1)	2.	D1	51.
85010D	IUS second stage	2.	D1	27.
85015A	Arabsat 1A	1.	D	465.
85015B	Brazilsat 1	1.	D	320.
85016A	Cosmos 1629	1.	L2	37.
85016F	Proton-K/DM fourth stage (Blok-DM)	1.	D	296.
85024A	Ekran 14	1.	D	10.
85024D	Proton-K/DM fourth stage (Blok-DM)	1.	D	515.
85025A	Intelsat VA F-10	1.	D	114.
85028B	Anik C1	1.	D	341.
85028C	Leasat 3	1.	D	39.

COSPAR	NAME	TABLE	STATUS	No
85035A	Gstar 1	1.	L2	1.
85035B	Telecom 1B	1.	L1	104.
85048B	Morelos 1	1.	D	307.
85048C	Arabsat 1B	1.	D	464.
85048D	Telstar 3D	1.	D	382.
85055A	Intelsat VA F-11	1.	D	425.
85070A	Raduga 16	1.	L2	33.
85070F	Proton-K/DM fourth stage (Blok-DM)	1.	D	77.
85076B	Optus A1	1.	D	355.
85076C	ASC 1	1.	L2	14.
85076D	Leasat 4	1.	D	74.
85087A	Intelsat VA F-12	1.	D	216.
85092B	USA 11 (DSCS III B-04)	2.	D1	75.
85092C	USA 12 (DSCS III B-05)	2.	D1	68.
85092E	IUS second stage	2.	D1	25.
85102A	Cosmos 1700	1.	L1	34.
85102D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	481.
85107A	Raduga 17	1.	D	444.
85107F	Proton-K/DM fourth stage (Blok-DM)	1.	D	51.
85109B	Morelos 2	1.	D	324.
85109C	Optus A2	1.	D	395.
85109D	Satcom Ku-2	1.	D	332.
86003B	Satcom Ku-1	1.	D	322.
86007A	Raduga 18	1.	D	169.
86007F	Proton-K/DM fourth stage (Blok-DM)	1.	D	75.
86010A	STTW-1	1.	L1	53.
86016A	Yuri 2B	1.	D	274.
86026A	Gstar 2	1.	D	362.
86026B	Brazilsat 2	1.	D	335.
86027A	Cosmos 1738	1.	L3	6.
86027F	Proton-K/DM fourth stage (Blok-DM)	1.	D	68.
86038A	Ekran 15	1.	D	34.
86038D	Proton-K/DM fourth stage (Blok-DM)	1.	D	525.
86044A	Gorizont 12	1.	L1	66.
86044F	Proton-K/DM fourth stage (Blok-DM)	1.	D	66.
86082A	Raduga 19	1.	D	127.
86082F	Proton-K/DM fourth stage (Blok-DM)	1.	D	56.
86090A	Gorizont 13	1.	D	37.
86090D	Proton-K/DM fourth stage (Blok-DM)	1.	L1	84.
86096A	USA 20 (FLTSATCOM F7)	2.	C2	18.
87022A	GOES 7	1.	D	387.
87022F	Star 27 (GOES 7 AKM)	1.	D	163.
87028A	Raduga 20	1.	D	28.
87028D	Proton-K/DM fourth stage (Blok-DM)	1.	D	381.
87029A	Agila 1	1.	D	390.
87040A	Gorizont 14	1.	D	63.
87040D	Proton-K/DM fourth stage (Blok-DM)	1.	D	554.
87070A	Kiku-5	1.	D	283.

COSPAR	NAME	TABLE	STATUS	No
87073A	Ekran 16	1.	D	33.
87073D	Proton-K/DM fourth stage (Blok-DM)	1.	D	526.
87078A	Optus A3	1.	D	180.
87078B	Eutelsat I F-4 (ECS 4)	1.	D	151.
87084A	Cosmos 1888	1.	L3	14.
87084D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	416.
87091A	Cosmos 1894	1.	L2	38.
87091D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	452.
87095A	TV-Sat 1	1.	D	185.
87096A	Cosmos 1897	1.	L1	38.
87096D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	476.
87097A	USA 28 (DSP F13)	2.	D1	90.
87097B	Titan 34D stage 3 (Transtage D-14)	2.	D1	18.
87100A	Raduga 21	1.	L2	26.
87100D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	559.
87109A	Ekran 17	1.	D	25.
87109D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	495.
88012A	Sakura 3A	1.	D	103.
88014A	STTW-2	1.	L1	27.
88018A	Spacenet 3R	1.	D	340.
88018B	Telecom 1C	1.	D	91.
88028A	Gorizont 15	1.	D	78.
88028D	Proton-K/DM fourth stage (Blok-DM)	1.	D	73.
88034A	Cosmos 1940	1.	D	485.
88034D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	426.
88036A	Ekran 18	1.	D	17.
88036E	Proton-K/DM fourth stage (Blok-DM)	1.	D	511.
88040A	Intelsat VA F-13 (NSS 513)	1.	D	136.
88051A	Meteosat 3	1.	D	38.
88051C	PAS 1	1.	D	291.
88063A	Insat-IC	1.	L1	33.
88063B	Eutelsat I F-5 (ECS 5)	1.	D	104.
88066A	Cosmos 1961	1.	L1	8.
88066D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	148.
88071A	Gorizont 16	1.	D	402.
88071D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	475.
88081A	Gstar 3	1.	L2	2.
88081B	SBS V	1.	D	361.
88086A	Sakura 3B	1.	D	256.
88091B	TDRS-West	1.	C2	73.
88091D	IUS second stage	1.	D	469.
88095A	Raduga 22	1.	L1	96.
88095F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	86.
88098A	TDF 1	1.	D	246.
88108A	Ekran 19	1.	D	35.
88108D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	531.
88109A	Skynet 4B	1.	D	343.
88109B	Astra 1A	1.	D	115.

COSPAR	NAME	TABLE	STATUS	No
88111A	STTW-3	1.	L1	69.
89004A	Gorizont 17	1.	D	209.
89004F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	94.
89006A	Intelsat VA F-15	1.	D	214.
89020A	JC-Sat 1	1.	D	317.
89020B	Meteosat 4	1.	D	41.
89020E	Mage 1 (Meteosat 4 AKM)	1.	D	467.
89021B	TDRS 4	1.	D	129.
89021D	IUS second stage	1.	D	480.
89027A	Tele-X	1.	D	241.
89030D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	84.
89035A	USA 37 (VORTEX 6)	2.	C2	19.
89035C	Titan 34D stage 3 (Transtage D-16)	2.	D1	67.
89041A	Superbird A	1.	D	351.
89041B	DFS-Kopernikus 1	1.	D	483.
89046A	USA 39 (DSP F14)	2.	D1	82.
89046D	IUS second stage	2.	D1	13.
89046E	DSP F14 operational debris (IR-telescope aperture suncover)	2.	U	4.
89048A	Raduga 1-1	1.	D	152.
89048D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	83.
89052A	Gorizont 18	1.	D	295.
89052D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	556.
89053A	Olympus 1	1.	D	524.
89062A	TV-Sat 2	1.	D	374.
89067A	Sirius 1	1.	D	243.
89069A	USA 43 (DSCS II F-15)	2.	D1	88.
89069B	USA 44 (DSCS III A-02)	2.	D1	71.
89069D	Titan 34D stage 3 (Transtage D-2)	2.	D1	17.
89070A	Himawari-4	1.	D	49.
89070C	Star 27 (Himawari-4 AKM)	1.	D	161.
89077A	USA 46 (FLTSATCOM F8)	2.	C2	53.
89081A	Gorizont 19	1.	L1	71.
89081D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	479.
89087A	Intelsat VI F-2	1.	D	199.
89090B	USA 48 (MAGNUM 2)	2.	D1	29.
89090D	IUS second stage	2.	D1	62.
89098A	Raduga 24	1.	L1	59.
89098D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	81.
89101A	Cosmos 2054	1.	L2	40.
89101D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	109.
89101G	Cosmos 2054 debris	1.	D	80.
90001A	Skynet 4A	1.	D	197.
90001B	JC-Sat 2	1.	D	133.
90002B	Leasat 5	1.	C2	27.
90011A	DFH-2A	1.	L1	42.
90016A	Raduga 25	1.	L2	30.
90016D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	410.
90021A	Intelsat VI F-3	1.	C2	69.

COSPAR	NAME	TABLE	STATUS	No
90030A	AsiaSat 1	1.	D	263.
90034A	Palapa B-2R	1.	D	315.
90051A	Insat-ID	1.	L1	15.
90054A	Gorizont 20	1.	L1	36.
90054D	Proton-K/DM fourth stage (Blok-DM)	1.	D	474.
90056A	Intelsat VI F-4	1.	D	121.
90061A	Cosmos 2085	1.	L1	6.
90061D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	82.
90063A	TDF 2	1.	D	140.
90063B	DFS-Kopernikus 2	1.	D	319.
90074A	Thor I	1.	D	253.
90077A	Yuri 3A	1.	D	167.
90079A	Skynet 4C	1.	C2	87.
90079B	Eutelsat II F-1	1.	D	284.
90091A	SBS VI	1.	D	195.
90091B	Galaxy VI	1.	D	354.
90093A	Inmarsat 2-F1	1.	D	177.
90094A	Gorizont 21	1.	L3	9.
90094D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	497.
90095A	USA 65 (DSP F15)	2.	D1	89.
90095D	IUS second stage	2.	D1	47.
90097B	USA 67 (SDS 2 F2)(QUASAR 2)	2.	D1	87.
90100A	Satcom C-1	1.	D	242.
90100B	Gstar 4	1.	D	226.
90102A	Gorizont 22	1.	L1	99.
90102D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	82.
90112A	Raduga 26	1.	L1	35.
90112D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	411.
90116A	Raduga 1-2	1.	L1	50.
90116D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	89.
91001A	NATO IVA	1.	D	113.
91003A	Italsat 1	1.	D	398.
91003B	Eutelsat II F-2	1.	D	186.
91010A	Cosmos 2133	1.	L1	11.
91010F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	434.
91014A	Raduga 27	1.	L1	2.
91014D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	560.
91015A	Astra 1B	1.	D	131.
91015B	Meteosat 5	1.	D	125.
91015E	Mage 1 (Meteosat 5 AKM)	1.	D	439.
91018A	Inmarsat 2-F2	1.	D	154.
91026A	Anik E2	1.	D	223.
91028A	Spacenet 4	1.	D	325.
91037A	Aurora II	1.	D	200.
91046A	Gorizont 23	1.	D	182.
91046D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	500.
91054B	TDRS 5	1.	C2	59.
91054D	IUS second stage	1.	L3	4.

COSPAR	NAME	TABLE	STATUS	No
91055A	Intelsat VI F-5	1.	D	280.
91060A	Yuri 3B	1.	D	164.
91064A	Cosmos 2155	1.	L3	5.
91064B	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	385.
91067A	Anik E1	1.	D	235.
91074A	Gorizont 24	1.	D	123.
91074D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	348.
91075A	Intelsat VI F-1	1.	D	328.
91079A	Cosmos 2172	1.	L3	16.
91079D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	142.
91080B	USA 75 (DSP F16)	2.	C2	44.
91080D	IUS second stage	2.	D1	14.
91083A	Eutelsat II F-3	1.	D	275.
91084A	Telecom 2A	1.	D	188.
91084B	Inmarsat 2-F3	1.	D	32.
91087A	Raduga 28	1.	L1	1.
91087D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	96.
92006A	USA 78 (DSCS III B-14)	2.	D1	73.
92006C	IABS (Integrated Apogee Boost System)	2.	D1	1.
92010A	Superbird B1	1.	D	207.
92010B	Insat-IIDT (Arabsat 1C)	1.	D	150.
92013A	Galaxy V	1.	D	273.
92017A	Gorizont 25	1.	D	376.
92017D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	509.
92021A	Telecom 2B	1.	D	316.
92021B	Inmarsat 2-F4	1.	D	88.
92027A	Palapa B4	1.	D	393.
92032A	Intelsat K (NSS K)	1.	D	44.
92037A	USA 82 (DSCS III B-12)(DSCS III F6)	2.	D1	83.
92037C	IABS (Integrated Apogee Boost System)	2.	D1	11.
92041A	Insat-IIA	1.	D	455.
92041B	Eutelsat II F-4	1.	D	211.
92043A	Gorizont 26	1.	D	262.
92043D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	79.
92054A	Optus B1	1.	D	250.
92057A	Satcom C-4	1.	D	201.
92059A	Cosmos 2209	1.	L2	36.
92059D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	364.
92060A	Hispasat 1A	1.	D	279.
92060B	Satcom C-3	1.	D	40.
92066A	DFS-Kopernikus 3	1.	D	350.
92072A	Galaxy VII	1.	D	347.
92074A	Ekran 20	1.	L1	45.
92074D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	512.
92082A	Gorizont 27	1.	D	451.
92082D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	97.
92084A	Superbird A1	1.	D	217.
92088A	Cosmos 2224	1.	L1	105.

COSPAR	NAME	TABLE	STATUS	No
92088D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	420.
93003B	TDRS 6	1.	C2	76.
93003D	IUS second stage	1.	D	432.
93013A	Raduga 29	1.	L1	94.
93013D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	95.
93015A	USA 98 (UFO F1)	1.	D	266.
93031A	Astra 1C	1.	D	173.
93039A	Galaxy IV	1.	L1	4.
93046A	USA 93 (DSCS III B-09)(DSCS III F7)	2.	D1	72.
93046C	IABS (Integrated Apogee Boost System)	2.	D1	7.
93048A	Hispasat 1B	1.	D	349.
93048B	Insat-IIB	1.	D	401.
93056A	USA 95 (UFO F2)	2.	C2	4.
93058B	ACTS	1.	L2	3.
93062A	Raduga 30	1.	L1	18.
93062D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	103.
93066A	Intelsat VII F-1	1.	C2	80.
93069A	Gorizont 28	1.	D	337.
93069D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	471.
93072A	Gorizont 29	1.	D	441.
93072D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	557.
93073A	Solidaridad 1	1.	L2	7.
93073B	Meteosat 6	1.	D	192.
93073E	Mage 1 (Meteosat 6 AKM)	1.	D	405.
93074A	USA 97 (DSCS III B-10)(DSCS III F8)	2.	C2	40.
93074B	IABS (Integrated Apogee Boost System)	2.	D1	69.
93076A	NATO IVB	1.	C2	17.
93077A	Telstar 4A	1.	L2	11.
93078A	DirecTV-1	1.	D	193.
93078B	Thaicom 1	1.	D	240.
94002A	Gals 1	1.	L1	76.
94002D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	308.
94008A	Raduga 1-3	1.	L1	51.
94008D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	93.
94009A	USA 99 (Milstar DFS-1)	2.	C2	49.
94009B	Titan IVA stage 3 (Centaur)	2.	D1	32.
94012A	Raduga 31	1.	L1	60.
94012D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	102.
94013A	Galaxy IR-A	1.	D	255.
94022A	GOES 8	1.	D	179.
94030A	Gorizont 30	1.	L3	17.
94030D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	563.
94034A	Intelsat VII F-2	1.	C2	16.
94035A	USA 104 (UFO F3)	2.	L2	1.
94038A	Cosmos 2282	1.	L2	35.
94038D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	303.
94040A	PAS 2	1.	D	245.
94040B	BS-3N	1.	D	229.

COSPAR	NAME	TABLE	STATUS	No
94043A	Apstar 1	1.	D	287.
94047A	DirecTV-2	1.	D	146.
94049A	Brazilsat B1	1.	D	264.
94049B	Turksat 1B	1.	D	204.
94054A	USA 105 (MERCURY 1)	2.	C2	8.
94054B	Titan IVA stage 3 (Centaur)	2.	D1	58.
94055A	Optus B3	1.	C2	54.
94060A	Cosmos 2291	1.	L2	42.
94060D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	421.
94064A	Intelsat VII F-3 (NSS 703)	1.	D	276.
94065A	Solidaridad 2	1.	D	175.
94065B	Thaicom 2	1.	D	329.
94067A	Ekspress 1	1.	D	368.
94067D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L3	12.
94069A	Elektro 1	1.	L1	16.
94069D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	433.
94070A	Astra 1D	1.	C2	71.
94079A	Orion 1	1.	D	137.
94080A	Zongxing 6 (A)	1.	D	501.
94082A	Luch 1	1.	L2	41.
94082D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	492.
94084A	USA 107 (DSP F17)	2.	C2	47.
94084D	IUS second stage	2.	D1	21.
94087A	Raduga 32	1.	L1	7.
94087D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	422.
95001A	Intelsat VII F-4	1.	D	239.
95003A	USA 108 (UFO F4)	2.	C2	42.
95011B	Himawari-5	1.	D	298.
95011D	Star 27 (Himawari-5 AKM)	1.	D	517.
95013A	Intelsat VII F-5	1.	D	191.
95016A	Brazilsat B2	1.	C2	72.
95016B	Hot Bird 1	1.	D	278.
95019A	AMSC-1	1.	C2	63.
95022A	USA 110 (Advanced ORION 1)	2.	C2	21.
95022B	Titan IVA stage 3 (Centaur)	2.	D1	36.
95023A	Intelsat VIIA F-1	1.	D	205.
95025A	GOES 9	1.	D	166.
95027A	USA 111 (UFO F5)	2.	D1	84.
95029A	DirecTV-3	1.	D	198.
95035B	TDRS 7	1.	C2	35.
95035D	IUS second stage	1.	D	473.
95038A	USA 113 (DSCS III B-07)(DSCS III F9)	2.	C2	26.
95038C	IABS (Integrated Apogee Boost System)	2.	D1	15.
95040A	PAS 4	1.	D	43.
95041A	Mugunghwa 1 (Koreasat 1)	1.	D	342.
95043A	JC-Sat 3	1.	D	228.
95044A	N-Star 1	1.	D	222.
95045A	Cosmos 2319	1.	L3	15.

COSPAR	NAME	TABLE	STATUS	No
95045D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	445.
95049A	Telstar 402R	1.	L2	13.
95054A	Luch 1-1	1.	L1	3.
95054D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	93.
95055A	Astra 1E	1.	C2	13.
95057A	USA 114 (UFO F6)	2.	C2	41.
95060A	USA 115 (Milstar DFS-2)	2.	C2	31.
95060B	Titan IVA stage 3 (Centaur)	2.	D1	31.
95063A	Gals 2	1.	D	383.
95063D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	98.
95064A	AsiaSat 2	1.	D	277.
95067A	Telecom 2C	1.	D	87.
95067B	Insat-IIC	1.	D	359.
95069A	Galaxy IIIR	1.	L2	21.
95073A	EchoStar 1	1.	C1	245.
96002A	PAS 3R	1.	D	213.
96002B	MEASAT 1	1.	D	208.
96003A	Mugunghwa 2 (Koreasat 2)	1.	C2	30.
96005A	Gorizont 31	1.	D	384.
96005D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	67.
96006A	Palapa C1	1.	D	330.
96007A	N-Star 2	1.	D	269.
96015A	Intelsat VIIA F-2	1.	D	128.
96020A	Inmarsat 3-F1	1.	C2	24.
96021A	Astra 1F	1.	C1	62.
96022A	MSAT	1.	C2	62.
96026A	USA 118 (MERCURY 2)	2.	C2	7.
96026B	Titan IVA stage 3 (Centaur)	2.	D1	59.
96030A	Palapa C2	1.	C2	52.
96030B	AMOS 1	1.	D	42.
96033A	Galaxy IX	1.	D	318.
96034A	Gorizont 32	1.	D	449.
96034D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	90.
96035A	Intelsat VII F-6	1.	D	238.
96039A	Apstar 1A	1.	D	244.
96040A	Arabsat 2A	1.	D	258.
96040B	Turksat 1C	1.	L1	87.
96042A	USA 127 (UFO F7)	2.	C2	51.
96044A	Italsat 2	1.	D	491.
96044B	Telecom 2D	1.	D	124.
96053A	Inmarsat 3-F2	1.	C2	83.
96053D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	100.
96054A	GE 1	1.	C1	212.
96055A	EchoStar 2	1.	L2	24.
96058A	Ekspress 2	1.	L1	54.
96058D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L1	75.
96063A	Arabsat 2B	1.	D	300.
96063B	MEASAT 2	1.	C2	50.

COSPAR	NAME	TABLE	STATUS	No
96067A	Hot Bird 2	1.	C2	19.
96070A	Inmarsat 3-F3	1.	C2	56.
97002A	GE 2	1.	C2	68.
97002B	Nahuel 1A	1.	D	290.
97007A	JC-Sat 4	1.	C2	25.
97008A	USA 130 (DSP F18)	2.	C2	1.
97008D	IUS second stage	2.	D1	63.
97008E	DSP F18 operational debris (IR-telescope aperture suncover)	2.	D1	61.
97009A	Intelsat VIII F-1	1.	D	155.
97011A	Tempo 2	1.	D	202.
97016A	Thaicom 3	1.	D	159.
97016B	BSAT-1a	1.	D	219.
97019A	GOES 10	1.	D	221.
97021A	Zhongxing 6 (B)	1.	L1	83.
97025A	Thor II	1.	D	190.
97026A	Telstar 5	1.	C1	229.
97027A	Inmarsat 3-F4	1.	C2	74.
97027B	Insat-IID	1.	D	570.
97029A	Fengyun 2A (Fengyun 2-1R)	1.	D	30.
97029C	Fengyun 2A AKM	1.	D	553.
97031A	Intelsat VIII F-2	1.	D	101.
97036A	Superbird C	3.	Ind	1.
97040A	PAS 6	1.	D	7.
97041A	Cosmos 2345	1.	L3	7.
97041D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	407.
97042A	Agila 2	1.	C2	86.
97046A	PAS 5	1.	C2	53.
97049A	Hot Bird 3	1.	D	549.
97049B	Meteosat 7	1.	C2	22.
97049E	Mage 1 (Meteosat 7 AKM)	1.	D	482.
97050A	GE 3	1.	C1	254.
97053A	Intelsat VIII F-3 (NSS 803)	1.	C2	20.
97059A	EchoStar 3	1.	C1	257.
97062A	Apstar 2R	1.	D	252.
97065A	USA 134 (DSCS III B-13)(DSCS III F10)	2.	C2	39.
97065C	IABS (Integrated Apogee Boost System)	1.	D	508.
97070A	Kupon 1	1.	L1	32.
97070D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	334.
97071A	Sirius 2	1.	D	297.
97071B	Cakrawatra 1	1.	L1	78.
97075A	JC-Sat 5	1.	C2	51.
97076A	Astra 1G	1.	C2	23.
97078A	Galaxy VIII-i	1.	D	346.
97083A	Intelsat 804	1.	L3	1.
97086A	HGS-1	1.	L2	28.
98002A	Skynet 4D	1.	D	232.
98006A	Brazilsat B-3A	1.	C2	67.
98006B	Inmarsat-3 F5	1.	C2	8.

COSPAR	NAME	TABLE	STATUS	No
98013A	Hot Bird 4	1.	C2	4.
98014A	Intelsat 806 (NSS 806)	1.	C1	269.
98016A	USA 138 (UFO F8)	2.	C2	25.
98024A	Nilesat 101	1.	D	48.
98024B	BSAT-1b	1.	D	218.
98025A	Cosmos 2350	1.	L1	13.
98025D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	418.
98028A	EchoStar 4	1.	D	187.
98029A	USA 139 (Advanced ORION 2)	2.	C2	50.
98029B	Titan IVB stage 3 (Centaur)	2.	L1	3.
98033A	Zhongwei 1	1.	C1	154.
98035A	Thor III	1.	C2	85.
98037A	Intelsat 805	1.	C1	265.
98044A	ZX 5B (ChinaSat 5B)	1.	D	237.
98049A	ST-1	1.	D	158.
98050A	Astra 2A	1.	C1	31.
98052A	PAS 7	1.	C2	81.
98056A	Eutelsat W2	1.	D	270.
98056B	Sirius 3	1.	C2	21.
98057A	Hot Bird 5	1.	D	126.
98058A	USA 140 (UFO F9)	2.	D1	92.
98063A	AfriStar 1	1.	C2	5.
98063B	GE 5 (AMC-5)	1.	D	282.
98065A	PAS 8	1.	C1	169.
98068A	Bonum 1	3.	Ind	2.
98070A	Satmex 5	1.	C2	60.
98075A	PAS 6B	1.	D	231.
99005A	Telstar 6	1.	D	196.
99006A	JC-Sat 6	1.	C2	33.
99009A	Arabsat 3A	1.	D	443.
99009B	Skynet 4E	1.	C2	15.
99010A	Raduga 1-4	1.	L1	72.
99010D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	98.
99013A	Asiasat 3S	1.	C2	44.
99016A	Insat 2E	1.	D	338.
99018A	Eutelsat W3	1.	D	120.
99027A	Nimiq	1.	C1	235.
99033A	Astra 1H	1.	C2	70.
99042A	Telkom 1	1.	C1	119.
99046A	Mugunghwa 3 (Koreasat 3)	1.	C1	131.
99047A	Yamal-100 No. 1	1.	D	379.
99047B	Yamal-100 No. 2	1.	D	406.
99047E	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	438.
99050A	EchoStar 5	1.	D	157.
99052A	Telstar 7	1.	C2	26.
99053A	LMI 1	1.	C1	162.
99056A	DirecTV-1R	1.	D	189.
99059A	Orion 2	1.	C1	288.

COSPAR	NAME	TABLE	STATUS	No
99060A	GE 4	1.	C1	253.
99063A	USA 146 (UFO F10)	2.	C2	13.
99071A	Galaxy 11	1.	C1	264.
00001A	USA 148 (DSCS III B-08)(DSCS III F11)	2.	C2	23.
00001C	IABS (Integrated Apogee Boost System)	2.	D1	19.
00002A	Galaxy 10R	1.	D	336.
00003A	Zhongxing-22 (FengHuo 1, FH-1)	1.	D	47.
00007A	Hispasat 1C	1.	C1	240.
00011A	Garuda 1	1.	C2	45.
00012A	Superbird 4	1.	C1	165.
00013A	Ekspress 2A	1.	C2	48.
00013D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	488.
00016A	Asiastar	1.	C1	115.
00016B	Insat 3B	1.	D	339.
00019A	Sesat	1.	C2	3.
00019D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	323.
00020A	Galaxy IVR	1.	D	371.
00022A	GOES 11	1.	D	203.
00024A	USA 149 (DSP F20)	2.	C2	28.
00024D	IUS second stage	2.	D1	53.
00024E	DSP F20 operational debris (IR-telescope aperture suncover)	2.	D1	54.
00028A	Eutelsat W4	1.	C1	43.
00029A	Gorizont 33	1.	L3	10.
00029B	Proton-K/Briz-M fourth stage (Briz-M)	1.	D	459.
00031A	Ekspress 3A	1.	D	162.
00031D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	304.
00032A	Fengyun 2B	1.	D	423.
00032C	Fengyun 2B AKM	1.	D	447.
00034A	TDRS 8	1.	C2	37.
00036A	Cosmos-2371	1.	L1	5.
00036D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	450.
00038A	EchoStar 6	1.	C2	65.
00043A	PAS 9	1.	C2	77.
00046A	Brasilsat B4	1.	C1	239.
00046B	Nilesat 102	1.	C1	295.
00049A	Raduga 1-5	1.	L1	57.
00049D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	108.
00052A	Eutelsat W1	1.	D	107.
00054A	Astra 2B	1.	C2	14.
00054B	GE 7	1.	C1	175.
00059A	GE-1A	1.	C1	120.
00060A	N-SAT-110	1.	C1	124.
00065A	USA 153 (DSCS III B-11)(DSCS III F12)	2.	C2	10.
00065C	IABS (Integrated Apogee Boost System)	2.	D1	20.
00066A	Thuraya 1	1.	D	194.
00067A	GE 6	1.	C1	251.
00068A	Europe*Star F1	1.	C1	51.
00069A	Beidou	1.	D	183.

COSPAR	NAME	TABLE	STATUS	No
00072A	PAS 1R	1.	C1	268.
00076A	Anik F1	1.	C1	204.
00080A	USA 155 (SDS 3 F2)	2.	C2	20.
00081A	Astra 2D	1.	C2	10.
00081B	GE 8 (Aurora 3)	1.	C1	174.
00082A	Beidou 1B	1.	D	267.
01002A	Turksat 2A (Eurasiasat 1)	1.	C1	49.
01005A	Sicral	2.	C2	3.
01005B	Skynet 4F	1.	C2	79.
01009A	USA 157 (Milstar-2 F2)	2.	C2	24.
01009B	Titan IVB stage 3 (Centaur)	2.	D1	39.
01011A	Eurobird 1	1.	C1	35.
01011B	BSAT-2a	1.	D	236.
01012A	XM Radio 2 (Rock)	1.	D	212.
01014A	Ekran 21 (Ekran-M)	1.	D	326.
01014C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	92.
01015A	GSAT-1	1.	D	562.
01018A	XM Radio 1 (Roll)	1.	C1	193.
01019A	PAS 10	1.	C1	54.
01020A	USA 158 (GeoLITE)	2.	D1	80.
01024A	Intelsat 901	1.	C1	286.
01025A	Astra 2C	1.	C1	33.
01029A	Artemis	1.	C2	6.
01031A	GOES 12	1.	D	224.
01033A	USA 159 (DSP F21)	2.	C2	22.
01033D	IUS second stage	2.	D1	48.
01033E	DSP F21 operational debris (IR-telescope aperture suncover)	2.	U	5.
01037A	Cosmos-2379	1.	L1	92.
01037D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	77.
01039A	Intelsat 902	1.	C1	71.
01042A	Atlantic Bird 2	1.	C1	291.
01045A	Raduga 1-6	1.	D	72.
01045D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	55.
01046A	USA 162 (SDS 3 F3)	2.	C2	35.
01052A	DirecTV-4S	1.	C1	217.
02001A	USA 164 (Milstar-2 F3)	2.	C2	5.
02001B	Titan IVB stage 3 (Centaur)	2.	D1	44.
02002A	Insat 3C	1.	C1	83.
02006A	EchoStar 7	1.	C1	188.
02007A	Intelsat 904	1.	C1	69.
02011A	TDRS 9	1.	C2	78.
02015A	JC-Sat 8	1.	C1	159.
02015B	Astra 3A	1.	C2	57.
02016A	Intelsat 903	1.	C1	276.
02019A	NSS-7	1.	C1	285.
02023A	DirecTV-5	1.	C1	201.
02027A	Intelsat 905	1.	C1	283.
02029A	Ekspress A1R (Express 4A)	1.	C2	84.

COSPAR	NAME	TABLE	STATUS	No
02029D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	272.
02030A	Galaxy 3C	1.	C1	226.
02035A	Atlantic Bird 3	1.	C1	297.
02035B	N-Star 3 (N-Star c)	1.	C2	46.
02038A	Hot Bird 6	1.	C1	292.
02039A	EchoStar 8	1.	C1	247.
02040A	Atlantic Bird 1	1.	C1	289.
02040B	MSG 1	1.	C2	1.
02040E	MSG-1 operational debris (SEVIRI Cooler Cover)	2.	U	6.
02040F	MSG-1 operational debris (SEVIRI Entry Baffle Cover)	1.	D	540.
02041A	Intelsat 906	1.	C1	74.
02042B	Kodama (DRTS)	1.	C2	38.
02043A	KALPANA-1 (METSAT-1)	1.	C2	28.
02044A	Hispasat 1D	1.	C1	280.
02051A	Eutelsat W5	1.	C1	41.
02055A	TDRS 10	1.	C2	58.
02057A	NSS 6	1.	C1	109.
02062A	Nimiq 2	1.	C1	203.
03007A	Intelsat 907	1.	C1	282.
03008A	USA 167 (DSCS III A-3)(DSCS III F13)	2.	C2	34.
03008C	IABS (Integrated Apogee Boost System)	2.	D1	24.
03012A	USA 169 (Milstar-2 F4)	2.	C2	45.
03012B	Titan IVB stage 3 (Centaur)	2.	D1	34.
03013A	Insat 3A	1.	C1	106.
03013B	Galaxy XII	1.	C1	180.
03014A	Asiasat 4	1.	C1	136.
03015A	Cosmos-2397	1.	D	468.
03015F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	89.
03018A	GSAT-2	1.	D	375.
03020A	Hellas Sat 2	1.	C1	46.
03021A	Beidou 3	1.	D	357.
03024A	AMC-9 (GE-12)	1.	C1	241.
03026A	Thuraya 2	1.	C2	18.
03028A	BSAT-2c	1.	D	249.
03028B	Optus C1 (Defense C1)	1.	C1	161.
03033A	Rainbow 1	1.	C1	258.
03034A	EchoStar 9 (Telstar 13)	1.	C1	186.
03040A	USA 170 (DSCS III B-6)(DSCS III F14)	2.	C2	48.
03040C	IABS (Integrated Apogee Boost System)	2.	D1	28.
03041A	USA 171 (Advanced ORION 3)	2.	C2	12.
03041B	Titan IVB stage 3 (Centaur)	2.	D1	26.
03043A	Eurobird 3	1.	C2	12.
03043E	Insat 3E	1.	D	493.
03044A	Galaxy 13/Horizons-1	1.	C1	182.
03052A	Zhongxing-20 (ShenTong 1, ST-1)	1.	C2	42.
03053A	Yamal 200 N2 (Yamal 202)	1.	C1	57.
03053B	Yamal 200 N1 (Yamal 201)	1.	L1	28.
03053E	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	414.

COSPAR	NAME	TABLE	STATUS	No
03057A	USA 174 (UFO F11)	2.	C2	14.
03059A	AMOS 2	1.	C1	298.
03060A	Ekspress AM-22	1.	C1	60.
03060D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L1	44.
04001A	Estrela do Sul 1 (Telstar 14)	1.	D	171.
04003A	AMC-10 (GE 10)	1.	C1	177.
04004A	USA 176 (DSP F22)	2.	C2	11.
04004D	IUS second stage	2.	D1	50.
04007A	MBSAT	1.	C1	70.
04008A	Eutelsat W3A	1.	C1	6.
04010A	Raduga-1	1.	L1	86.
04010F	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	430.
04011A	Superbird A2 (Superbird 6)	1.	D	306.
04015A	Ekspress AM-11	1.	D	261.
04015D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	487.
04016A	DirecTV-7S	1.	C1	187.
04017A	AMC-11 (GE-11)	1.	C1	179.
04022A	Intelsat 10-02	1.	C1	300.
04024A	Telstar 18 (APstar 5)	1.	C1	148.
04027A	Anik F2	1.	C1	198.
04031A	Amazonas	1.	C1	266.
04036A	GSAT 3 (EDUSAT)	1.	D	271.
04041A	AMC-15	1.	C1	209.
04042A	Fengyun 2C	1.	D	99.
04042C	Fengyun 2C AKM	1.	D	522.
04042D	Fengyun 2C operational debris (cooler cover)	1.	L1	61.
04043A	Ekspress AM-1	1.	D	248.
04043D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	437.
04048A	AMC 16	1.	C1	238.
05003A	AMC 12	1.	C1	275.
05005A	XTAR-EUR	1.	C1	36.
05006A	Himawari-6	1.	C1	150.
05008A	XM Radio 3 (Rhythm)	1.	C1	237.
05009A	Inmarsat 4 F1	1.	C2	47.
05010A	Ekspress AM-2	1.	C2	31.
05010F	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	L1	56.
05012A	Apstar 6	1.	C1	147.
05015A	Spaceway 1	1.	C1	213.
05019A	DirectTV-8	1.	C1	220.
05022A	Intelsat Americas 8 (Telstar 8)	1.	C1	232.
05023A	Ekspress AM-3	1.	C1	114.
05023H	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	494.
05028A	Thaicom 4 (IPStar 1)	1.	C1	134.
05030A	Galaxy 14	1.	C1	183.
05036A	Anik F1R	1.	C1	206.
05041A	Galaxy 15	1.	C1	178.
05041B	Syracuse 3A	1.	C1	53.
05044A	Inmarsat 4 F2	1.	C2	9.

COSPAR	NAME	TABLE	STATUS	No
05046A	Telkom 2	1.	C1	133.
05046B	Spaceway 2	1.	C1	222.
05049A	Insat 4A	1.	C1	93.
05049B	MSG 2 (Meteosat 9)	1.	C1	10.
05049E	MSG-2 operational debris (SEVIRI Cooler Cover)	1.	D	514.
05049F	MSG-2 operational debris (SEVIRI Entry Baffle Cover)	1.	D	547.
05052A	AMC 23	1.	C1	170.
06003A	Echostar 10	1.	C1	200.
06004A	MTSAT-2	1.	C1	157.
06007A	Spainsat	1.	C1	279.
06007B	Hot Bird 7A	1.	C1	9.
06010A	JCSAT 9	1.	C1	146.
06012A	Astra 1KR	1.	C1	20.
06018A	GOES N	1.	C1	249.
06020A	Satmex 6	1.	C1	197.
06020B	Thaicom 5	1.	C1	88.
06022A	KAZSAT	1.	D	260.
06022D	Proton-K/DM-2M fourth stage (Blok DM-2M)	1.	D	504.
06023A	Galaxy 16	1.	C1	223.
06024A	USA 187 (MITEx OSC satellite)	2.	C4	36.
06024B	USA 188 (MITEx Lockheed satellite)	2.	D1	78.
06024C	USA 189 (NRL Upper Stage/Satellite)	2.	C4	54.
06032A	Hot Bird 8	1.	C1	13.
06033A	JCSAT 3A	1.	C1	139.
06033B	Syracuse 3B	1.	C1	296.
06034A	Mugunghwa 5	1.	C1	129.
06038A	Zhongxing-22A (FengHuo 1, FH-1)	1.	C2	41.
06043A	DirecTV 9S	1.	C1	218.
06043B	Optus D1	1.	C1	164.
06048A	Xinnuo 2	1.	D	6.
06049A	XM Radio 4 (Blues)	1.	C1	194.
06051A	Badr 4	1.	C1	29.
06053A	Fengyun 2D	1.	C2	36.
06053C	Fengyun 2D AKM (FG-36 AKM)	1.	D	285.
06053D	Fengyun 2D debris	1.	L1	26.
06054A	WildBlue 1	1.	C1	199.
06054B	AMC 18	1.	C1	210.
06056A	Measat 3	1.	C1	102.
06059A	Kiku-8 (ETS VIII)	1.	C2	49.
07003A	Beidou 4	1.	D	230.
07007A	Insat 4B	1.	C1	107.
07007B	Skynet 5A	1.	C1	5.
07009A	Anik F3	1.	C1	190.
07016A	Astra 1L	1.	C1	22.
07016B	Galaxy 17	1.	C1	231.
07018A	Nigcomsat 1	1.	L1	63.
07021A	Xinnuo 3	3.	Ind	3.
07031A	Zhongxing 6B	1.	C1	130.

COSPAR	NAME	TABLE	STATUS	No
07032A	DirecTV 10	1.	C1	214.
07036A	Spaceway 3	1.	C1	228.
07036B	BSAT-3A	1.	C1	122.
07037A	INSAT 4CR	1.	C1	82.
07044A	Optus D2	1.	C1	158.
07044B	Intelsat IS-11	1.	C1	272.
07046A	USA 195 (WGS SV-1)	2.	C1	6.
07054A	USA 197 (DSP F23)	2.	L1	1.
07054B	Delta 4 second stage (Delta 329, DCSS-5 F02)	2.	D1	97.
07056A	Star One C1	1.	C1	255.
07056B	Skynet 5B	1.	C1	26.
07057A	Sirius 4	1.	C1	3.
07058A	Cosmos-2434 (Raduga-1M1)	1.	D	293.
07058C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	569.
07063A	Rascom-QAF 1	1.	D	210.
07063B	Horizons 2	1.	C1	95.
08001A	Thuraya 3	1.	C2	40.
08003A	Ekspress AM-33	1.	C1	110.
08003B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	564.
08006A	Thor 2R	1.	C1	302.
08006C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	16.
08007A	Kizuna	1.	C1	155.
08011A	AMC 14	1.	C2	11.
08013A	DirecTV 11	1.	C1	221.
08016A	ICO G1	1.	C2	66.
08018A	Vinasat	1.	C1	145.
08018B	Star One C2	1.	C1	252.
08019A	Tian Lian 1A	1.	C2	32.
08022A	Amos 3	1.	C1	299.
08022B	Zenit-3SLB third stage (Blok-DM-SL-B)	1.	D	22.
08024A	Galaxy 18	1.	C1	185.
08028A	Zhongxing 9	1.	C1	105.
08030A	Skynet 5C	1.	C1	287.
08030B	Turksat 3A	1.	C1	48.
08033A	Cosmos-2440	1.	L1	10.
08033D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L1	30.
08034A	Protostar 1	1.	C1	278.
08034B	Badr 6	1.	C1	30.
08035A	Echostar 11	1.	C1	202.
08038A	Superbird C2	1.	C1	156.
08038B	AMC 21	1.	C1	184.
08039A	Inmarsat 4 F3	1.	C2	64.
08044A	Nimiq 4	1.	C1	242.
08045A	Galaxy 19	1.	C1	224.
08055A	Simon Bolivar	1.	C1	244.
08057A	Astra 1M	1.	C1	19.
08063A	Ciel 2	1.	C1	181.
08065A	Hot Bird 9	1.	C1	12.

COSPAR	NAME	TABLE	STATUS	No
08065B	Eutelsat W2M	1.	C1	56.
08066A	Fengyun 2E	1.	C2	43.
08066C	Fengyun 2E AKM (FG-36 AKM)	1.	D	544.
09001A	USA 202 (NROL-26)	2.	C2	6.
09001B	Delta 4 second stage (Delta 337, DCSS-5 F03)	2.	D1	96.
09007A	Ekspress AM-44	1.	C1	290.
09007B	Ekspress MD-1	1.	D	215.
09007D	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	61.
09008A	NSS 9	1.	C1	172.
09008B	Atlantic Bird 4A	1.	C1	14.
09009A	Telstar 11N	1.	C1	274.
09010A	Raduga-1	1.	C2	2.
09010B	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	D	408.
09016A	Eutelsat W2A	1.	C1	11.
09017A	USA 204 (WGS SV-2)	2.	C1	3.
09018A	Beidou DW 2 (Compass G2)	1.	L1	91.
09020A	SICRAL 1B	2.	C1	1.
09027A	Indostar II/Protostar II	1.	C1	118.
09032A	Measat 3A	1.	C1	103.
09033A	GOES 14	1.	C1	208.
09034A	Sirius FM5	1.	C1	225.
09035A	Terrestar 1	1.	C2	61.
09042A	Asiasat 5	1.	C1	113.
09044A	JCSAT 12 (JCSAT-RA)	1.	C1	140.
09044B	Optus D3	1.	C1	160.
09046A	Palapa D	1.	C1	128.
09047A	USA 207 (PAN)	2.	C1	2.
09050A	Nimiq 5	1.	C1	250.
09054A	Amazonas 2	1.	C1	261.
09054B	COMSATBw-1	1.	C1	73.
09058A	NSS 12	1.	C1	66.
09058B	Thor 6	1.	C1	301.
09064A	Intelsat IS-14	1.	C1	271.
09065A	Eutelsat W7	1.	C1	42.
09067A	Intelsat IS-15	1.	C1	97.
09068A	USA 211 (WGS SV-3)	2.	C1	9.
09075A	DirecTV 12	1.	C1	215.
10001A	Beidou DW 3	1.	C1	151.
10002A	Raduga-1M	1.	C1	96.
10002B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	565.
10005A	Solar Dynamics Observatory	4.	I	3.
10006A	Intelsat IS-16	1.	C1	243.
10008A	GOES 15	1.	C1	176.
10010A	Echostar XIV	1.	C1	189.
10016A	SES-1	1.	C1	219.
10021A	Astra 3B	1.	C1	25.
10021B	COMSATBw-2	1.	C1	15.
10024A	Beidou DW 4	1.	C1	125.

COSPAR	NAME	TABLE	STATUS	No
10025A	Badr 5	1.	C1	28.
10032A	Chollian	1.	C1	141.
10032B	Arabsat 5A	1.	C1	37.
10034A	Echostar XV	1.	C1	270.
10036A	Beidou DW 5	4.	I	4.
10037A	Nilesat 201	1.	C1	294.
10037B	RASCOM-QAF 1R	1.	C1	1.
10039A	USA 214 (AEHF SV-1)	2.	C2	46.
10042A	Zhongxing 6A	1.	C1	138.
10045A	Michibiki	4.	I	5.
10053A	Sirius XM-5	1.	C1	236.
10056B	BSAT-3B	1.	C1	121.
10057A	Beidou DW 6	1.	C1	163.
10061A	SkyTerra 1	1.	C1	216.
10063A	USA 223 (NROL-32)	2.	C2	17.
10063B	Delta 4 second stage (Delta 351, DCSS-5 F05)	2.	D1	2.
10064A	Zhongxing 20A	1.	C1	143.
10065A	Hylas	1.	C1	277.
10065B	Intelsat IS-17	1.	C1	76.
10068A	Beidou DW 7	4.	I	6.
10069A	KA-Sat	1.	C1	8.
10070A	Hispasat 1E	1.	C1	281.
10070B	Koreasat 6	1.	C1	132.
11001A	Elektro-L No. 1	1.	C2	29.
11001B	Zenit-3SLBF third stage (Fregat-SB)	1.	D	551.
11011A	USA 227 (NROL-27)	2.	C2	15.
11013A	Beidou DW 8	4.	I	7.
11016A	Intelsat New Dawn	1.	C1	40.
11016B	Yahsat 1A	1.	C1	58.
11019A	USA 230 (SBIRS-GEO 1)	2.	C2	16.
11021A	Estrela do Sul 2	1.	C1	256.
11022A	GSAT-8	1.	C1	64.
11022B	ST-2	1.	C1	100.
11026A	Zhongxing 10	1.	C1	126.
11032A	Tian Lian 1B	1.	C2	55.
11034A	GSAT-12	1.	C1	94.
11035A	SES-3	1.	C1	211.
11035B	Kazsat-2	1.	C1	98.
11038A	Beidou DW 9	4.	I	8.
11041A	Astra 1N	1.	C1	21.
11041B	BSAT 3c	1.	C1	123.
11042A	Paksat 1R	1.	C1	45.
11047A	Zhongxing 1A	1.	C1	142.
11048A	Cosmos-2473	1.	C1	89.
11048B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	567.
11049A	SES-2	1.	C1	234.
11049B	Arabsat 5C	1.	C1	23.
11051A	Atlantic Bird 7	1.	C1	293.

COSPAR	NAME	TABLE	STATUS	No
11054A	QuetzSat-1	1.	C1	246.
11056A	Intelsat IS-18	1.	C1	171.
11057A	Eutelsat W3C	1.	C1	16.
11059A	ViaSat-1	1.	C1	195.
11069A	Asiasat 7	1.	C1	117.
11073A	Beidou DW 10	4.	I	9.
11074A	Amos 5	1.	C1	18.
11074B	Luch-5A	1.	C1	168.
11077A	Nigcomsat 1R	1.	C1	50.
12002A	Fengyun 2F	1.	C1	127.
12002C	Fengyun 2F AKM (FG-36 AKM)	1.	D	292.
12003A	USA 233 (WGS SV-4)	2.	C1	4.
12007A	SES-4	1.	C1	284.
12008A	Beidou DW 11	1.	C1	68.
12009A	MUOS 1	2.	C2	27.
12011A	Intelsat IS-22	1.	C1	80.
12012A	Cosmos-2479	1.	L3	11.
12012D	Proton-K/DM-2 fourth stage (Blok DM-2)	1.	L3	8.
12013A	Apstar 7	1.	C1	86.
12016A	Yahsat 1B	1.	C1	55.
12019A	USA 235 (AEHF 2)	2.	C2	52.
12023A	JCSAT 13	1.	C1	137.
12023B	Vinasat-2	1.	C1	144.
12026A	Nimiq 6	1.	C1	230.
12028A	Zhongxing 2A	1.	C1	112.
12030A	Intelsat IS-19	1.	C1	167.
12033A	USA 236 (SDS 3 F7, NROL-38)	2.	C2	55.
12034A	USA 237 (NROL-15)	2.	C2	9.
12034B	Delta 4 second stage (Delta 360, DCSS-5 F09)	2.	D1	4.
12035A	Echostar 17	1.	C1	207.
12035B	Meteosat 10	1.	C1	303.
12036A	SES-5	1.	C1	4.
12040A	Tian Lian 1-03	1.	C1	17.
12043A	Intelsat IS-20	1.	C1	77.
12043B	Hylas 2	1.	C1	38.
12045A	Intelsat IS-21	1.	C1	263.
12051A	Astra 2F	1.	C1	32.
12051B	GSAT-10	1.	C1	92.
12057A	Intelsat IS-23	1.	C1	267.
12059A	Beidou DW 16	1.	C1	90.
12061A	Luch-5B	1.	C2	82.
12061B	Yamal-300K	1.	C1	101.
12062A	Star One C3	1.	C1	248.
12062B	Eutelsat 21B	1.	C1	24.
12065A	Echostar XVI	1.	C1	259.
12067A	Zhongxing 12	1.	C1	99.
12069A	Eutelsat 70B	1.	C1	79.
12070A	Yamal-402	1.	C1	63.

COSPAR	NAME	TABLE	STATUS	No
12075A	Skynet 5D	1.	C1	59.
12075B	Mexsat Bicentenario	1.	C1	196.
13004A	TDRS 11	1.	C1	173.
13006A	Amazonas 3	1.	C1	260.
13006B	Azerspace	1.	C1	52.
13011A	USA 241 (SBIRS GEO-2)	2.	C2	2.
13012A	Satmex 8	1.	C1	191.
13014A	Anik G-1	1.	C1	205.
13020A	Zhongxing 11	1.	C1	111.
13022A	Eutelsat 3D	1.	C1	7.
13024A	USA 243 (WGS SV-5)	2.	C1	8.
13026A	SES-6	1.	C1	273.
13034A	IRNSS-R1A	4.	I	10.
13036A	MUOS 2	2.	C2	43.
13038A	Alphasat	1.	C2	7.
13038B	Insat 3D	1.	C1	91.
13041A	USA 244 (WGS SV-6)	2.	C1	7.
13044A	Es'hail 1 / Eutelsat 25B	1.	C1	27.
13044B	GSAT-7	1.	C1	81.
13045A	Amos 4	1.	C1	75.
13050A	USA 246 (AEHF SV-3)	2.	C2	30.
13056A	Astra 2E	1.	C1	34.
13058A	Sirius FM6	1.	C1	192.
13062A	Raduga-1M	1.	C1	78.
13062B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	566.
13071A	SES-8	1.	C1	108.
13073A	Inmarsat 5F1	1.	C1	72.
13075A	Tupac Katari (TKSat 1)	1.	C1	233.
13077A	Ekspress-AM5	1.	C1	152.
14001A	GSAT-14	1.	C1	84.
14002A	Thaicom 6	1.	C1	87.
14004A	TDRS 12	1.	C2	75.
14006A	ABS-2	1.	C1	85.
14006B	ATHENA-FIDUS	1.	C1	44.
14007A	Turksat 4A	1.	C1	47.
14010A	Ekspress-AT1	1.	C1	65.
14010B	Ekspress-AT2	1.	C1	149.
14010C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	3.
14011A	Amazonas 4A	1.	C1	262.
14011B	Astra 5B	1.	C1	39.
14017A	IRNSS-R1B	4.	I	11.
14020A	USA 250 (NROL-67)	2.	C2	29.
14023A	Luch-5V	1.	C2	39.
14023B	Kazsat-3	1.	C1	67.
14023C	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	5.
14027A	USA 252 (NROL-33)	2.	C2	32.
14030A	Eutelsat 3B	1.	C1	2.
14043A	USA 253 (GSSAP 1, AFSPC-4 F1)	2.	C4	37.

COSPAR	NAME	TABLE	STATUS	No
14043B	USA 254 (GSSAP 2, AFSPC-4 F2)	2.	C4	38.
14043C	USA 255 (ANGELS)	2.	C4	33.
14043D	Delta 4 second stage (DCSS 4)	2.	D1	77.
14046A	Asiasat 8	1.	C1	116.
14052A	Asiasat 6	1.	C1	135.
14054A	Optus 10	1.	C1	166.
14054B	Measat 3B	1.	C1	104.
14055A	USA 257 (CLIO)	2.	C1	5.
14058A	Luch	1.	C1	61.
14058B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	4.
14060A	Himawari-8	1.	C1	153.
14061A	IRNSS-R1C	1.	C2	34.
14062A	Intelsat IS-30	1.	C1	227.
14062B	ARSAT-1	3.	Ind	4.
14064A	Ekspress-AM6	3.	Ind	5.
14064B	Proton-M/Briz-M fourth stage (Briz-M)	1.	D	18.
14078A	GSAT 16	3.	Ind	6.
14078B	DirectTV-14	3.	Ind	7.
14082A	Yamal 401	3.	Ind	8.
14085A	GVM/Briz-M	3.	Ind	9.
14089A	Astra 2G	3.	Ind	10.
14090A	Fengyun 2G	3.	Ind	11.
14090C	Fengyun 2G AKM	3.	Ind	12.

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 303 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 35.

C1 .nn	**COSPAR**	**NAME**					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 1	**10037B**	**RASCOM-QAF 1R**					
	31-DEC-14	2.90				49	234
	23740.838275	42164.42038	0.0004574	0.0249	68.3520	207.9121	2.8944
C1 . 2	**14030A**	**Eutelsat 3B**					
	26-DEC-14	2.96				31	31
	23735.084271	42164.65446	0.0004010	0.0397	28.0106	212.9330	3.1009
C1 . 3	**07057A**	**Sirius 4**					
	24-DEC-14	4.82				48	364
	23733.313495	42164.64409	0.0002049	0.0200	329.1433	302.8323	4.8256
C1 . 4	**12036A**	**SES-5**					
	31-DEC-14	5.00				49	130
	23740.219757	42164.64213	0.0002057	0.0680	269.0311	357.5408	4.9716
C1 . 5	**07007B**	**Skynet 5A**					
	30-DEC-14	6.00				49	402
	23739.024225	42164.79295	0.0003591	0.0683	0.3181	263.4914	5.9327
C1 . 6	**04008A**	**Eutelsat W3A**					
	26-DEC-14	7.00				48	544
	23735.078368	42164.68081	0.0005389	0.0593	352.2073	250.7855	7.0115
C1 . 7	**13022A**	**Eutelsat 3D**					
	26-DEC-14	7.01				48	87
	23735.078368	42164.87677	0.0003559	0.0359	8.8651	305.5260	7.0212
C1 . 8	**10069A**	**KA-Sat**					
	26-DEC-14	9.00				48	211
	23735.081262	42165.14674	0.0001406	0.0367	299.0601	327.2577	9.0143
C1 . 9	**06007B**	**Hot Bird 7A**					
	26-DEC-14	9.00				48	439
	23735.081157	42164.82855	0.0005957	0.0805	77.2060	196.1951	8.9842
C1 . 10	**05049B**	**MSG 2 (Meteosat 9)**					
	26-DEC-14	9.40				48	453
	23735.111898	42166.72570	0.0000563	0.5348	41.4733	180.4584	9.4610
C1 . 11	**09016A**	**Eutelsat W2A**					
	30-DEC-14	10.00				49	299
	23739.020278	42164.39123	0.0005128	0.0601	1.4319	267.2771	9.9944

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 12	**08065A**	**Hot Bird 9**					
	26-DEC-14	13.00				48	316
	23735.276181	42165.11954	0.0001525	0.0568	48.3755	274.0405	12.9958
C1 . 13	**06032A**	**Hot Bird 8**					
	26-DEC-14	13.01				48	423
	23735.277303	42165.01049	0.0004080	0.0527	358.2528	341.0495	12.9771
C1 . 14	**09008B**	**Atlantic Bird 4A**					
	26-DEC-14	13.01				48	309
	23735.277303	42164.82407	0.0005570	0.0368	333.9435	302.7287	13.0117
C1 . 15	**10021B**	**COMSATBw-2**					
	31-DEC-14	13.21				49	244
	23740.206273	42164.87985	0.0002339	0.0257	354.2262	284.1401	13.1249
C1 . 16	**11057A**	**Eutelsat W3C**					
	26-DEC-14	15.90				48	171
	23735.112049	42164.03409	0.0004572	0.0580	351.3551	279.0979	16.0333
C1 . 17	**12040A**	**Tian Lian 1-03**					
	25-DEC-14	16.78				48	128
	23734.265822	42164.41842	0.0004793	0.2164	269.5682	345.9633	16.7665
C1 . 18	**11074A**	**Amos 5**					
	25-DEC-14	17.00				48	160
	23734.961933	42163.82217	0.0001858	0.0055	310.3457	121.8898	16.9950
C1 . 19	**08057A**	**Astra 1M**					
	26-DEC-14	19.19				47	255
	23735.112130	42163.73611	0.0001852	0.0385	66.9993	148.1429	19.2392
C1 . 20	**06012A**	**Astra 1KR**					
	25-DEC-14	19.20				48	361
	23734.116933	42165.02339	0.0004000	0.0450	287.0527	324.6278	19.1838
C1 . 21	**11041A**	**Astra 1N**					
	24-DEC-14	19.21				48	170
	23733.057766	42164.05399	0.0002681	0.0662	25.4829	319.3261	19.2241
C1 . 22	**07016A**	**Astra 1L**					
	25-DEC-14	19.21				48	324
	23734.116933	42164.81678	0.0004903	0.0571	314.5072	325.8927	19.1811
C1 . 23	**11049B**	**Arabsat 5C**					
	30-DEC-14	19.99				49	173
	23739.716377	42164.41674	0.0003263	0.0612	17.1639	226.3433	19.9558
C1 . 24	**12062B**	**Eutelsat 21B**					
	30-DEC-14	21.60				48	112
	23739.119988	42165.33513	0.0002274	0.0612	358.1816	274.4423	21.5754
C1 . 25	**10021A**	**Astra 3B**					
	30-DEC-14	23.50				49	226
	23739.970556	42165.04077	0.0001365	0.0596	14.4756	237.3790	23.4331

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 26	**07056B**	**Skynet 5B**					
	30-DEC-14	24.44				49	374
	23739.970255	42164.39347	0.0003579	0.0623	1.7909	268.0850	24.3093
C1 . 27	**13044A**	**Es'hail 1 / Eutelsat 25B**					
	25-DEC-14	25.50				48	70
	23734.969745	42164.47084	0.0001593	0.0446	353.9755	280.8091	25.4925
C1 . 28	**10025A**	**Badr 5**					
	31-DEC-14	26.00				49	240
	23740.212303	42165.18010	0.0003017	0.0076	88.2751	145.6668	25.9613
C1 . 29	**06051A**	**Badr 4**					
	25-DEC-14	26.01				48	419
	23734.010602	42164.99199	0.0005412	0.0518	326.5771	321.2677	25.9907
C1 . 30	**08034B**	**Badr 6**					
	26-DEC-14	26.01				48	341
	23735.112292	42164.27629	0.0003514	0.0600	31.3624	262.8289	26.0328
C1 . 31	**98050A**	**Astra 2A**					
	26-DEC-14	28.18				48	733
	23735.211100	42164.75903	0.0001532	0.0746	93.7218	69.1410	28.1782
C1 . 32	**12051A**	**Astra 2F**					
	24-DEC-14	28.21				48	111
	23733.956100	42164.41506	0.0003925	0.0041	275.6991	327.3008	28.1931
C1 . 33	**01025A**	**Astra 2C**					
	25-DEC-14	28.21				47	563
	23734.206516	42164.22612	0.0004021	0.0544	354.1235	310.4336	28.2110
C1 . 34	**13056A**	**Astra 2E**					
	26-DEC-14	28.35				48	65
	23735.211100	42164.80080	0.0001131	0.0566	320.0582	312.3132	28.3504
C1 . 35	**01011A**	**Eurobird 1**					
	26-DEC-14	28.50				48	706
	23735.211100	42164.67352	0.0004388	0.0712	22.8453	249.5070	28.4770
C1 . 36	**05005A**	**XTAR-EUR**					
	25-DEC-14	29.01				48	496
	23734.206516	42164.99115	0.0001404	0.0075	45.5499	237.0203	28.9918
C1 . 37	**10032B**	**Arabsat 5A**					
	26-DEC-14	30.49				48	238
	23735.006146	42165.02927	0.0002966	0.0528	357.4431	276.2283	30.4833
C1 . 38	**12043B**	**Hylas 2**					
	25-DEC-14	31.01				48	126
	23734.117199	42164.93340	0.0001588	0.0035	168.1911	114.4772	30.9918
C1 . 39	**14011B**	**Astra 5B**					
	26-DEC-14	31.54				40	40
	23735.211400	42164.65362	0.0001876	0.0344	352.9225	281.3684	31.5238

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 40	**11016A**	**Intelsat New Dawn**					
	26-DEC-14	32.81				48	196
	23735.727581	42165.10048	0.0000948	0.0099	300.4176	271.2798	32.7652
C1 . 41	**02051A**	**Eutelsat W5**					
	25-DEC-14	33.10				48	613
	23734.212153	42163.92224	0.0001035	0.0642	54.8704	219.4569	33.1219
C1 . 42	**09065A**	**Eutelsat W7**					
	31-DEC-14	35.92				49	265
	23740.214734	42164.24462	0.0004146	0.0628	3.1727	268.1142	35.8992
C1 . 43	**00028A**	**Eutelsat W4**					
	24-DEC-14	36.10				48	738
	23733.132338	42164.71557	0.0004563	0.0617	356.5959	275.9004	36.0906
C1 . 44	**14006B**	**ATHENA-FIDUS**					
	26-DEC-14	37.81				46	46
	23735.206157	42164.64016	0.0001081	0.0054	335.8466	294.0521	37.7973
C1 . 45	**11042A**	**Paksat 1R**					
	31-DEC-14	37.99				49	178
	23740.917986	42165.09179	0.0004353	0.0423	151.3693	102.7966	37.9567
C1 . 46	**03020A**	**Hellas Sat 2**					
	31-DEC-14	39.00				49	592
	23740.918079	42164.00073	0.0003698	0.0015	4.2837	262.4636	38.9912
C1 . 47	**14007A**	**Turksat 4A**					
	26-DEC-14	42.00				45	45
	23735.142234	42164.99844	0.0004597	0.0470	278.7012	347.9362	41.9867
C1 . 48	**08030B**	**Turksat 3A**					
	25-DEC-14	42.00				48	344
	23734.112454	42164.23817	0.0003882	0.0588	161.1182	75.6334	42.0173
C1 . 49	**01002A**	**Turksat 2A (Eurasiasat 1)**					
	25-DEC-14	42.01				48	709
	23734.117442	42164.03746	0.0003516	0.0559	20.6169	264.6641	42.0276
C1 . 50	**11077A**	**Nigcomsat 1R**					
	31-DEC-14	42.50				49	160
	23740.916273	42164.67380	0.0002898	0.0505	123.5117	114.3936	42.4597
C1 . 51	**00068A**	**Europe*Star F1**					
	31-DEC-14	45.01				49	714
	23740.914167	42164.52186	0.0003661	0.0071	27.1067	251.2532	44.9886
C1 . 52	**13006B**	**Azerspace**					
	31-DEC-14	46.00				49	100
	23740.741609	42164.02540	0.0003851	0.0385	78.4503	146.4961	46.1137
C1 . 53	**05041B**	**Syracuse 3A**					
	31-DEC-14	47.00				49	472
	23740.723912	42164.77837	0.0002982	0.0285	79.0504	211.6937	47.0117

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 54	**01019A**	**PAS 10**					
	24-DEC-14	47.51				48	690
	23733.890428	42164.03269	0.0002211	0.0098	32.8635	254.7782	47.5151
C1 . 55	**12016A**	**Yahsat 1B**					
	24-DEC-14	47.61				48	141
	23733.614051	42164.37805	0.0001890	0.0073	352.2626	269.6788	47.6222
C1 . 56	**08065B**	**Eutelsat W2M**					
	23-DEC-14	48.10				48	314
	23732.170868	42165.05507	0.0002096	0.0651	310.5949	319.7785	48.1144
C1 . 57	**03053A**	**Yamal 200 N2 (Yamal 202)**					
	26-DEC-14	48.99				48	570
	23735.661204	42164.68334	0.0001669	0.0103	314.1050	291.0754	48.9226
C1 . 58	**11016B**	**Yahsat 1A**					
	26-DEC-14	52.50				48	195
	23735.147280	42164.69539	0.0002134	0.0117	301.9415	328.3593	52.5043
C1 . 59	**12075A**	**Skynet 5D**					
	25-DEC-14	52.75				48	107
	23734.128461	42164.32675	0.0003717	0.0654	350.7979	267.4988	52.7547
C1 . 60	**03060A**	**Ekspress AM-22**					
	26-DEC-14	53.01				48	564
	23735.147280	42164.74305	0.0001024	0.0447	205.0378	184.9699	53.0033
C1 . 61	**14058A**	**Luch**					
	26-DEC-14	54.03				13	13
	23735.807894	42164.03774	0.0000791	0.0432	119.3705	79.2492	53.9837
C1 . 62	**96021A**	**Astra 1F**					
	25-DEC-14	54.81				48	798
	23734.054896	42164.74417	0.0003854	0.0629	312.2843	328.8420	54.6597
C1 . 63	**12070A**	**Yamal-402**					
	26-DEC-14	54.89				48	108
	23735.807917	42164.69651	0.0000856	0.0123	306.5602	141.7482	54.8820
C1 . 64	**11022A**	**GSAT-8**					
	26-DEC-14	55.06				48	192
	23735.807917	42164.44814	0.0008462	0.0895	268.1746	347.0639	55.1062
C1 . 65	**14010A**	**Ekspress-AT1**					
	24-DEC-14	56.02				41	41
	23733.964583	42164.15043	0.0000442	0.0344	204.2618	212.0334	56.0331
C1 . 66	**09058A**	**NSS 12**					
	25-DEC-14	57.01				48	273
	23734.811782	42164.93452	0.0002516	0.0220	29.8841	243.0323	56.9978
C1 . 67	**14023B**	**Kazsat-3**					
	24-DEC-14	58.52				34	34
	23733.579259	42165.02703	0.0000603	0.0072	105.0406	253.6432	58.4509

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 68	**12008A**	**Beidou DW 11**					
	26-DEC-14	58.70				48	152
	23735.140903	42163.21472	0.0001391	0.9869	14.9107	220.6179	58.8348
C1 . 69	**02007A**	**Intelsat 904**					
	26-DEC-14	60.00				48	655
	23735.140903	42164.52831	0.0002741	0.0193	351.3367	278.9796	60.0099
C1 . 70	**04007A**	**MBSAT**					
	31-DEC-14	60.99				49	553
	23740.880104	42164.32619	0.0002337	0.0757	106.1239	130.3724	60.9694
C1 . 71	**01039A**	**Intelsat 902**					
	22-DEC-14	62.00				48	680
	23731.868264	42164.41225	0.0002724	0.0175	28.0077	242.7728	62.0217
C1 . 72	**13073A**	**Inmarsat 5F1**					
	26-DEC-14	62.61				48	55
	23735.089282	42164.53672	0.0000282	0.0137	27.0983	26.0792	62.6154
C1 . 73	**09054B**	**COMSATBw-1**					
	26-DEC-14	63.01				48	274
	23735.089282	42165.01498	0.0001921	0.0328	35.4985	240.3832	62.9356
C1 . 74	**02041A**	**Intelsat 906**					
	26-DEC-14	64.12				48	630
	23735.851713	42164.66399	0.0002392	0.0198	0.8839	263.9518	64.1554
C1 . 75	**13045A**	**Amos 4**					
	29-DEC-14	65.00				49	70
	23738.634572	42164.59111	0.0001670	0.0189	269.5833	359.5260	64.9878
C1 . 76	**10065B**	**Intelsat IS-17**					
	29-DEC-14	65.96				49	217
	23738.583067	42164.61578	0.0002961	0.0210	61.0865	208.7803	65.9963
C1 . 77	**12043A**	**Intelsat IS-20**					
	26-DEC-14	68.52				48	127
	23735.849907	42164.71053	0.0000390	0.0133	307.1870	354.9119	68.5004
C1 . 78	**13062A**	**Raduga-1M**					
	26-DEC-14	70.01				48	59
	23735.757477	42164.78958	0.0001857	0.0307	66.0491	226.5833	70.0016
C1 . 79	**12069A**	**Eutelsat 70B**					
	26-DEC-14	70.50				48	109
	23735.757477	42164.63372	0.0004001	0.0603	16.1845	224.1885	70.4887
C1 . 80	**12011A**	**Intelsat IS-22**					
	25-DEC-14	72.11				48	146
	23734.998588	42165.03993	0.0001627	0.0213	357.4375	266.2554	72.1168
C1 . 81	**13044B**	**GSAT-7**					
	25-DEC-14	74.00				48	70
	23734.598715	42164.84369	0.0003880	0.0628	265.2193	359.6327	73.9730

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 82	**07037A**	**INSAT 4CR**					
	31-DEC-14	74.00				49	380
	23740.091366	42164.74417	0.0007078	0.0295	110.0479	152.4249	73.9958
C1 . 83	**02002A**	**Insat 3C**					
	26-DEC-14	74.00				48	665
	23735.522535	42165.01526	0.0001078	0.0845	81.6947	167.0988	74.0212
C1 . 84	**14001A**	**GSAT-14**					
	25-DEC-14	74.01				48	51
	23734.596007	42164.86051	0.0009968	0.0315	278.0318	356.6491	73.9993
C1 . 85	**14006A**	**ABS-2**					
	26-DEC-14	74.91				47	47
	23735.090590	42164.73183	0.0002744	0.0078	32.3732	231.7145	74.9272
C1 . 86	**12013A**	**Apstar 7**					
	25-DEC-14	76.51				48	144
	23734.834757	42164.76379	0.0002388	0.0170	31.8207	239.7247	76.5181
C1 . 87	**14002A**	**Thaicom 6**					
	31-DEC-14	78.50				48	51
	23740.789375	42165.23000	0.0001453	0.0892	134.1495	64.4490	78.4737
C1 . 88	**06020B**	**Thaicom 5**					
	22-DEC-14	78.50				47	440
	23731.801528	42164.71642	0.0007062	0.0274	280.6528	348.9363	78.5334
C1 . 89	**11048A**	**Cosmos-2473**					
	26-DEC-14	79.93				48	174
	23735.011458	42165.00124	0.0001381	0.0719	82.1801	290.8959	79.9399
C1 . 90	**12059A**	**Beidou DW 16**					
	26-DEC-14	80.08				48	114
	23735.011458	42164.72763	0.0002137	0.2299	301.1387	300.4868	80.0771
C1 . 91	**13038B**	**Insat 3D**					
	26-DEC-14	82.08				48	75
	23735.905324	42165.08394	0.0001479	0.0159	233.5899	16.9109	82.0713
C1 . 92	**12051B**	**GSAT-10**					
	26-DEC-14	82.97				48	119
	23735.787998	42164.77669	0.0005209	0.0863	266.6242	234.5938	83.0456
C1 . 93	**05049A**	**Insat 4A**					
	26-DEC-14	83.00				48	462
	23735.077604	42164.91630	0.0007796	0.0864	83.8274	178.2275	83.0069
C1 . 94	**11034A**	**GSAT-12**					
	26-DEC-14	83.00				48	184
	23735.788299	42165.11842	0.0002925	0.0388	262.7009	320.0562	83.0047
C1 . 95	**07063B**	**Horizons 2**					
	26-DEC-14	84.85				47	364
	23735.075475	42165.07273	0.0002259	0.0105	338.1675	297.2423	84.8521

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 96	**10002A**	**Raduga-1M**					
	26-DEC-14	85.00				48	260
	23735.785579	42165.23336	0.0002416	0.0106	336.2690	304.1675	84.9901
C1 . 97	**09067A**	**Intelsat IS-15**					
	26-DEC-14	85.15				48	267
	23735.075475	42164.65362	0.0002091	0.0085	356.7215	285.6373	85.1526
C1 . 98	**11035B**	**Kazsat-2**					
	25-DEC-14	86.48				48	182
	23734.577755	42165.45147	0.0000851	0.0348	220.1267	151.1087	86.5003
C1 . 99	**12067A**	**Zhongxing 12**					
	26-DEC-14	87.50				48	109
	23735.008032	42165.36064	0.0002453	0.0208	19.2485	240.7714	87.4874
C1 . 100	**11022B**	**ST-2**					
	26-DEC-14	87.95				48	191
	23735.785197	42165.77696	0.0001924	0.0025	338.0636	307.5909	87.9661
C1 . 101	**12061B**	**Yamal-300K**					
	26-DEC-14	90.07				48	110
	23735.071192	42165.31158	0.0000202	0.0422	253.1364	135.2619	90.0640
C1 . 102	**06056A**	**Measat 3**					
	26-DEC-14	91.49				48	418
	23735.782870	42164.93284	0.0001547	0.0609	145.7914	54.1400	91.5137
C1 . 103	**09032A**	**Measat 3A**					
	24-DEC-14	91.50				48	290
	23733.778125	42165.32223	0.0003090	0.0494	206.3202	71.4015	91.4921
C1 . 104	**14054B**	**Measat 3B**					
	25-DEC-14	91.51				14	14
	23734.955463	42165.51623	0.0001612	0.0168	337.4342	284.0275	91.4902
C1 . 105	**08028A**	**Zhongxing 9**					
	25-DEC-14	92.20				48	345
	23734.955463	42164.75678	0.0003138	0.0073	352.8921	289.4983	92.2284
C1 . 106	**03013A**	**Insat 3A**					
	24-DEC-14	93.50				48	599
	23733.872188	42165.59753	0.0000671	0.0553	89.7949	66.2507	93.5013
C1 . 107	**07007A**	**Insat 4B**					
	31-DEC-14	93.50				49	406
	23740.575671	42164.83163	0.0007042	0.0097	40.5075	236.3317	93.4755
C1 . 108	**13071A**	**SES-8**					
	24-DEC-14	95.00				48	56
	23733.915208	42164.76632	0.0000499	0.0334	264.8132	302.3530	95.0290
C1 . 109	**02057A**	**NSS 6**					
	24-DEC-14	95.00				47	609
	23733.916609	42164.69062	0.0002777	0.0158	73.3518	186.7795	95.0090

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 110	**08003A**	**Ekspress AM-33**					
	26-DEC-14	96.49				48	362
	23735.686817	42164.88097	0.0000784	0.0418	201.4939	159.5716	96.4943
C1 . 111	**13020A**	**Zhongxing 11**					
	26-DEC-14	98.01				48	89
	23735.458600	42165.06936	0.0001185	0.0480	238.4281	293.2708	98.0301
C1 . 112	**12028A**	**Zhongxing 2A**					
	26-DEC-14	98.26				48	137
	23735.458600	42164.29676	0.0004047	0.0249	186.4697	125.2362	98.2602
C1 . 113	**09042A**	**Asiasat 5**					
	26-DEC-14	100.51				48	283
	23735.743484	42165.68332	0.0001043	0.0067	316.8722	279.1479	100.4631
C1 . 114	**05023A**	**Ekspress AM-3**					
	26-DEC-14	102.99				48	489
	23735.003333	42164.99479	0.0000977	0.0172	240.5346	58.1157	103.0192
C1 . 115	**00016A**	**Asiastar**					
	25-DEC-14	105.00				48	759
	23734.529016	42166.01414	0.0003541	0.0780	15.0287	253.6617	104.9842
C1 . 116	**14046A**	**Asiasat 8**					
	26-DEC-14	105.32				21	21
	23735.778542	42163.98307	0.0002140	0.0220	330.2749	246.7347	105.3150
C1 . 117	**11069A**	**Asiasat 7**					
	25-DEC-14	105.50				48	164
	23734.529028	42165.92639	0.0001344	0.0184	288.8581	284.9471	105.4635
C1 . 118	**09027A**	**Indostar II/Protostar II**					
	24-DEC-14	107.99				48	295
	23733.970116	42165.74808	0.0002350	0.0546	55.8988	212.9918	108.2538
C1 . 119	**99042A**	**Telkom 1**					
	25-DEC-14	107.99				48	788
	23734.529086	42165.71360	0.0002786	0.0176	25.7135	324.5446	108.0149
C1 . 120	**00059A**	**GE-1A**					
	24-DEC-14	108.20				48	729
	23733.583495	42165.59669	0.0000538	0.0253	308.0511	49.0378	108.2048
C1 . 121	**10056B**	**BSAT-3B**					
	26-DEC-14	109.86				48	219
	23735.013843	42165.31326	0.0004653	0.0543	324.5976	329.5820	109.8565
C1 . 122	**07036B**	**BSAT-3A**					
	31-DEC-14	109.86				49	377
	23740.794063	42166.95645	0.0004356	0.0182	222.3566	30.9555	109.8035
C1 . 123	**11041B**	**BSAT 3c**					
	24-DEC-14	109.95				48	178
	23733.996181	42165.93985	0.0000103	0.0091	345.8412	207.6560	109.9663

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 124	**00060A**	**N-SAT-110**					
	24-DEC-14	110.06				48	724
	23733.941192	42165.57791	0.0000558	0.0057	11.9649	98.1495	110.0649
C1 . 125	**10024A**	**Beidou DW 4**					
	26-DEC-14	110.50				48	242
	23735.013843	42165.15627	0.0003161	1.3878	22.1463	292.1577	110.5880
C1 . 126	**11026A**	**Zhongxing 10**					
	26-DEC-14	110.51				48	185
	23735.709097	42164.13080	0.0005646	0.0347	261.7194	303.7987	110.4969
C1 . 127	**12002A**	**Fengyun 2F**					
	24-DEC-14	111.99				48	158
	23733.991563	42164.09436	0.0001989	0.2069	317.6191	218.4985	112.0959
C1 . 128	**09046A**	**Palapa D**					
	24-DEC-14	112.96				48	279
	23733.694861	42165.45820	0.0001616	0.0285	53.5490	268.8872	112.9547
C1 . 129	**06034A**	**Mugunghwa 5**					
	25-DEC-14	113.04				48	429
	23734.872407	42165.46661	0.0000754	0.0149	51.4699	158.7848	113.0463
C1 . 130	**07031A**	**Zhongxing 6B**					
	26-DEC-14	115.54				48	391
	23735.878021	42166.01470	0.0003296	0.0100	349.8436	283.0699	115.4878
C1 . 131	**99046A**	**Mugunghwa 3 (Koreasat 3)**					
	31-DEC-14	115.98				49	772
	23740.950336	42163.29349	0.0001298	0.0221	106.6128	169.6261	116.1122
C1 . 132	**10070B**	**Koreasat 6**					
	25-DEC-14	116.01				48	211
	23734.704780	42165.08562	0.0001911	0.0436	189.3643	97.5401	115.9957
C1 . 133	**05046A**	**Telkom 2**					
	25-DEC-14	118.01				48	467
	23734.702674	42165.20112	0.0001306	0.0167	4.4469	240.3598	118.0103
C1 . 134	**05028A**	**Thaicom 4 (IPStar 1)**					
	25-DEC-14	119.48				48	481
	23734.864688	42165.67071	0.0001931	0.0008	351.0566	278.9359	119.4984
C1 . 135	**14052A**	**Asiasat 6**					
	26-DEC-14	119.89				16	16
	23735.878808	42165.08114	0.0000462	0.0075	53.6204	170.6116	119.9165
C1 . 136	**03014A**	**Asiasat 4**					
	26-DEC-14	122.14				48	603
	23735.601458	42164.27798	0.0000536	0.0249	79.9197	213.1832	122.0814
C1 . 137	**12023A**	**JCSAT 13**					
	30-DEC-14	124.12				49	138
	23739.381123	42166.70215	0.0001993	0.0390	40.6677	248.6147	124.0397

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 138	**10042A**	**Zhongxing 6A**					
	25-DEC-14	125.02				48	227
	23734.436979	42165.37662	0.0002113	0.0322	195.1896	270.6685	125.0494
C1 . 139	**06033A**	**JCSAT 3A**					
	25-DEC-14	127.84				48	430
	23734.681331	42165.45091	0.0001704	0.0200	312.9535	350.3026	128.0038
C1 . 140	**09044A**	**JCSAT 12 (JCSAT-RA)**					
	25-DEC-14	127.93				48	282
	23734.681435	42165.31999	0.0000566	0.0418	17.4371	266.9162	127.9300
C1 . 141	**10032A**	**Chollian**					
	24-DEC-14	128.21				48	237
	23733.683727	42165.45456	0.0000280	0.0357	43.3253	267.7767	128.2175
C1 . 142	**11047A**	**Zhongxing 1A**					
	26-DEC-14	129.85				48	174
	23735.652697	42165.24205	0.0002257	0.0256	189.7342	94.6251	129.8271
C1 . 143	**10064A**	**Zhongxing 20A**					
	26-DEC-14	130.03				48	217
	23735.652697	42165.80079	0.0001722	0.0119	19.5775	272.7946	130.0376
C1 . 144	**12023B**	**Vinasat-2**					
	31-DEC-14	131.84				49	138
	23740.726979	42165.29616	0.0002240	0.0171	299.9289	343.0845	131.8212
C1 . 145	**08018A**	**Vinasat**					
	26-DEC-14	131.94				48	351
	23735.652095	42165.13636	0.0001622	0.0137	336.5841	290.0505	131.9498
C1 . 146	**06010A**	**JCSAT 9**					
	31-DEC-14	132.03				49	452
	23740.726979	42165.42961	0.0001615	0.0153	318.6700	307.7148	132.0351
C1 . 147	**05012A**	**Apstar 6**					
	26-DEC-14	134.00				48	501
	23735.887708	42165.12263	0.0001903	0.0163	37.5048	232.5111	134.0267
C1 . 148	**04024A**	**Telstar 18 (APstar 5)**					
	26-DEC-14	138.00				48	539
	23735.693414	42165.22299	0.0002516	0.0120	301.1768	7.2977	137.9841
C1 . 149	**14010B**	**Ekspress-AT2**					
	25-DEC-14	139.85				40	40
	23734.795012	42165.01105	0.0000715	0.0479	211.6997	227.1120	139.8457
C1 . 150	**05006A**	**Himawari-6**					
	31-DEC-14	139.96				49	505
	23740.646273	42164.46243	0.0003285	0.0869	105.1999	199.6409	139.9674
C1 . 151	**10001A**	**Beidou DW 3**					
	26-DEC-14	140.00				48	261
	23735.811296	42166.05872	0.0004816	1.5810	4.3488	217.8530	140.0051

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 152	**13077A**	**Ekspress-AM5**					
	26-DEC-14	140.04				48	53
	23735.645475	42165.45400	0.0001285	0.0280	169.9116	203.3008	140.0178
C1 . 153	**14060A**	**Himawari-8**					
	25-DEC-14	140.78				12	12
	23734.393877	42165.31382	0.0000515	0.0110	331.0453	6.2967	140.6969
C1 . 154	**98033A**	**Zhongwei 1**					
	26-DEC-14	142.01				48	858
	23735.648796	42164.98442	0.0002831	0.0221	280.3767	312.4556	142.0306
C1 . 155	**08007A**	**Kizuna**					
	23-DEC-14	142.98				48	355
	23732.792488	42165.12936	0.0002961	0.0830	269.1828	1.6928	143.0019
C1 . 156	**08038A**	**Superbird C2**					
	25-DEC-14	143.92				48	337
	23734.559676	42165.24990	0.0001041	0.0092	18.9141	246.6933	143.9650
C1 . 157	**06004A**	**MTSAT-2**					
	25-DEC-14	145.02				48	455
	23734.661412	42164.86387	0.0003145	0.0250	84.2004	174.1106	145.0483
C1 . 158	**07044A**	**Optus D2**					
	29-DEC-14	152.01				49	378
	23738.617569	42165.20449	0.0002740	0.0107	336.7943	286.5837	152.0045
C1 . 159	**02015A**	**JC-Sat 8**					
	30-DEC-14	154.00				49	655
	23739.627234	42165.11113	0.0001779	0.0066	26.4066	233.0791	153.9904
C1 . 160	**09044B**	**Optus D3**					
	26-DEC-14	156.01				48	282
	23735.638495	42165.00432	0.0002847	0.0362	343.3142	300.5890	156.0238
C1 . 161	**03028B**	**Optus C1 (Defense C1)**					
	31-DEC-14	156.01				49	591
	23740.815301	42164.38843	0.0003577	0.0426	157.8820	106.1527	155.9996
C1 . 162	**99053A**	**LMI 1**					
	26-DEC-14	159.03				48	786
	23735.144468	42165.38447	0.0001223	0.0058	327.9262	276.1385	159.0329
C1 . 163	**10057A**	**Beidou DW 6**					
	26-DEC-14	160.00				48	220
	23735.585023	42164.69847	0.0008226	0.7363	43.1562	171.3322	159.9948
C1 . 164	**06043B**	**Optus D1**					
	26-DEC-14	160.00				48	421
	23735.825127	42164.91630	0.0002877	0.0165	357.7752	265.4525	160.0068
C1 . 165	**00012A**	**Superbird 4**					
	26-DEC-14	162.02				48	763
	23735.586528	42164.86556	0.0001996	0.0244	263.9659	359.8599	162.0088

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 166	**14054A**	**Optus 10**					
	22-DEC-14	164.02				16	16
	23731.321852	42164.47673	0.0002502	0.0045	18.8133	240.2049	164.0256
C1 . 167	**12030A**	**Intelsat IS-19**					
	26-DEC-14	166.02				48	136
	23735.818843	42164.93312	0.0002673	0.0163	344.2588	283.2215	165.9935
C1 . 168	**11074B**	**Luch-5A**					
	25-DEC-14	167.00				48	159
	23734.809456	42164.57344	0.0003491	2.5622	243.3553	5.0256	166.9473
C1 . 169	**98065A**	**PAS 8**					
	26-DEC-14	169.02				48	809
	23735.643241	42164.93620	0.0002716	0.0390	258.7110	358.1186	168.9861
C1 . 170	**05052A**	**AMC 23**					
	26-DEC-14	172.01				48	464
	23735.814433	42164.86079	0.0005694	0.0606	356.9083	273.9843	171.9969
C1 . 171	**11056A**	**Intelsat IS-18**					
	26-DEC-14	180.01				48	169
	23735.518021	42164.94797	0.0002013	0.0080	308.3409	317.6957	179.9920
C1 . 172	**09008A**	**NSS 9**					
	26-DEC-14	183.01				48	310
	23735.517419	42164.64493	0.0001625	0.0161	341.3297	286.1232	182.9860
C1 . 173	**13004A**	**TDRS 11**					
	31-DEC-14	188.90				47	100
	23740.535891	42165.34354	0.0010275	6.4147	330.3178	261.5884	188.7517
C1 . 174	**00081B**	**GE 8 (Aurora 3)**					
	26-DEC-14	221.02				48	717
	23735.660972	42164.57513	0.0002058	0.0241	330.0401	307.1751	220.9990
C1 . 175	**00054B**	**GE 7**					
	30-DEC-14	223.01				49	730
	23739.500810	42164.42991	0.0002485	0.0145	339.1994	294.5717	222.9931
C1 . 176	**10008A**	**GOES 15**					
	26-DEC-14	224.88				48	255
	23735.621227	42163.69294	0.0002360	0.1747	258.3286	354.5139	224.6794
C1 . 177	**04003A**	**AMC-10 (GE 10)**					
	26-DEC-14	225.01				48	558
	23735.621227	42164.60905	0.0002307	0.0150	6.8417	261.9311	224.9936
C1 . 178	**05041A**	**Galaxy 15**					
	29-DEC-14	226.99				49	473
	23738.503426	42164.64885	0.0002099	0.0153	322.3195	335.8294	226.9843
C1 . 179	**04017A**	**AMC-11 (GE-11)**					
	29-DEC-14	229.01				49	543
	23738.438206	42164.82547	0.0002524	0.0287	312.9894	314.4796	228.9916

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 180	**03013B**	**Galaxy XII**					
	26-DEC-14	231.01				48	600
	23735.679039	42164.79968	0.0001593	0.0262	84.7374	173.6545	230.9871
C1 . 181	**08063A**	**Ciel 2**					
	26-DEC-14	231.16				48	317
	23735.679039	42164.63876	0.0002355	0.0138	341.0758	281.2696	231.1368
C1 . 182	**03044A**	**Galaxy 13/Horizons-1**					
	22-DEC-14	233.00				48	570
	23731.548947	42159.45169	0.0002423	0.0249	356.4108	272.0616	233.0008
C1 . 183	**05030A**	**Galaxy 14**					
	26-DEC-14	235.01				48	484
	23735.679340	42164.58410	0.0001988	0.0159	337.1516	292.2881	235.0047
C1 . 184	**08038B**	**AMC 21**					
	26-DEC-14	235.11				48	338
	23735.679340	42164.88742	0.0001885	0.0159	349.8706	287.3264	235.0970
C1 . 185	**08024A**	**Galaxy 18**					
	25-DEC-14	237.00				48	349
	23734.513391	42165.22159	0.0002763	0.0185	356.1974	272.7362	236.9873
C1 . 186	**03034A**	**EchoStar 9 (Telstar 13)**					
	25-DEC-14	239.01				48	585
	23734.529919	42164.83836	0.0003194	0.0073	107.4200	171.5358	238.9896
C1 . 187	**04016A**	**DirecTV-7S**					
	26-DEC-14	240.92				48	544
	23735.055301	42164.77108	0.0002346	0.0223	10.7309	255.3527	240.9259
C1 . 188	**02006A**	**EchoStar 7**					
	26-DEC-14	241.07				48	658
	23735.055289	42164.41954	0.0000601	0.0160	328.2081	286.9122	241.2150
C1 . 189	**10010A**	**Echostar XIV**					
	26-DEC-14	241.11				48	251
	23735.646528	42164.39571	0.0003265	0.0124	267.7300	7.9539	241.1014
C1 . 190	**07009A**	**Anik F3**					
	31-DEC-14	241.30				49	401
	23740.437477	42164.46636	0.0002063	0.0042	13.2833	261.7031	241.3081
C1 . 191	**13012A**	**Satmex 8**					
	31-DEC-14	243.21				49	94
	23740.960914	42164.62306	0.0002922	0.0046	339.9725	292.6353	243.1851
C1 . 192	**13058A**	**Sirius FM6**					
	29-DEC-14	243.88				47	60
	23738.545463	42164.79042	0.0000744	0.0206	44.6019	180.2376	243.8569
C1 . 193	**01018A**	**XM Radio 1 (Roll)**					
	25-DEC-14	244.75				48	697
	23734.603634	42164.89443	0.0003407	0.1546	250.4217	318.5301	244.7805

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 194	**06049A**	**XM Radio 4 (Blues)**					
	31-DEC-14	244.87				49	422
	23740.612998	42165.23364	0.0000517	0.0106	242.4414	16.8697	244.7535
C1 . 195	**11059A**	**ViaSat-1**					
	30-DEC-14	244.91				49	169
	23739.603032	42164.85546	0.0002495	0.0012	6.6888	259.4300	244.8941
C1 . 196	**12075B**	**Mexsat Bicentenario**					
	31-DEC-14	245.21				49	109
	23740.612998	42164.81033	0.0002097	0.0393	204.7155	63.5511	245.1860
C1 . 197	**06020A**	**Satmex 6**					
	26-DEC-14	246.99				48	444
	23735.116192	42164.68614	0.0002330	0.0156	248.0531	15.2995	246.9937
C1 . 198	**04027A**	**Anik F2**					
	25-DEC-14	248.87				48	532
	23734.608715	42164.86836	0.0000208	0.0228	0.5844	91.2725	248.9301
C1 . 199	**06054A**	**WildBlue 1**					
	26-DEC-14	248.90				48	417
	23735.125266	42164.96564	0.0001425	0.0096	68.4498	197.3034	248.8196
C1 . 200	**06003A**	**Echostar 10**					
	24-DEC-14	249.80				48	460
	23733.277998	42164.44786	0.0001326	0.0134	352.6050	263.3503	249.8245
C1 . 201	**02023A**	**DirecTV-5**					
	26-DEC-14	249.93				48	650
	23735.187442	42164.85042	0.0003187	0.0183	287.2562	347.5786	249.8927
C1 . 202	**08035A**	**Echostar 11**					
	25-DEC-14	250.01				48	342
	23734.628623	42165.05815	0.0002841	0.0185	327.2855	316.2673	250.0010
C1 . 203	**02062A**	**Nimiq 2**					
	25-DEC-14	250.82				48	613
	23734.396759	42164.47953	0.0006308	0.1344	90.5509	195.9460	250.8250
C1 . 204	**00076A**	**Anik F1**					
	25-DEC-14	252.64				48	723
	23734.659861	42164.83808	0.0001520	0.0144	77.2981	130.8224	252.7168
C1 . 205	**13014A**	**Anik G-1**					
	30-DEC-14	252.66				49	91
	23739.302002	42164.81565	0.0003143	0.0086	304.9272	318.2303	252.6949
C1 . 206	**05036A**	**Anik F1R**					
	26-DEC-14	252.70				47	477
	23735.335868	42164.98049	0.0001632	0.0127	341.7263	327.4449	252.6948
C1 . 207	**12035A**	**Echostar 17**					
	26-DEC-14	252.90				48	131
	23735.335868	42164.92555	0.0002478	0.0039	18.1707	247.5344	252.8982

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 208	**09033A**	**GOES 14**					
	26-DEC-14	254.56				48	289
	23735.547407	42164.87397	0.0002231	0.1233	260.9228	318.1639	255.6454
C1 . 209	**04041A**	**AMC-15**					
	25-DEC-14	254.84				48	523
	23734.479097	42165.01694	0.0001688	0.0200	333.0262	300.4305	254.9587
C1 . 210	**06054B**	**AMC 18**					
	26-DEC-14	255.06				48	418
	23735.051852	42164.65474	0.0002877	0.0125	345.6337	284.6909	255.0675
C1 . 211	**11035A**	**SES-3**					
	25-DEC-14	256.94				48	183
	23734.537384	42164.84313	0.0002499	0.0190	315.8447	312.2406	257.0095
C1 . 212	**96054A**	**GE 1**					
	25-DEC-14	256.99				48	926
	23734.537384	42164.98414	0.0000283	0.0254	34.4208	215.0840	257.0095
C1 . 213	**05015A**	**Spaceway 1**					
	31-DEC-14	257.12				49	498
	23740.590069	42164.87284	0.0000806	0.0491	208.6193	355.0442	257.0724
C1 . 214	**07032A**	**DirecTV 10**					
	25-DEC-14	257.22				48	390
	23734.608414	42165.17001	0.0000471	0.0301	156.3071	254.7065	257.1801
C1 . 215	**09075A**	**DirecTV 12**					
	25-DEC-14	257.24				48	263
	23734.608414	42164.92807	0.0000371	0.0322	182.7565	292.1748	257.2550
C1 . 216	**10061A**	**SkyTerra 1**					
	25-DEC-14	258.70				48	218
	23734.419780	42164.72539	0.0005701	4.3174	323.9670	195.5029	258.7087
C1 . 217	**01052A**	**DirecTV-4S**					
	31-DEC-14	258.84				49	671
	23740.437928	42164.85714	0.0002041	0.0179	49.5314	236.2373	258.7953
C1 . 218	**06043A**	**DirecTV 9S**					
	30-DEC-14	258.90				49	425
	23739.942095	42164.95246	0.0003065	0.0118	277.9741	350.5459	258.8883
C1 . 219	**10016A**	**SES-1**					
	26-DEC-14	259.01				48	245
	23735.323542	42165.06207	0.0001655	0.0149	343.0725	290.5494	258.9989
C1 . 220	**05019A**	**DirectTV-8**					
	31-DEC-14	259.16				49	494
	23740.310220	42164.95498	0.0003045	0.0077	338.5080	291.2506	259.1313
C1 . 221	**08013A**	**DirecTV 11**					
	26-DEC-14	260.75				48	354
	23735.145984	42164.85322	0.0000281	0.0356	161.0181	248.9062	260.7828

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 222	**05046B**	**Spaceway 2**					
	26-DEC-14	260.87				48	472
	23735.145984	42165.03684	0.0000336	0.0260	180.4912	268.6372	260.8686
C1 . 223	**06023A**	**Galaxy 16**					
	26-DEC-14	261.00				48	441
	23735.323588	42164.82715	0.0003065	0.0032	277.6172	343.9884	261.0099
C1 . 224	**08045A**	**Galaxy 19**					
	30-DEC-14	262.95				49	331
	23739.555382	42164.63007	0.0003369	0.0214	84.4641	206.3741	262.9934
C1 . 225	**09034A**	**Sirius FM5**					
	30-DEC-14	264.00				49	289
	23739.546655	42164.62306	0.0000802	0.0044	47.9716	241.7254	263.9998
C1 . 226	**02030A**	**Galaxy 3C**					
	31-DEC-14	264.95				49	641
	23740.438079	42165.29364	0.0001438	0.0102	1.8020	357.5086	264.9040
C1 . 227	**14062A**	**Intelsat IS-30**					
	26-DEC-14	264.96				11	11
	23735.354468	42165.09628	0.0002503	0.0010	338.9109	228.9599	264.9456
C1 . 228	**07036A**	**Spaceway 3**					
	26-DEC-14	265.05				48	386
	23735.354468	42165.02983	0.0000689	0.0208	136.5168	348.8959	265.0616
C1 . 229	**97026A**	**Telstar 5**					
	31-DEC-14	266.91				49	898
	23740.438125	42164.82154	0.0003226	0.0049	317.8094	311.5050	266.8996
C1 . 230	**12026A**	**Nimiq 6**					
	26-DEC-14	268.89				48	137
	23735.323773	42165.20729	0.0001827	0.0095	312.7526	301.8990	268.9305
C1 . 231	**07016B**	**Galaxy 17**					
	25-DEC-14	269.00				48	394
	23734.324549	42165.01554	0.0002998	0.0163	4.3284	261.5323	269.0109
C1 . 232	**05022A**	**Intelsat Americas 8 (Telstar 8)**					
	29-DEC-14	271.00				49	491
	23738.213484	42165.19580	0.0000947	0.0099	345.4907	185.0332	270.9832
C1 . 233	**13075A**	**Tupac Katari (TKSat 1)**					
	25-DEC-14	272.81				48	54
	23734.122303	42164.79547	0.0003297	0.0084	98.4281	153.7795	272.8369
C1 . 234	**11049A**	**SES-2**					
	26-DEC-14	273.00				48	172
	23735.323889	42165.23841	0.0002635	0.0151	357.8288	272.0828	272.9972
C1 . 235	**99027A**	**Nimiq**					
	26-DEC-14	273.51				48	795
	23735.323900	42165.10777	0.0005730	0.0166	39.8722	251.5787	273.5038

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 236	**10053A**	**Sirius XM-5**					
	26-DEC-14	274.78				48	223
	23735.293472	42165.40774	0.0001137	0.0206	298.6671	101.3120	274.7792
C1 . 237	**05008A**	**XM Radio 3 (Rhythm)**					
	26-DEC-14	274.91				47	502
	23735.293472	42165.28831	0.0000165	0.0232	170.2190	277.6551	274.9023
C1 . 238	**04048A**	**AMC 16**					
	26-DEC-14	274.94				48	514
	23735.293472	42165.01049	0.0002374	0.0172	332.8911	304.2447	275.0115
C1 . 239	**00046A**	**Brasilsat B4**					
	24-DEC-14	276.00				48	737
	23733.529063	42164.44926	0.0002102	0.0495	232.5472	47.7209	276.0498
C1 . 240	**00007A**	**Hispasat 1C**					
	24-DEC-14	276.17				48	747
	23733.529063	42165.20281	0.0001780	0.0515	53.6389	229.5376	276.1549
C1 . 241	**03024A**	**AMC-9 (GE-12)**					
	23-DEC-14	276.72				48	592
	23732.516262	42165.26588	0.0002717	0.0134	338.7340	297.9450	276.9965
C1 . 242	**08044A**	**Nimiq 4**					
	30-DEC-14	278.00				49	331
	23739.376620	42164.50140	0.0002641	0.0005	221.1351	59.7244	277.9904
C1 . 243	**10006A**	**Intelsat IS-16**					
	25-DEC-14	281.02				48	257
	23734.079745	42164.88041	0.0001571	0.0184	8.2849	270.4364	281.0200
C1 . 244	**08055A**	**Simon Bolivar**					
	25-DEC-14	282.00				48	322
	23734.234074	42165.66230	0.0001809	0.0500	130.2209	146.8901	281.9738
C1 . 245	**95073A**	**EchoStar 1**					
	26-DEC-14	282.85				48	938
	23735.287280	42165.18795	0.0002778	0.0056	50.9137	251.2851	282.8508
C1 . 246	**11054A**	**QuetzSat-1**					
	25-DEC-14	282.99				48	173
	23734.139757	42165.22159	0.0001750	0.0275	10.1074	267.9567	283.0078
C1 . 247	**02039A**	**EchoStar 8**					
	26-DEC-14	283.02				48	636
	23735.216389	42165.24458	0.0001958	0.0133	23.7902	233.4908	283.1058
C1 . 248	**12062A**	**Star One C3**					
	26-DEC-14	285.00				48	112
	23735.324190	42165.54483	0.0002539	0.0665	87.6585	186.3818	284.9835
C1 . 249	**06018A**	**GOES N**					
	26-DEC-14	285.16				48	448
	23735.324190	42164.55466	0.0000979	0.2229	95.3757	11.7744	285.4988

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 250	**09050A**	**Nimiq 5**					
	31-DEC-14	287.30				49	280
	23740.240567	42165.17589	0.0002492	0.0099	301.1022	320.8747	287.2969
C1 . 251	**00067A**	**GE 6**					
	26-DEC-14	288.00				48	725
	23735.209595	42165.33849	0.0002318	0.0170	330.6013	297.5206	287.9981
C1 . 252	**08018B**	**Star One C2**					
	25-DEC-14	290.03				48	351
	23734.228542	42164.51345	0.0002320	0.0169	66.4105	231.7717	290.0156
C1 . 253	**99060A**	**GE 4**					
	26-DEC-14	293.00				48	773
	23735.062118	42165.18346	0.0000240	0.0294	35.4018	58.8035	293.0043
C1 . 254	**97050A**	**GE 3**					
	26-DEC-14	293.01				48	881
	23735.062118	42165.05058	0.0002435	0.0167	320.7123	296.8692	293.0052
C1 . 255	**07056A**	**Star One C1**					
	23-DEC-14	295.01				48	371
	23732.075880	42165.00320	0.0002294	0.0487	273.6865	24.8558	295.0253
C1 . 256	**11021A**	**Estrela do Sul 2**					
	26-DEC-14	296.98				48	192
	23735.410324	42165.50137	0.0001871	0.0182	340.8009	272.5167	296.9739
C1 . 257	**97059A**	**EchoStar 3**					
	26-DEC-14	298.47				48	876
	23735.236528	42164.83836	0.0000835	0.2968	81.4013	172.4403	298.2027
C1 . 258	**03033A**	**Rainbow 1**					
	24-DEC-14	298.48				48	587
	23733.518414	42164.24658	0.0001348	0.0146	346.6730	217.4931	298.6355
C1 . 259	**12065A**	**Echostar XVI**					
	31-DEC-14	298.50				49	112
	23740.863241	42165.00208	0.0002834	0.0028	39.9571	238.2417	298.4843
C1 . 260	**13006A**	**Amazonas 3**					
	24-DEC-14	299.01				48	100
	23733.337708	42165.60146	0.0004527	0.0467	213.3238	35.4134	298.9983
C1 . 261	**09054A**	**Amazonas 2**					
	31-DEC-14	299.01				49	278
	23740.182419	42165.37494	0.0002505	0.0447	158.9007	79.0901	298.9760
C1 . 262	**14011A**	**Amazonas 4A**					
	26-DEC-14	299.08				40	40
	23735.484769	42164.91742	0.0002268	0.0240	15.5052	281.9027	299.0849
C1 . 263	**12045A**	**Intelsat IS-21**					
	24-DEC-14	302.00				48	125
	23733.058993	42165.43297	0.0002413	0.0094	8.3498	265.8281	301.9961

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 264	**99071A**	**Galaxy 11**					
	25-DEC-14	304.41				48	771
	23734.408681	42165.31354	0.0000563	0.0716	253.2892	195.1387	304.4099
C1 . 265	**98037A**	**Intelsat 805**					
	24-DEC-14	304.51				48	839
	23733.420278	42165.35868	0.0002666	0.0125	297.4441	345.2789	304.4985
C1 . 266	**04031A**	**Amazonas**					
	31-DEC-14	304.61				49	532
	23740.240810	42165.56445	0.0002281	0.0039	320.1414	321.7661	304.5787
C1 . 267	**12057A**	**Intelsat IS-23**					
	22-DEC-14	307.01				48	117
	23731.425579	42166.38786	0.0001439	0.0029	324.4081	304.3161	307.0063
C1 . 268	**00072A**	**PAS 1R**					
	25-DEC-14	310.00				48	703
	23734.162002	42165.04385	0.0000613	0.0366	196.0590	45.7480	309.9981
C1 . 269	**98014A**	**Intelsat 806 (NSS 806)**					
	24-DEC-14	312.51				47	844
	23733.402616	42165.42091	0.0004342	0.0498	13.0997	257.2411	312.5031
C1 . 270	**10034A**	**Echostar XV**					
	26-DEC-14	314.91				48	235
	23735.343600	42164.96395	0.0002332	0.0234	6.5890	278.5720	314.9143
C1 . 271	**09064A**	**Intelsat IS-14**					
	26-DEC-14	315.00				48	268
	23735.109155	42164.98806	0.0002624	0.0026	359.9832	274.9231	315.0179
C1 . 272	**07044B**	**Intelsat IS-11**					
	26-DEC-14	316.97				48	373
	23735.221273	42165.06880	0.0002898	0.0247	268.6922	5.5116	317.0060
C1 . 273	**13026A**	**SES-6**					
	24-DEC-14	319.50				48	83
	23733.395613	42165.43241	0.0001872	0.0172	336.1966	301.5209	319.4956
C1 . 274	**09009A**	**Telstar 11N**					
	26-DEC-14	322.45				48	306
	23735.343900	42165.15515	0.0001407	0.0018	2.0098	283.7409	322.4400
C1 . 275	**05003A**	**AMC 12**					
	26-DEC-14	322.59				48	489
	23735.114525	42165.16019	0.0002238	0.0187	351.0791	292.8146	322.5952
C1 . 276	**02016A**	**Intelsat 903**					
	31-DEC-14	325.50				49	641
	23740.928854	42164.64269	0.0004086	0.0157	327.9380	301.4899	325.4950
C1 . 277	**10065A**	**Hylas**					
	26-DEC-14	326.50				48	215
	23735.347037	42164.68978	0.0001042	0.0204	354.0293	300.6279	326.5095

C1 .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
C1 . 278	**08034A**	**Protostar 1**					
	25-DEC-14	328.50				48	341
	23734.115718	42164.68670	0.0002444	0.0170	333.6143	272.9341	328.5307
C1 . 279	**06007A**	**Spainsat**					
	23-DEC-14	330.00				48	436
	23732.369965	42164.63540	0.0006805	0.0310	309.3498	311.4366	330.0354
C1 . 280	**02044A**	**Hispasat 1D**					
	31-DEC-14	330.00				49	614
	23740.113148	42165.25747	0.0005484	0.0231	324.9457	321.4797	329.9819
C1 . 281	**10070A**	**Hispasat 1E**					
	26-DEC-14	330.08				48	211
	23735.864688	42164.92106	0.0002333	0.0471	154.5256	82.3645	330.0186
C1 . 282	**03007A**	**Intelsat 907**					
	26-DEC-14	332.51				48	594
	23735.108773	42165.05843	0.0002808	0.0165	304.1229	308.1614	332.5158
C1 . 283	**02027A**	**Intelsat 905**					
	23-DEC-14	335.49				48	620
	23732.321620	42165.05815	0.0002425	0.0111	345.2476	248.1447	335.5050
C1 . 284	**12007A**	**SES-4**					
	29-DEC-14	338.00				49	154
	23738.240359	42165.18122	0.0001854	0.0152	345.9805	287.6070	337.9796
C1 . 285	**02019A**	**NSS-7**					
	26-DEC-14	339.70				48	648
	23735.355880	42165.11169	0.0003254	0.0415	105.3372	149.1075	340.0073
C1 . 286	**01024A**	**Intelsat 901**					
	30-DEC-14	342.00				49	695
	23739.089676	42165.00040	0.0002782	0.0196	14.2476	269.0783	341.9798
C1 . 287	**08030A**	**Skynet 5C**					
	29-DEC-14	342.20				49	345
	23738.767037	42165.23000	0.0004448	0.0657	343.8757	262.0389	342.1538
C1 . 288	**99059A**	**Orion 2**					
	26-DEC-14	345.00				48	779
	23735.150498	42164.89022	0.0002610	0.0177	289.6734	358.1119	344.9927
C1 . 289	**02040A**	**Atlantic Bird 1**					
	26-DEC-14	347.51				48	628
	23735.090463	42164.82210	0.0004341	0.0601	347.6404	312.5872	347.4958
C1 . 290	**09007A**	**Ekspress AM-44**					
	26-DEC-14	349.01				48	310
	23735.726470	42164.93592	0.0000474	0.0006	92.3298	334.0068	348.9977
C1 . 291	**01042A**	**Atlantic Bird 2**					
	26-DEC-14	351.92				48	676
	23735.346736	42164.87284	0.0005512	0.0527	335.4236	289.8338	351.9120

C1 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C1 . 292	**02038A**	**Hot Bird 6**					
	26-DEC-14	352.47				48	547
	23735.346736	42165.24486	0.0005062	0.0441	358.3374	283.5237	352.4946
C1 . 293	**11051A**	**Atlantic Bird 7**					
	26-DEC-14	352.70				48	173
	23735.346736	42165.02927	0.0003934	0.0630	358.0134	225.0302	352.7009
C1 . 294	**10037A**	**Nilesat 201**					
	24-DEC-14	353.00				48	231
	23733.198542	42165.20084	0.0004471	0.0616	183.7736	57.1208	353.0013
C1 . 295	**00046B**	**Nilesat 102**					
	26-DEC-14	353.01				48	735
	23735.088866	42164.44393	0.0004938	0.0423	298.0069	331.8447	353.0182
C1 . 296	**06033B**	**Syracuse 3B**					
	26-DEC-14	354.81				48	431
	23735.340521	42164.69006	0.0005249	0.0120	25.9359	241.0661	354.8095
C1 . 297	**02035A**	**Atlantic Bird 3**					
	26-DEC-14	355.00				48	635
	23735.340521	42165.17561	0.0005940	0.0394	342.2460	289.3210	355.0027
C1 . 298	**03059A**	**AMOS 2**					
	31-DEC-14	356.01				49	559
	23740.633495	42164.28554	0.0003196	0.0089	276.6774	351.5259	355.9736
C1 . 299	**08022A**	**Amos 3**					
	31-DEC-14	356.03				49	349
	23740.344410	42165.16664	0.0001623	0.0566	249.1054	35.9709	356.0109
C1 . 300	**04022A**	**Intelsat 10-02**					
	26-DEC-14	359.04				48	537
	23735.341134	42165.09571	0.0000710	0.0203	37.2268	291.3898	359.0342
C1 . 301	**09058B**	**Thor 6**					
	25-DEC-14	359.18				48	273
	23734.329444	42164.70380	0.0001608	0.0068	77.2724	206.0818	359.1645
C1 . 302	**08006A**	**Thor 2R**					
	31-DEC-14	359.25				49	357
	23740.341667	42164.56588	0.0002537	0.0401	246.2389	35.9967	359.2386
C1 . 303	**12035B**	**Meteosat 10**					
	31-DEC-14	359.90				49	130
	23740.859190	42164.97769	0.0000820	0.5405	149.2193	109.4082	359.4801

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

In the case where the satellite is only under longitude control, there are 87 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 35.

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 1	**02040B**	**MSG 1**					
	26-DEC-14	3.63				48	616
	23735.111759	42166.29702	0.0003035	3.2177	61.6692	174.3503	3.7849
C2 . 2	**09010A**	**Raduga-1**					
	25-DEC-14	11.80				48	307
	23734.781771	42163.57465	0.0001008	3.9460	78.5933	202.4169	11.4398
C2 . 3	**00019A**	**Sesat**					
	26-DEC-14	14.49				48	751
	23735.112025	42163.91019	0.0003110	2.5241	71.2514	205.0787	14.5105
C2 . 4	**98013A**	**Hot Bird 4**					
	25-DEC-14	15.80				48	698
	23734.265822	42165.18234	0.0004550	2.5888	71.6462	204.9337	15.7796
C2 . 5	**98063A**	**AfriStar 1**					
	31-DEC-14	21.00				49	828
	23740.162998	42164.27209	0.0004408	1.7387	72.7788	190.6142	21.0058
C2 . 6	**01029A**	**Artemis**					
	31-DEC-14	21.41				49	691
	23740.859745	42164.06661	0.0004829	11.5850	42.9939	243.7865	21.3941
C2 . 7	**13038A**	**Alphasat**					
	24-DEC-14	24.87				48	75
	23733.781944	42163.96765	0.0002085	0.6276	36.5167	234.9694	24.8614
C2 . 8	**98006B**	**Inmarsat-3 F5**					
	30-DEC-14	24.90				49	868
	23739.970556	42163.99485	0.0004745	0.7930	70.1327	203.0566	24.6072
C2 . 9	**05044A**	**Inmarsat 4 F2**					
	31-DEC-14	25.09				49	471
	23740.981123	42164.35254	0.0002867	2.4157	359.3651	275.1147	25.0724
C2 . 10	**00081A**	**Astra 2D**					
	25-DEC-14	28.13				48	616
	23734.259815	42164.09044	0.0001200	1.8969	74.6564	175.9772	28.0213
C2 . 11	**08011A**	**AMC 14**					
	31-DEC-14	29.49				48	352
	23740.223183	42164.38506	0.0043350	17.4015	77.3432	358.8719	29.4087
C2 . 12	**03043A**	**Eurobird 3**					
	26-DEC-14	30.83				48	577
	23735.211400	42164.72427	0.0000436	0.5627	80.3868	99.6007	30.7848
C2 . 13	**95055A**	**Astra 1E**					
	31-DEC-14	31.23				49	785
	23740.220058	42164.34946	0.0003762	3.7607	66.5984	212.6419	31.2048

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 14	**00054A**	**Astra 2B**					
	26-DEC-14	31.36				48	599
	23735.211400	42165.58408	0.0002734	0.3718	76.1420	194.8742	31.3586
C2 . 15	**99009B**	**Skynet 4E**					
	31-DEC-14	32.39				49	783
	23740.216678	42165.17113	0.0003206	9.1414	36.0673	230.0695	32.2941
C2 . 16	**94034A**	**Intelsat VII F-2**					
	25-DEC-14	32.95				48	1013
	23734.212153	42164.83163	0.0003143	2.7939	70.6758	214.3073	32.8908
C2 . 17	**93076A**	**NATO IVB**					
	31-DEC-14	35.05				49	995
	23740.078495	42163.93822	0.0008335	11.4141	32.0468	217.7745	33.7676
C2 . 18	**03026A**	**Thuraya 2**					
	26-DEC-14	44.04				48	593
	23735.112697	42164.93788	0.0004583	4.0916	24.6061	235.3745	44.0268
C2 . 19	**96067A**	**Hot Bird 2**					
	24-DEC-14	48.25				48	728
	23733.951505	42163.56203	0.0006643	4.7636	61.7570	207.9749	48.3141
C2 . 20	**97053A**	**Intelsat VIII F-3 (NSS 803)**					
	25-DEC-14	50.50				48	871
	23734.898831	42164.98358	0.0002856	2.0643	74.1789	185.8461	50.4763
C2 . 21	**98056B**	**Sirius 3**					
	25-DEC-14	51.21				48	818
	23734.117662	42164.27966	0.0001078	4.8950	61.1567	244.8457	51.2043
C2 . 22	**97049B**	**Meteosat 7**					
	23-DEC-14	57.50				48	883
	23732.924618	42164.81201	0.0002568	9.4025	46.1216	198.6299	57.5518
C2 . 23	**97076A**	**Astra 1G**					
	25-DEC-14	59.86				48	710
	23734.811863	42163.94074	0.0003695	0.4842	77.9626	103.5989	59.8938
C2 . 24	**96020A**	**Inmarsat 3-F1**					
	23-DEC-14	64.18				48	921
	23732.102882	42164.13052	0.0006723	2.2282	71.7717	195.4436	64.5358
C2 . 25	**97007A**	**JC-Sat 4**					
	22-DEC-14	65.80				48	902
	23731.909780	42164.27125	0.0004581	5.9473	57.3628	210.8406	65.8051
C2 . 26	**99052A**	**Telstar 7**					
	26-DEC-14	66.21				48	777
	23735.018762	42164.67997	0.0006734	1.4137	77.5384	152.4283	66.2139
C2 . 27	**90002B**	**Leasat 5**					
	25-DEC-14	72.01				48	1182
	23734.819190	42164.94910	0.0004151	11.1041	19.6266	202.4247	72.0058

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 28	**02043A**	**KALPANA-1 (METSAT-1)**					
	30-DEC-14	73.99				49	626
	23739.881424	42164.95442	0.0014428	4.7673	61.8395	211.2059	73.8205
C2 . 29	**11001A**	**Elektro-L No. 1**					
	25-DEC-14	76.03				48	208
	23734.834757	42164.15519	0.0000518	0.6209	80.8503	169.5134	75.8951
C2 . 30	**96003A**	**Mugunghwa 2 (Koreasat 2)**					
	25-DEC-14	78.04				48	918
	23734.124653	42164.48458	0.0004462	6.7502	54.8134	211.6623	78.0196
C2 . 31	**05010A**	**Ekspress AM-2**					
	26-DEC-14	80.00				48	500
	23735.789803	42164.97769	0.0001188	0.4924	83.3498	13.1119	80.0098
C2 . 32	**08019A**	**Tian Lian 1A**					
	25-DEC-14	80.03				48	353
	23734.871771	42164.45935	0.0036654	0.9691	80.1713	211.1319	80.0494
C2 . 33	**99006A**	**JC-Sat 6**					
	26-DEC-14	81.96				48	808
	23735.077604	42165.12683	0.0001377	0.4437	84.8045	174.3509	81.9446
C2 . 34	**14061A**	**IRNSS-R1C**					
	26-DEC-14	83.02				11	11
	23735.787998	42165.68725	0.0022216	4.8429	271.8068	1.1123	82.9298
C2 . 35	**95035B**	**TDRS 7**					
	30-DEC-14	84.78				49	989
	23739.075220	42166.27684	0.0019787	14.3610	25.0769	3.5528	84.5909
C2 . 36	**06053A**	**Fengyun 2D**					
	25-DEC-14	86.49				48	419
	23734.945058	42165.60286	0.0001070	2.7436	69.0663	167.7404	86.9360
C2 . 37	**00034A**	**TDRS 8**					
	24-DEC-14	89.08				48	743
	23733.816285	42165.01554	0.0005107	5.8715	64.6853	183.5306	89.2282
C2 . 38	**02042B**	**Kodama (DRTS)**					
	24-DEC-14	90.75				48	629
	23733.822130	42165.31578	0.0002330	3.3518	67.8164	216.5162	90.7400
C2 . 39	**14023A**	**Luch-5V**					
	26-DEC-14	95.06				35	35
	23735.456123	42164.35170	0.0002909	4.3729	301.7350	353.0839	95.1530
C2 . 40	**08001A**	**Thuraya 3**					
	24-DEC-14	98.63				48	361
	23733.839572	42165.19496	0.0004781	4.4552	345.8164	274.0288	98.6492
C2 . 41	**06038A**	**Zhongxing-22A (FengHuo 1, FH-1)**					
	31-DEC-14	101.52				49	432
	23740.951123	42165.35728	0.0004392	4.1727	63.9354	182.7386	101.4785

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 42	**03052A**	**Zhongxing-20 (ShenTong 1, ST-1)**					
	26-DEC-14	103.26				48	571
	23735.888912	42164.59699	0.0004784	1.7185	75.8259	207.3472	103.2903
C2 . 43	**08066A**	**Fengyun 2E**					
	26-DEC-14	104.35				48	317
	23735.713009	42165.35503	0.0000537	2.2880	58.0677	288.8836	104.5509
C2 . 44	**99013A**	**Asiasat 3S**					
	26-DEC-14	120.07				48	806
	23735.878808	42165.68360	0.0004228	0.6697	82.5979	176.5979	120.1176
C2 . 45	**00011A**	**Garuda 1**					
	31-DEC-14	123.01				49	755
	23740.960336	42167.18608	0.0003899	1.0644	208.3416	83.2498	122.8572
C2 . 46	**02035B**	**N-Star 3 (N-Star c)**					
	30-DEC-14	135.98				49	634
	23739.637199	42164.71810	0.0003410	2.9169	70.5833	222.3166	135.9901
C2 . 47	**05009A**	**Inmarsat 4 F1**					
	31-DEC-14	143.50				49	505
	23740.889444	42164.96227	0.0003232	2.7387	359.4962	273.5719	143.4930
C2 . 48	**00013A**	**Ekspress 2A**					
	25-DEC-14	145.04				48	763
	23734.936053	42163.95896	0.0013316	7.5676	52.1308	118.3111	145.1548
C2 . 49	**06059A**	**Kiku-8 (ETS VIII)**					
	31-DEC-14	145.86				49	413
	23740.886678	42165.68977	0.0005110	3.9080	65.1314	218.4498	145.6723
C2 . 50	**96063B**	**MEASAT 2**					
	24-DEC-14	148.02				48	923
	23733.140787	42164.77669	0.0007408	5.9851	57.1335	165.6118	148.0745
C2 . 51	**97075A**	**JC-Sat 5**					
	25-DEC-14	150.00				48	863
	23734.394097	42165.34326	0.0006082	3.9131	64.9923	193.9071	149.9831
C2 . 52	**96030A**	**Palapa C2**					
	31-DEC-14	150.34				49	922
	23740.609641	42165.44615	0.0001715	3.9067	65.1137	214.5109	145.9998
C2 . 53	**97046A**	**PAS 5**					
	26-DEC-14	157.02				48	862
	23735.814086	42164.97152	0.0001850	1.7589	75.7991	205.2764	156.9894
C2 . 54	**94055A**	**Optus B3**					
	26-DEC-14	164.02				48	1019
	23735.628958	42164.85658	0.0005793	5.8859	57.5275	209.8984	164.1736
C2 . 55	**11032A**	**Tian Lian 1B**					
	26-DEC-14	167.00				48	184
	23735.818843	42164.65474	0.0033161	0.7507	81.1732	186.1603	166.9798

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 56	**96070A**	**Inmarsat 3-F3**					
	26-DEC-14	178.08				48	925
	23735.321435	42165.02030	0.0006216	1.6388	76.3374	195.3517	178.0914
C2 . 57	**02015B**	**Astra 3A**					
	26-DEC-14	183.15				48	611
	23735.470382	42164.58858	0.0001085	2.0735	73.5297	172.8204	183.1227
C2 . 58	**02055A**	**TDRS 10**					
	22-DEC-14	185.68				48	605
	23731.520984	42163.53120	0.0010639	3.4010	62.5569	203.9021	185.5952
C2 . 59	**91054B**	**TDRS 5**					
	31-DEC-14	192.41				49	1177
	23740.529236	42165.94770	0.0015077	13.5481	31.4213	318.1011	192.3087
C2 . 60	**98070A**	**Satmex 5**					
	26-DEC-14	243.41				48	823
	23735.475903	42164.85714	0.0004280	1.3451	78.3335	188.0041	245.0963
C2 . 61	**09035A**	**Terrestar 1**					
	30-DEC-14	249.00				49	291
	23739.487384	42164.72174	0.0002973	3.6843	331.2260	293.8697	248.9961
C2 . 62	**96022A**	**MSAT**					
	26-DEC-14	253.50				48	960
	23735.411481	42164.62334	0.0006898	6.2759	56.2584	208.4661	253.4832
C2 . 63	**95019A**	**AMSC-1**					
	26-DEC-14	258.49				48	997
	23735.401817	42164.58718	0.0006042	8.7768	48.6075	198.8973	256.6958
C2 . 64	**08039A**	**Inmarsat 4 F3**					
	26-DEC-14	262.35				48	337
	23735.423727	42164.81257	0.0003053	3.0053	352.8515	272.1053	262.0254
C2 . 65	**00038A**	**EchoStar 6**					
	29-DEC-14	263.81				49	742
	23738.907650	42165.08815	0.0001995	2.4417	72.2122	217.0232	263.7661
C2 . 66	**08016A**	**ICO G1**					
	30-DEC-14	267.15				49	352
	23739.376354	42164.53616	0.0004187	4.2187	345.6386	295.4255	267.1530
C2 . 67	**98006A**	**Brazilsat B-3A**					
	30-DEC-14	268.01				49	855
	23739.592558	42164.11595	0.0003052	2.2913	73.7459	218.2842	267.9764
C2 . 68	**97002A**	**GE 2**					
	26-DEC-14	279.16				48	910
	23735.324039	42164.71670	0.0004658	2.6131	71.1012	198.3308	279.1475
C2 . 69	**90021A**	**Intelsat VI F-3**					
	30-DEC-14	279.41				49	1197
	23739.355081	42164.03157	0.0005300	10.5334	43.2796	175.0198	279.5070

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 70	**99033A**	**Astra 1H**					
	23-DEC-14	292.41				48	649
	23732.342824	42165.10160	0.0004667	2.0454	74.3828	184.5791	292.4072
C2 . 71	**94070A**	**Astra 1D**					
	22-DEC-14	292.41				48	913
	23731.898877	42164.79379	0.0001188	6.0648	56.6559	254.4304	292.3941
C2 . 72	**95016A**	**Brazilsat B2**					
	30-DEC-14	296.80				49	976
	23739.094711	42165.45736	0.0002071	5.7020	58.3521	211.8502	296.7584
C2 . 73	**88091B**	**TDRS-West**					
	25-DEC-14	297.64				48	1189
	23734.353808	42164.44898	0.0038814	14.5076	17.9309	297.3034	297.7713
C2 . 74	**97027A**	**Inmarsat 3-F4**					
	30-DEC-14	306.01				49	895
	23739.467257	42164.09688	0.0005032	4.1434	63.3759	228.8603	305.9862
C2 . 75	**14004A**	**TDRS 12**					
	23-DEC-14	311.17				48	49
	23732.819248	42168.44922	0.0003498	6.7920	337.8036	307.1775	310.6504
C2 . 76	**93003B**	**TDRS 6**					
	26-DEC-14	314.10				48	1090
	23735.101701	42164.30264	0.0005995	12.9976	34.3096	279.2515	314.2420
C2 . 77	**00043A**	**PAS 9**					
	25-DEC-14	316.91				48	739
	23734.325359	42164.56251	0.0002290	1.7421	76.1436	181.3732	316.8985
C2 . 78	**02011A**	**TDRS 9**					
	26-DEC-14	319.01				48	653
	23735.160081	42163.76134	0.0008070	3.3774	93.9722	291.8712	319.0767
C2 . 79	**01005B**	**Skynet 4F**					
	31-DEC-14	326.01				49	699
	23740.928854	42165.28270	0.0003342	7.7074	43.5856	219.6880	325.9628
C2 . 80	**93066A**	**Intelsat VII F-1**					
	23-DEC-14	330.50				48	1042
	23732.237419	42165.04778	0.0004256	2.4418	72.2249	208.3899	330.4996
C2 . 81	**98052A**	**PAS 7**					
	25-DEC-14	341.80				48	829
	23734.849954	42165.55576	0.0007498	1.3412	79.0298	213.1597	341.7820
C2 . 82	**12061A**	**Luch-5B**					
	26-DEC-14	343.99				48	111
	23735.150498	42165.45063	0.0004955	1.7180	83.3761	152.2867	343.9758
C2 . 83	**96053A**	**Inmarsat 3-F2**					
	26-DEC-14	344.51				48	933
	23735.292442	42164.71417	0.0007331	0.7881	82.4551	180.7927	344.5250

C2 .nn	COSPAR	NAME					
	Date	$\overline{\lambda}$				N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
C2 . 84	**02029A**	**Ekspress A1R (Express 4A)**					
	26-DEC-14	346.01				48	647
	23735.796574	42164.86920	0.0003708	4.4533	63.0048	153.6847	346.0197
C2 . 85	**98035A**	**Thor III**					
	26-DEC-14	355.70				48	832
	23735.111574	42164.85771	0.0002577	3.8096	65.2231	191.1256	355.6967
C2 . 86	**97042A**	**Agila 2**					
	26-DEC-14	356.96				48	877
	23735.027269	42164.55298	0.0003350	3.1820	69.1211	204.7663	356.9775
C2 . 87	**90079A**	**Skynet 4C**					
	25-DEC-14	358.80				48	1161
	23734.330046	42164.08932	0.0003845	13.1717	25.6248	247.0074	358.8019

3.3 Objects in a drift orbit

In the case where the object is in a drift orbit, there are 604 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 35.

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**					
	29-DEC-14	-36.83	3135.843	3019.619	3252.067	49	331
	23738.090347	45299.99433	0.0023693	13.4909	322.6067	337.6339	293.9780
D . 2	**68116A**	**Intelsat III F-2**					
	22-DEC-14	-36.29	3085.634	2632.824	3538.443	48	327
	23731.248831	45249.89523	0.0096550	13.3554	325.6241	350.6070	238.7505
D . 3	**14010C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	31-DEC-14	-34.90	2957.009	-93.069	6007.086	41	41
	23740.718102	45120.85215	0.0677064	0.5265	74.9103	336.3813	7.3127
D . 4	**14058B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	26-DEC-14	-30.91	2593.105	39.872	5146.338	13	13
	23735.218218	44756.91015	0.0570617	0.2049	44.6012	148.1661	185.3036
D . 5	**14023C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	26-DEC-14	-27.83	2316.173	-255.942	4888.287	34	34
	23735.323264	44480.12549	0.0579561	1.3196	24.1532	161.0105	175.0521
D . 6	**06048A**	**Xinnuo 2**					
	25-DEC-14	-26.69	2215.047	2036.529	2393.565	48	419
	23734.018252	44377.53297	0.0041335	4.4072	110.3808	159.2483	10.5072
D . 7	**97040A**	**PAS 6**					
	24-DEC-14	-23.67	1950.006	-1118.053	5018.065	48	515
	23733.925949	44114.33975	0.0693193	13.9552	353.1950	154.6275	107.4356
D . 8	**78113D**	**Titan IIIC stage 3 (Transtage 36)**					
	30-DEC-14	-23.46	1931.728	730.724	3132.731	49	1022
	23739.421308	44095.87448	0.0268357	17.8798	345.9939	320.1925	156.0893
D . 9	**78113A**	**OPS 9441 (DSCS II F-11)**					
	25-DEC-14	-22.47	1845.513	1728.103	1962.923	48	1147
	23734.636157	44009.79097	0.0026963	16.8981	351.1942	103.5200	207.9733
D . 10	**85024A**	**Ekran 14**					
	23-DEC-14	-19.72	1608.701	1533.472	1683.930	48	1133
	23732.180266	43772.69666	0.0019782	17.0238	357.6330	252.4623	197.8428
D . 11	**84115A**	**NATO IIID**					
	30-DEC-14	-19.15	1560.205	1126.960	1993.449	49	1165
	23739.850428	43724.26137	0.0099544	13.5856	25.3324	30.9261	342.2557
D . 12	**73100D**	**Titan IIIC stage 3 (Transtage 26)**					
	31-DEC-14	-18.99	1547.008	367.597	2726.420	49	1048
	23740.557454	43711.37352	0.0261752	15.3940	330.2586	14.5714	200.1510
D . 13	**83016A**	**Ekran 10**					
	25-DEC-14	-18.88	1537.267	1389.871	1684.663	48	1127
	23734.885266	43701.44605	0.0031918	16.9127	349.1007	277.7336	70.4476

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	**81122A**	**Marecs A**					
	27-DEC-14	-18.84	1534.100	1017.564	2050.636	49	1155
	23736.909549	43698.32227	0.0119553	15.6773	1.8155	161.0926	123.7848
D . 15	**82106A**	**DSCS II F-16**					
	29-DEC-14	-18.66	1518.644	1499.648	1537.641	49	1197
	23738.160359	43683.01247	0.0004544	16.3586	1.5744	139.1975	238.7435
D . 16	**08006C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	31-DEC-14	-18.55	1509.152	368.182	2650.122	49	199
	23740.436956	43673.37780	0.0264483	6.3361	43.7431	215.0050	224.4444
D . 17	**88036A**	**Ekran 18**					
	29-DEC-14	-18.34	1491.371	1445.447	1537.295	49	1120
	23738.881539	43655.57921	0.0008969	16.5753	7.7156	341.3706	312.0917
D . 18	**14064B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	25-DEC-14	-18.19	1478.340	-915.405	3872.084	10	10
	23734.853148	43642.15891	0.0552920	0.8622	276.7550	298.0126	314.8476
D . 19	**77005A**	**NATO IIIB**					
	24-DEC-14	-18.01	1463.833	1272.544	1655.123	48	1130
	23733.386586	43628.31020	0.0043200	15.0146	345.0181	302.7333	253.0946
D . 20	**79098C**	**Titan IIIC stage 3 (Transtage 37)**					
	24-DEC-14	-17.84	1448.871	75.136	2822.607	47	1121
	23733.409664	43613.15832	0.0310143	17.1523	346.6280	325.2448	237.5484
D . 21	**77034B**	**OPS 9438 (DSCS II F-8)**					
	30-DEC-14	-17.45	1415.981	1263.972	1567.991	49	1103
	23739.242130	43580.16584	0.0031520	16.4024	341.1292	48.5679	282.1958
D . 22	**08022B**	**Zenit-3SLB third stage (Blok-DM-SL-B)**					
	30-DEC-14	-17.06	1383.330	-822.930	3589.591	49	343
	23739.615150	43547.62526	0.0518324	6.4937	61.8210	317.9103	267.0817
D . 23	**77034C**	**Titan IIIC stage 3 (Transtage 32)**					
	31-DEC-14	-16.97	1375.493	67.159	2683.827	49	1132
	23740.271713	43540.73682	0.0296320	16.6770	338.9173	351.2790	341.9576
D . 24	**79098A**	**OPS 9443 (DSCS II F-13)**					
	29-DEC-14	-16.83	1363.568	1322.057	1405.079	48	1160
	23738.499201	43527.92242	0.0006147	16.4334	350.6476	32.8508	230.6031
D . 25	**87109A**	**Ekran 17**					
	30-DEC-14	-15.81	1277.554	1094.182	1460.926	49	1111
	23739.914120	43442.09046	0.0044220	16.2094	10.2095	134.3131	38.9350
D . 26	**76053A**	**Marisat 2**					
	25-DEC-14	-15.75	1272.542	731.077	1814.008	47	1132
	23734.142951	43436.71777	0.0127060	15.3464	340.2286	222.7718	26.1887
D . 27	**84114B**	**Marecs B2**					
	22-DEC-14	-15.64	1263.998	760.070	1767.926	48	1202
	23731.091852	43428.18891	0.0113025	16.5106	9.0586	305.1430	27.7984

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 28	**87028A**	**Raduga 20**					
	24-DEC-14	-15.52	1253.501	1131.715	1375.286	48	1074
	23733.994433	43417.97531	0.0026174	17.0122	5.7707	69.9911	99.0204
D . 29	**84090A**	**Ekran 13**					
	24-DEC-14	-15.30	1235.362	1167.202	1303.523	48	1154
	23733.266019	43399.08010	0.0018053	16.4648	354.3236	107.5006	347.9071
D . 30	**97029A**	**Fengyun 2A (Fengyun 2-1R)**					
	23-DEC-14	-15.20	1226.832	807.661	1646.002	48	888
	23732.606759	43391.28466	0.0100709	12.5596	39.9899	131.9802	87.0149
D . 31	**84028A**	**Ekran 12**					
	25-DEC-14	-15.17	1224.008	1182.846	1265.170	48	1128
	23734.397789	43387.92182	0.0005174	16.4420	351.0753	67.1512	313.0761
D . 32	**91084B**	**Inmarsat 2-F3**					
	26-DEC-14	-15.16	1223.308	1171.305	1275.311	48	1084
	23735.322697	43387.67822	0.0009532	10.1299	42.0294	349.8145	227.1239
D . 33	**87073A**	**Ekran 16**					
	25-DEC-14	-13.64	1096.845	1076.791	1116.899	48	1049
	23734.944456	43261.19187	0.0004814	16.1596	3.9202	144.1892	111.2044
D . 34	**86038A**	**Ekran 15**					
	25-DEC-14	-13.42	1078.344	1025.356	1131.332	48	1096
	23734.073669	43242.70679	0.0010737	16.2259	359.0875	252.7814	258.2027
D . 35	**88108A**	**Ekran 19**					
	26-DEC-14	-13.04	1046.613	922.022	1171.205	48	1192
	23735.002731	43211.03416	0.0029198	15.9403	12.4047	111.1842	116.6805
D . 36	**77034A**	**OPS 9437 (DSCS II F-7)**					
	25-DEC-14	-12.96	1040.333	965.513	1115.153	48	1088
	23734.795012	43204.41807	0.0018975	16.1122	337.8013	243.5543	139.4479
D . 37	**86090A**	**Gorizont 13**					
	31-DEC-14	-12.77	1025.015	959.286	1090.744	49	1106
	23740.927801	43188.95693	0.0015746	16.0006	4.6745	250.9786	10.4315
D . 38	**88051A**	**Meteosat 3**					
	25-DEC-14	-11.97	958.925	935.080	982.770	48	1163
	23734.849954	43122.93912	0.0003960	15.6630	18.1675	248.0434	340.9074
D . 39	**85028C**	**Leasat 3**					
	26-DEC-14	-11.92	954.434	624.820	1284.047	48	1222
	23735.458600	43118.89811	0.0079057	17.6973	350.5202	189.8468	96.4106
D . 40	**92060B**	**Satcom C-3**					
	31-DEC-14	-11.75	940.194	840.447	1039.940	49	1125
	23740.506030	43103.99142	0.0023563	8.7912	49.9837	271.1477	140.7152
D . 41	**89020B**	**Meteosat 4**					
	23-DEC-14	-11.39	910.954	826.516	995.392	48	1133
	23732.172512	43075.22058	0.0019100	15.3346	22.8208	98.4723	29.3514

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 42	**96030B**	**AMOS 1**					
	25-DEC-14	-11.36	908.707	861.178	956.236	48	948
	23734.394560	43072.53953	0.0009698	5.4368	60.6994	105.5743	167.9020
D . 43	**95040A**	**PAS 4**					
	25-DEC-14	-11.33	905.966	805.159	1006.772	48	934
	23734.396238	43070.24676	0.0027791	4.0631	65.9405	144.1190	231.4689
D . 44	**92032A**	**Intelsat K (NSS K)**					
	31-DEC-14	-11.14	890.216	506.133	1274.299	49	1102
	23740.588912	43054.08010	0.0085903	10.8477	45.7949	251.8660	115.2318
D . 45	**71095C**	**Titan IIIC stage 3 (Transtage 21)**					
	29-DEC-14	-11.11	887.607	209.853	1565.361	49	1111
	23738.620532	43051.56654	0.0151224	12.5337	322.8199	68.0583	162.0565
D . 46	**84023A**	**Intelsat V F-8**					
	31-DEC-14	-10.74	857.486	767.837	947.136	49	1222
	23740.513113	43021.57587	0.0018729	15.7053	14.0578	117.0116	92.2414
D . 47	**00003A**	**Zhongxing-22 (FengHuo 1, FH-1)**					
	24-DEC-14	-10.62	848.129	835.551	860.708	48	772
	23733.194271	43012.01888	0.0006148	5.6535	57.4759	194.7614	350.7867
D . 48	**98024A**	**Nilesat 101**					
	26-DEC-14	-10.37	827.255	728.066	926.444	48	846
	23735.015810	42991.65975	0.0028951	1.6546	76.7477	188.2328	97.0149
D . 49	**89070A**	**Himawari-4**					
	25-DEC-14	-10.30	821.858	624.134	1019.582	48	1183
	23734.529363	42986.06868	0.0045099	15.1475	23.3576	40.6400	119.9478
D . 50	**84093C**	**Leasat 2**					
	30-DEC-14	-10.14	808.809	676.862	940.757	49	1205
	23739.397766	42973.12339	0.0033225	16.7102	353.0627	168.6130	295.7363
D . 51	**85107F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	-10.00	797.156	713.266	881.045	48	1094
	23733.181238	42961.33819	0.0014609	15.7182	359.6266	19.7317	28.6284
D . 52	**73100B**	**OPS 9434 (DSCS II F-4)**					
	24-DEC-14	-9.92	790.371	491.219	1089.524	48	1135
	23733.375775	42954.66543	0.0069956	13.5146	328.2283	324.9145	296.8805
D . 53	**78073F**	**Proton-K/DM fourth stage (Blok-DM)**					
	29-DEC-14	-9.74	775.663	708.799	842.526	49	1121
	23738.287257	42939.61447	0.0012687	14.8289	333.5680	69.8812	139.7775
D . 54	**82113F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-9.73	774.753	678.743	870.764	49	1112
	23739.569016	42939.48186	0.0025551	15.5494	349.4209	174.7878	254.8986
D . 55	**76101A**	**Marisat 3**					
	29-DEC-14	-9.66	769.266	347.065	1191.467	49	1187
	23738.452963	42933.21380	0.0102534	12.9230	340.3371	249.0554	192.1903

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 56	**86082F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	-9.63	766.759	647.806	885.712	48	1038
	23733.617778	42931.49759	0.0026655	15.7006	2.8333	67.7803	102.0498
D . 57	**83088F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-9.57	761.944	692.339	831.549	49	1116
	23740.162928	42926.24531	0.0012827	15.7510	351.9814	43.4257	18.3086
D . 58	**83066F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-9.56	761.231	714.719	807.742	49	1114
	23740.338576	42925.76423	0.0010295	15.6880	351.7103	95.8752	302.9329
D . 59	**69013B**	**Titan IIIC stage 3 (Transtage 17)**					
	26-DEC-14	-9.55	760.831	201.419	1320.244	48	1052
	23735.330093	42928.41516	0.0146741	8.3799	311.5386	98.3344	99.7328
D . 60	**80016D**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-14	-9.54	759.929	696.162	823.696	48	1138
	23734.116887	42924.02677	0.0017990	15.2180	337.9242	181.8084	17.2396
D . 61	**09007D**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	24-DEC-14	-9.51	757.514	-66.894	1581.923	48	306
	23733.485417	42921.46004	0.0195117	4.9635	64.4522	323.2350	195.3676
D . 62	**73100A**	**OPS 9433 (DSCS II F-3)**					
	30-DEC-14	-9.43	750.366	623.315	877.418	49	1040
	23739.344757	42914.28567	0.0030955	14.0626	327.0664	123.1569	331.4749
D . 63	**87040A**	**Gorizont 14**					
	31-DEC-14	-9.42	749.624	624.059	875.190	49	1150
	23740.958796	42914.09554	0.0030645	15.7938	357.2172	107.4874	70.0972
D . 64	**81027F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-9.40	748.117	673.193	823.042	49	1115
	23739.876528	42912.51335	0.0018171	15.6457	340.6566	112.5073	101.9420
D . 65	**79062D**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-9.37	746.195	725.782	766.608	49	1080
	23739.100162	42910.20725	0.0006687	15.2340	337.4129	164.3797	325.5122
D . 66	**86044F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-14	-9.37	745.913	702.213	789.612	48	1130
	23735.276863	42910.17621	0.0010942	15.6519	1.7674	108.8735	350.2676
D . 67	**96005D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-9.36	744.632	689.395	799.868	49	895
	23739.480174	42909.37077	0.0014050	13.7222	33.4759	86.2742	240.6263
D . 68	**86027F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-14	-9.30	740.208	584.898	895.518	48	1119
	23735.455521	42904.92283	0.0033381	16.2465	1.0465	39.5659	109.1189
D . 69	**81069F**	**Proton-K/DM fourth stage (Blok-DM)**					
	21-DEC-14	-9.27	737.399	644.019	830.780	48	1117
	23730.878252	42901.37971	0.0020364	15.5340	342.2022	85.2944	158.4294

D .nn	COSPAR	NAME					
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D . 70	**82113A**	**Raduga 11**					
	28-DEC-14	-9.24	734.970	557.655	912.286	49	1054
	23737.106875	42898.87519	0.0043562	15.4335	349.7283	178.6171	19.5722
D . 71	**77071F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-9.13	725.948	676.902	774.994	49	1095
	23740.051528	42890.52039	0.0007411	14.3179	330.5094	37.7861	298.5087
D . 72	**01045A**	**Raduga 1-6**					
	23-DEC-14	-9.10	724.197	650.779	797.616	48	675
	23732.538449	42888.10814	0.0017970	10.1105	47.8754	102.4664	140.8144
D . 73	**88028D**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-8.96	712.741	621.207	804.275	49	1132
	23740.095336	42876.60417	0.0017997	15.9499	8.0888	25.5858	32.8204
D . 74	**85076D**	**Leasat 4**					
	30-DEC-14	-8.91	708.221	682.586	733.856	49	1106
	23739.579537	42872.91550	0.0007067	13.9463	1.4984	238.7614	80.7249
D . 75	**86007F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-8.91	708.130	573.952	842.308	48	1116
	23740.438426	42873.06572	0.0031416	15.6994	359.6680	72.4707	279.5240
D . 76	**77108D**	**Mage 1 (Meteosat 1 AKM)**					
	29-DEC-14	-8.89	706.623	327.351	1085.894	49	711
	23738.813519	42871.41512	0.0082903	14.9726	331.0697	28.6195	122.3965
D . 77	**85070F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	-8.89	706.520	655.865	757.174	48	1122
	23733.362373	42870.57001	0.0010974	15.6578	358.3538	87.8119	184.8883
D . 78	**88028A**	**Gorizont 15**					
	25-DEC-14	-8.81	700.021	550.687	849.355	48	1157
	23734.782905	42863.62515	0.0035777	15.8990	8.3593	87.7369	349.5773
D . 79	**92043D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-8.79	698.408	590.557	806.259	48	1004
	23739.129028	42863.08127	0.0025468	15.0142	23.2431	89.0774	51.6307
D . 80	**89101G**	**Cosmos 2054 debris**					
	26-DEC-14	-8.72	693.294	562.771	823.817	46	744
	23735.158472	42857.76901	0.0031608	15.4446	14.3697	215.4557	46.7639
D . 81	**89098D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-8.71	692.055	613.625	770.486	49	1086
	23740.146238	42857.04866	0.0019024	15.6997	14.4492	86.7644	48.5455
D . 82	**90102D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-8.66	688.047	606.736	769.358	47	1043
	23733.356852	42852.67002	0.0019886	15.3395	17.5162	104.5924	282.7377
D . 83	**89048D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-8.57	681.141	586.045	776.237	48	1052
	23740.948981	42845.67346	0.0020078	15.4914	12.4927	42.9802	110.6257

D .nn	COSPAR	NAME					
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D . 84	**89030D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-8.46	671.620	595.958	747.282	49	1120
	23740.438299	42836.75803	0.0018771	15.4307	11.6902	100.3124	273.2986
D . 85	**80049F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-8.41	667.722	541.314	794.129	49	1132
	23739.376215	42832.38894	0.0030305	15.3293	339.7755	108.3429	261.2375
D . 86	**88095F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-8.40	667.290	606.795	727.785	49	1111
	23740.728912	42831.23584	0.0016941	15.5099	10.1410	153.8259	12.5794
D . 87	**95067A**	**Telecom 2C**					
	24-DEC-14	-8.40	666.866	604.860	728.873	48	967
	23733.979028	42830.71223	0.0018584	9.5021	47.8117	195.5602	358.9279
D . 88	**92021B**	**Inmarsat 2-F4**					
	31-DEC-14	-8.39	665.959	637.589	694.328	49	1104
	23740.437928	42830.60465	0.0002076	8.3062	38.1564	79.6778	258.5411
D . 89	**90116D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-8.38	665.691	519.678	811.705	48	1104
	23733.991563	42830.57667	0.0029896	15.3161	17.9043	349.6568	112.5860
D . 90	**96034D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-8.37	664.956	529.339	800.572	49	910
	23740.576053	42829.51872	0.0028590	13.5693	34.2391	353.9097	108.8767
D . 91	**88018B**	**Telecom 1C**					
	26-DEC-14	-8.34	662.254	237.613	1086.895	48	1093
	23735.144583	42826.81803	0.0098770	14.8949	26.6421	45.2570	53.8771
D . 92	**01014C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	25-DEC-14	-8.31	659.520	-80.616	1399.656	48	687
	23734.191111	42824.21947	0.0170067	10.6578	50.1484	125.7032	263.9653
D . 93	**94008D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-8.30	658.951	565.823	752.078	49	973
	23740.505718	42823.42069	0.0018139	14.5928	28.1584	316.1018	129.2039
D . 94	**89004F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	29-DEC-14	-8.20	650.938	549.421	752.454	49	1123
	23738.660741	42816.01631	0.0020743	15.4448	10.9773	26.0061	250.2020
D . 95	**93013D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-8.14	645.753	574.679	716.828	48	954
	23733.325417	42809.87707	0.0014577	14.8664	25.4309	23.0960	290.9689
D . 96	**91087D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-8.11	643.780	566.623	720.937	49	1006
	23739.240382	42808.52982	0.0014450	15.1729	21.1587	324.2602	297.4531
D . 97	**92082D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	-8.10	642.493	598.563	686.423	48	997
	23734.261250	42806.54102	0.0006516	14.9365	24.1547	5.4598	12.1478

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 . 98	**99010D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	-8.02	636.330	549.702	722.958	48	768
	23735.322130	42800.63160	0.0020641	13.3108	43.3406	224.4856	205.2414
D . 99	**04042A**	**Fengyun 2C**					
	30-DEC-14	-7.88	625.000	611.000	641.000	49	526
	23739.967604	42789.49505	0.0002998	5.8144	57.2725	253.2228	329.4554
D . 100	**96053D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-7.85	622.665	406.011	839.319	49	823
	23739.435787	42786.12953	0.0054392	12.5330	38.8165	205.6485	170.0075
D . 101	**97031A**	**Intelsat VIII F-2**					
	25-DEC-14	-7.79	617.927	511.354	724.500	48	883
	23734.506343	42781.71839	0.0029005	3.2894	67.6568	191.2917	180.1884
D . 102	**94012D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-7.79	617.866	471.182	764.550	49	949
	23740.889444	42781.71723	0.0032242	14.5291	28.0038	16.6883	144.2361
D . 103	**88012A**	**Sakura 3A**					
	31-DEC-14	-7.69	609.912	576.440	643.383	49	1113
	23740.575648	42774.64876	0.0009328	14.5813	29.0705	218.1382	92.5053
D . 104	**88063B**	**Eutelsat I F-5 (ECS 5)**					
	30-DEC-14	-7.59	601.664	547.676	655.652	49	1079
	23739.256759	42765.89483	0.0009607	15.0165	23.0603	57.1076	218.0726
D . 105	**83088A**	**Raduga 13**					
	24-DEC-14	-7.56	599.169	527.430	670.908	48	1038
	23733.394722	42762.99565	0.0013351	15.5047	351.5796	318.4989	135.7674
D . 106	**69069C**	**JPL SR-28-3 (ATS 5 AKM)**					
	26-DEC-14	-7.54	597.334	38.538	1156.130	47	886
	23735.387072	42760.69827	0.0132413	10.0253	316.6778	186.8680	154.8991
D . 107	**00052A**	**Eutelsat W1**					
	24-DEC-14	-7.54	597.262	561.402	633.123	48	727
	23733.824688	42761.99036	0.0013549	2.7999	74.9236	185.0466	71.5819
D . 108	**00049D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	23-DEC-14	-7.50	594.409	523.035	665.783	48	712
	23732.538229	42757.98054	0.0013627	10.8698	44.0642	268.1671	132.2088
D . 109	**89101D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-7.29	577.030	532.951	621.108	48	1074
	23733.133090	42742.06551	0.0012047	15.3211	14.2097	127.8649	238.5815
D . 110	**76023J**	**LES 8, LES 9 operational debris**					
	25-DEC-14	-7.25	573.900	-39.095	1186.895	48	897
	23734.229144	42738.33872	0.0152943	12.9493	105.1252	329.7532	285.9120
D . 111	**76023F**	**Titan IIIC stage 3 (Transtage 30)**					
	25-DEC-14	-7.24	573.476	-28.670	1175.622	48	1099
	23734.133831	42737.10060	0.0150881	12.9503	105.1093	330.7020	4.3719

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 112	**83118A**	**Gorizont 8**					
	30-DEC-14	-7.22	571.494	459.635	683.352	49	1046
	23739.805845	42735.01746	0.0026692	15.3450	352.7234	82.4380	166.8016
D . 113	**91001A**	**NATO IVA**					
	25-DEC-14	-7.16	567.195	541.153	593.237	48	1153
	23734.195069	42731.66061	0.0005533	12.3941	25.7243	143.4023	230.4591
D . 114	**85025A**	**Intelsat VA F-10**					
	24-DEC-14	-7.15	566.322	430.658	701.986	48	1206
	23733.824780	42731.32178	0.0032468	15.2556	17.4456	263.6865	56.4608
D . 115	**88109B**	**Astra 1A**					
	30-DEC-14	-6.97	551.834	483.113	620.554	49	1092
	23739.320255	42715.90761	0.0012382	11.7348	40.7243	14.5733	305.1302
D . 116	**83066A**	**Gorizont 7**					
	29-DEC-14	-6.94	548.836	501.166	596.505	49	1059
	23738.201644	42713.16427	0.0012805	15.3316	351.2090	227.9744	227.5232
D . 117	**79098B**	**OPS 9444 (DSCS II F-14)**					
	31-DEC-14	-6.92	547.742	526.555	568.930	49	1139
	23740.878692	42712.04118	0.0001093	15.2629	346.1197	331.9493	115.2454
D . 118	**84081B**	**Telecom 1A**					
	24-DEC-14	-6.74	532.846	379.358	686.334	48	1099
	23733.408241	42698.16221	0.0034399	15.4435	10.9814	292.3084	260.0295
D . 119	**82097A**	**Intelsat V F-5**					
	30-DEC-14	-6.71	530.925	428.287	633.563	49	1170
	23739.668750	42695.34160	0.0022307	15.3291	7.8826	293.6309	126.9555
D . 120	**99018A**	**Eutelsat W3**					
	29-DEC-14	-6.64	525.173	511.913	538.433	49	800
	23738.813900	42689.45544	0.0003217	1.6490	76.5174	199.8258	44.5726
D . 121	**90056A**	**Intelsat VI F-4**					
	30-DEC-14	-6.62	523.615	497.831	549.398	49	1101
	23739.225255	42688.19224	0.0007297	10.9086	44.1832	210.6567	281.2553
D . 122	**78113B**	**OPS 9442 (DSCS II F-12)**					
	31-DEC-14	-6.59	521.450	493.250	549.650	49	1111
	23740.890069	42685.92801	0.0005070	15.2567	344.5259	96.1975	37.1275
D . 123	**91074A**	**Gorizont 24**					
	24-DEC-14	-6.59	521.151	441.697	600.605	48	1136
	23733.391574	42684.78127	0.0021772	14.9575	20.4532	154.7444	153.8522
D . 124	**96044B**	**Telecom 2D**					
	24-DEC-14	-6.57	519.702	458.797	580.607	48	913
	23733.466620	42683.77450	0.0016250	7.3043	53.4591	259.5013	310.6685
D . 125	**91015B**	**Meteosat 5**					
	25-DEC-14	-6.56	518.679	494.111	543.247	48	1159
	23734.035382	42682.59178	0.0009913	14.3845	26.8408	172.8263	11.6639

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 126	**98057A**	**Hot Bird 5**					
	26-DEC-14	-6.54	517.271	482.101	552.441	48	776
	23735.504815	42681.47879	0.0006434	1.6210	76.0901	289.6759	211.7883
D . 127	**86082A**	**Raduga 19**					
	24-DEC-14	-6.53	516.128	467.099	565.156	48	1138
	23733.053160	42680.80195	0.0011012	15.3367	2.2572	95.8057	95.2507
D . 128	**96015A**	**Intelsat VIIA F-2**					
	24-DEC-14	-6.45	509.981	229.265	790.697	48	944
	23733.184016	42674.38289	0.0066094	1.7201	75.9073	253.3636	39.4742
D . 129	**89021B**	**TDRS 4**					
	26-DEC-14	-6.45	509.502	452.714	566.291	48	1216
	23735.106076	42673.96950	0.0019644	12.1808	25.4784	222.2515	289.3903
D . 130	**78106A**	**NATO IIIC**					
	30-DEC-14	-6.44	508.711	488.255	529.168	49	1128
	23739.442072	42673.57461	0.0006356	14.8678	352.2978	219.3935	115.1640
D . 131	**91015A**	**Astra 1B**					
	30-DEC-14	-6.35	501.702	477.836	525.569	49	977
	23739.670139	42665.35504	0.0008194	7.9025	52.3735	230.3562	174.5629
D . 132	**82020A**	**Gorizont 5**					
	24-DEC-14	-6.27	495.696	353.199	638.193	48	1067
	23733.373171	42660.19647	0.0035915	15.4843	343.9836	139.9354	248.3506
D . 133	**90001B**	**JC-Sat 2**					
	27-DEC-14	-6.25	493.771	239.044	748.497	49	1149
	23736.906771	42658.47653	0.0063088	11.7300	49.7264	211.8489	90.1291
D . 134	**79038A**	**OPS 6392 (FLTSATCOM F2)**					
	30-DEC-14	-6.23	492.269	422.011	562.526	49	1219
	23739.499225	42656.60265	0.0014658	14.8428	343.2631	321.4119	222.9344
D . 135	**84113C**	**Leasat 1**					
	26-DEC-14	-6.23	491.854	365.787	617.921	48	1106
	23735.321563	42655.62121	0.0031729	13.8033	10.2519	190.7570	183.6306
D . 136	**88040A**	**Intelsat VA F-13 (NSS 513)**					
	29-DEC-14	-6.11	482.679	426.410	538.948	49	1257
	23738.378426	42646.47118	0.0009980	14.5881	26.0748	355.3712	173.1710
D . 137	**94079A**	**Orion 1**					
	31-DEC-14	-6.09	481.074	402.215	559.933	49	965
	23740.093090	42645.39602	0.0019535	9.1541	48.4779	263.8852	300.4623
D . 138	**75011F**	**Aerojet SVM-5 (SMS 2 AKM)**					
	31-DEC-14	-6.07	479.435	57.254	901.617	49	917
	23740.836771	42644.41377	0.0094425	12.7893	324.8311	14.6014	71.6529
D . 139	**81073A**	**FLTSATCOM F5**					
	30-DEC-14	-6.00	473.633	431.177	516.090	49	1124
	23739.307049	42638.16866	0.0007377	19.7284	356.2051	61.0189	198.5047

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 140	**90063A**	**TDF 2**					
	31-DEC-14	-5.98	472.586	275.078	670.094	49	1108
	23740.505972	42635.62514	0.0051433	13.3611	35.3284	211.4492	139.2452
D . 141	**74033A**	**SMS 1**					
	31-DEC-14	-5.98	472.236	407.526	536.946	49	1044
	23740.094178	42635.85313	0.0016669	13.5188	317.4473	303.3735	343.9116
D . 142	**91079D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-5.95	469.975	445.010	494.941	49	1003
	23739.339491	42634.32384	0.0002898	15.0443	20.1895	46.2717	301.7365
D . 143	**76029A**	**RCA Satcom II**					
	30-DEC-14	-5.94	468.726	221.495	715.958	48	1069
	23739.227743	42633.39439	0.0057726	15.2920	348.8505	129.1973	222.8071
D . 144	**84041D**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-14	-5.93	468.131	402.594	533.667	48	1128
	23735.178600	42632.18115	0.0016574	15.2505	353.3570	117.0289	316.8978
D . 145	**80049A**	**Gorizont 4**					
	29-DEC-14	-5.92	467.595	448.674	486.516	49	1050
	23738.453796	42632.12035	0.0004663	14.8840	339.1515	218.3363	258.8519
D . 146	**94047A**	**DirecTV-2**					
	24-DEC-14	-5.90	465.671	423.477	507.864	48	1044
	23733.853183	42630.24591	0.0011077	6.8662	55.3908	224.0803	46.9182
D . 147	**82020F**	**Proton-K/DM fourth stage (Blok-DM)**					
	22-DEC-14	-5.89	465.301	349.081	581.521	48	1121
	23731.218553	42628.96806	0.0027309	15.5235	343.5118	99.0030	152.4002
D . 148	**88066D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-5.81	458.714	316.211	601.218	49	1115
	23739.630266	42623.08171	0.0030899	15.2565	8.6021	37.3132	229.9434
D . 149	**79105E**	**Proton-K/DM fourth stage (Blok-DM)**					
	23-DEC-14	-5.72	451.543	381.672	521.414	48	1093
	23732.863171	42616.09786	0.0019659	14.7876	337.2930	185.1837	111.2188
D . 150	**92010B**	**Insat-IIDT (Arabsat 1C)**					
	24-DEC-14	-5.72	451.270	347.367	555.173	48	1055
	23733.881435	42615.98789	0.0030761	10.3913	45.4271	175.3665	102.9104
D . 151	**87078B**	**Eutelsat I F-4 (ECS 4)**					
	31-DEC-14	-5.71	450.216	417.461	482.972	49	1144
	23740.021250	42615.04332	0.0007842	15.0072	19.2322	280.1114	63.2394
D . 152	**89048A**	**Raduga 1-1**					
	26-DEC-14	-5.64	444.647	363.390	525.905	48	1212
	23735.276863	42608.25528	0.0018194	15.1933	12.0660	49.5380	351.3469
D . 153	**81057A**	**Meteosat 2**					
	24-DEC-14	-5.58	439.904	314.604	565.204	48	1124
	23733.390868	42604.26903	0.0031152	15.3153	357.2301	267.1309	212.7729

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 154	**91018A**	**Inmarsat 2-F2**					
	26-DEC-14	-5.57	0.439	0.427	0.452	48	1139
	23735.378113	42603.97961	0.0002409	9.7311	36.9980	191.8956	166.0676
D . 155	**97009A**	**Intelsat VIII F-1**					
	31-DEC-14	-5.54	436.820	401.134	472.505	49	865
	23740.829340	42601.23177	0.0010287	5.3320	60.2570	252.9526	109.6306
D . 156	**83026B**	**TDRS-1**					
	24-DEC-14	-5.51	434.249	339.953	528.546	48	1256
	23733.316806	42598.13984	0.0022750	13.9628	353.7544	160.5262	194.1936
D . 157	**99050A**	**EchoStar 5**					
	31-DEC-14	-5.50	433.619	414.485	452.753	49	783
	23740.506748	42597.21927	0.0006769	4.6945	62.6259	186.7225	166.8404
D . 158	**98049A**	**ST-1**					
	25-DEC-14	-5.50	433.394	413.366	453.421	48	830
	23734.798634	42596.95901	0.0006504	2.7189	71.0066	190.7585	144.8077
D . 159	**97016A**	**Thaicom 3**					
	24-DEC-14	-5.48	431.860	74.998	788.722	48	882
	23733.843183	42596.65993	0.0083405	7.1417	54.6158	304.5410	89.0419
D . 160	**84093B**	**SBS IV**					
	30-DEC-14	-5.44	428.895	387.307	470.483	49	1263
	23739.413912	42593.40897	0.0006107	14.8395	18.4783	3.9116	223.7976
D . 161	**89070C**	**Star 27 (Himawari-4 AKM)**					
	31-DEC-14	-5.43	428.310	-625.872	1482.491	49	732
	23740.273160	42592.37711	0.0241158	14.7962	13.0893	310.4561	3.5289
D . 162	**00031A**	**Ekspress 3A**					
	26-DEC-14	-5.43	428.065	411.679	444.452	48	743
	23735.184410	42592.03556	0.0007031	5.5150	59.4716	137.8726	258.9805
D . 163	**87022F**	**Star 27 (GOES 7 AKM)**					
	29-DEC-14	-5.41	426.790	-4155.419	5009.000	48	475
	23738.319456	42591.49824	0.1060716	15.3301	357.8866	333.4868	282.7818
D . 164	**91060A**	**Yuri 3B**					
	25-DEC-14	-5.34	421.170	396.817	445.523	48	1048
	23734.885266	42586.00963	0.0004183	12.2193	29.3315	98.2809	70.4285
D . 165	**84081A**	**Eutelsat I F-2 (ECS 2)**					
	23-DEC-14	-5.32	419.054	384.278	453.829	48	1129
	23732.101840	42583.99772	0.0009481	15.3278	10.2149	124.4852	62.7612
D . 166	**95025A**	**GOES 9**					
	24-DEC-14	-5.30	418.207	395.671	440.744	48	997
	23733.901088	42581.72459	0.0002938	9.5990	47.1232	90.0938	345.4900
D . 167	**90077A**	**Yuri 3A**					
	29-DEC-14	-5.27	415.306	375.116	455.496	49	1114
	23738.992697	42579.44832	0.0013489	13.8290	35.8220	169.7978	30.5416

D .nn	COSPAR	NAME					
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D . 168	**83081A**	**Sakura 2B**					
	29-DEC-14	-5.26	414.703	393.182	436.224	49	1077
	23738.466863	42578.36157	0.0002780	15.3481	1.9317	262.9404	143.7181
D . 169	**86007A**	**Raduga 18**					
	24-DEC-14	-5.26	414.569	111.522	717.616	48	1113
	23733.421042	42578.31072	0.0073853	15.2884	358.8721	92.0728	183.2672
D . 170	**72090A**	**Anik A1**					
	29-DEC-14	-5.20	410.132	348.267	471.998	49	1012
	23738.554479	42573.78897	0.0012388	14.1573	336.2979	95.6461	183.3752
D . 171	**04001A**	**Estrela do Sul 1 (Telstar 14)**					
	25-DEC-14	-5.19	409.166	392.977	425.354	48	555
	23734.699363	42573.20140	0.0005512	2.8396	69.5832	198.4542	122.9662
D . 172	**71006A**	**Intelsat IV F-2**					
	30-DEC-14	-5.17	407.357	348.312	466.403	49	1063
	23739.894838	42572.38498	0.0011615	13.2112	326.8956	326.0152	89.0352
D . 173	**93031A**	**Astra 1C**					
	30-DEC-14	-5.16	406.630	390.901	422.359	49	901
	23739.375880	42571.34204	0.0003618	6.9703	54.3084	233.4620	249.1032
D . 174	**81050A**	**Intelsat V F-1**					
	24-DEC-14	-5.10	402.052	378.968	425.136	48	1197
	23733.355405	42567.42614	0.0007146	15.2239	1.8631	187.2776	256.5430
D . 175	**94065A**	**Solidaridad 2**					
	23-DEC-14	-5.07	399.616	386.321	412.911	48	1025
	23732.791863	42563.83460	0.0004973	5.6930	58.6663	212.4010	121.9656
D . 176	**83058A**	**Eutelsat I F-1 (ECS 1)**					
	30-DEC-14	-5.05	398.038	353.687	442.390	49	1159
	23739.427269	42562.96783	0.0009787	15.2439	6.7618	98.8031	247.0075
D . 177	**90093A**	**Inmarsat 2-F1**					
	26-DEC-14	-5.03	396.279	381.615	410.942	48	1106
	23735.595301	42561.13025	0.0006860	10.3681	35.7733	240.1208	254.6146
D . 178	**80098A**	**Intelsat V F-2**					
	30-DEC-14	-4.99	393.352	338.264	448.440	48	1191
	23739.935359	42557.50246	0.0015071	15.1805	3.8842	208.2609	95.0378
D . 179	**94022A**	**GOES 8**					
	25-DEC-14	-4.93	387.949	364.009	411.889	48	1047
	23734.529525	42552.03282	0.0007949	10.0808	48.1778	205.4697	124.9545
D . 180	**87078A**	**Optus A3**					
	30-DEC-14	-4.92	387.678	361.813	413.543	49	1127
	23739.607569	42551.11388	0.0005593	13.9229	27.7111	252.5460	156.0890
D . 181	**84113B**	**Arabsat 1D**					
	30-DEC-14	-4.92	387.558	272.026	503.090	49	1176
	23739.781563	42551.10642	0.0026301	14.8632	18.6258	272.7803	352.0928

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 182	**91046A**	**Gorizont 23**					
	31-DEC-14	-4.92	387.269	361.861	412.677	49	1056
	23740.212604	42551.32353	0.0007309	15.0098	18.8479	208.7062	26.0631
D . 183	**00069A**	**Beidou**					
	31-DEC-14	-4.91	386.906	317.427	456.385	49	731
	23740.437708	42551.68634	0.0012339	5.5421	60.1926	300.7477	250.0756
D . 184	**77118A**	**Sakura**					
	31-DEC-14	-4.89	385.454	367.320	403.588	49	1080
	23740.270741	42549.00859	0.0001784	14.8935	340.5280	222.3712	353.5052
D . 185	**87095A**	**TV-Sat 1**					
	23-DEC-14	-4.88	384.415	129.791	639.039	48	908
	23732.051215	42547.82829	0.0057261	15.0124	4.4852	21.8174	0.1513
D . 186	**91003B**	**Eutelsat II F-2**					
	31-DEC-14	-4.80	378.056	352.933	403.179	49	1087
	23740.220359	42542.14591	0.0003559	12.5266	37.8822	89.1055	27.5414
D . 187	**98028A**	**EchoStar 4**					
	25-DEC-14	-4.76	374.857	331.635	418.078	48	844
	23734.811921	42540.25583	0.0015488	5.3294	53.8117	203.5836	62.0765
D . 188	**91084A**	**Telecom 2A**					
	30-DEC-14	-4.76	374.814	358.523	391.105	49	1131
	23739.260775	42539.60235	0.0004583	11.4669	41.5478	181.6589	235.0811
D . 189	**99056A**	**DirecTV-1R**					
	26-DEC-14	-4.73	372.251	350.056	394.447	48	780
	23735.132847	42535.92355	0.0005143	2.0149	73.9605	152.3372	13.3547
D . 190	**97025A**	**Thor II**					
	30-DEC-14	-4.69	368.867	358.038	379.696	49	875
	23739.569468	42533.71070	0.0004853	5.2707	58.4107	207.8726	243.7329
D . 191	**95013A**	**Intelsat VII F-5**					
	30-DEC-14	-4.68	368.401	284.627	452.174	49	995
	23739.938530	42533.08469	0.0015629	4.2675	63.7749	5.3720	102.8716
D . 192	**93073B**	**Meteosat 6**					
	26-DEC-14	-4.64	365.414	343.009	387.820	48	1022
	23735.197130	42530.26663	0.0006278	12.2610	36.5214	145.5156	269.4711
D . 193	**93078A**	**DirecTV-1**					
	24-DEC-14	-4.64	364.895	321.838	407.952	48	1079
	23733.551470	42529.86503	0.0009307	5.1151	61.1233	105.4205	85.2607
D . 194	**00066A**	**Thuraya 1**					
	31-DEC-14	-4.63	364.716	336.260	393.173	49	717
	23740.884502	42528.34379	0.0007817	6.0012	28.8665	251.9594	142.1556
D . 195	**90091A**	**SBS VI**					
	30-DEC-14	-4.61	363.050	326.652	399.447	49	1176
	23739.510174	42526.66545	0.0005508	6.2898	57.4971	44.5507	138.9550

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	MJD	a	e	i	Ω	ω	λ
D . 196	**99005A**	**Telstar 6**					
	25-DEC-14	-4.60	361.727	334.952	388.502	48	802
	23734.063356	42526.69839	0.0002430	2.9220	84.7990	118.8670	86.6242
D . 197	**90001A**	**Skynet 4A**					
	31-DEC-14	-4.60	361.677	310.934	412.421	49	1142
	23740.815000	42524.97354	0.0015139	12.7827	21.3369	205.0462	160.7790
D . 198	**95029A**	**DirecTV-3**					
	26-DEC-14	-4.58	360.486	342.190	378.782	48	969
	23735.352211	42523.89485	0.0004018	4.8414	62.1679	259.1342	343.3975
D . 199	**89087A**	**Intelsat VI F-2**					
	23-DEC-14	-4.56	359.028	333.861	384.195	48	1147
	23732.538229	42522.78988	0.0004811	11.0510	41.8007	120.7063	132.2684
D . 200	**91037A**	**Aurora II**					
	27-DEC-14	-4.54	357.016	339.947	374.085	49	1157
	23736.675220	42521.35802	0.0006496	11.7345	40.8364	172.9060	55.0415
D . 201	**92057A**	**Satcom C-4**					
	30-DEC-14	-4.52	356.023	344.132	367.914	49	1045
	23739.246910	42520.78629	0.0003460	9.1562	48.3388	169.4994	269.2168
D . 202	**97011A**	**Tempo 2**					
	31-DEC-14	-4.47	351.657	231.857	471.457	49	896
	23740.438137	42516.55800	0.0032294	7.6203	52.7671	209.3178	267.7580
D . 203	**00022A**	**GOES 11**					
	26-DEC-14	-4.43	348.629	327.149	370.110	48	755
	23735.280775	42512.33276	0.0003818	3.1013	85.4212	100.0816	10.1894
D . 204	**94049B**	**Turksat 1B**					
	30-DEC-14	-4.42	347.349	277.952	416.745	49	980
	23739.256007	42510.78247	0.0013682	9.0677	48.5307	4.6751	150.6638
D . 205	**95023A**	**Intelsat VIIA F-1**					
	25-DEC-14	-4.41	0.348	0.335	0.360	48	978
	23734.117361	42510.34013	0.0003217	2.7193	69.0887	166.0096	38.2797
D . 206	**84005A**	**Yuri 2A**					
	30-DEC-14	-4.39	345.644	294.149	397.138	49	1095
	23739.548449	42510.76301	0.0010861	15.2651	2.2041	146.7051	275.0091
D . 207	**92010A**	**Superbird B1**					
	30-DEC-14	-4.39	345.307	278.075	412.538	49	1136
	23739.599560	42510.10809	0.0010629	11.4569	41.4638	28.9938	256.5292
D . 208	**96002B**	**MEASAT 1**					
	25-DEC-14	-4.36	342.968	333.306	352.630	48	953
	23734.148032	42507.33703	0.0004872	6.0579	56.9619	209.4195	294.0567
D . 209	**89004A**	**Gorizont 17**					
	23-DEC-14	-4.35	342.060	254.016	430.105	48	1240
	23732.852778	42507.04210	0.0019547	15.0571	10.2453	65.5841	88.4356

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D . 210	**07063A**	**Rascom-QAF 1**					
	24-DEC-14	-4.35	341.904	295.659	388.150	48	363
	23733.687639	42505.98056	0.0006310	3.4619	68.0747	341.5180	123.0685
D . 211	**92041B**	**Eutelsat II F-4**					
	31-DEC-14	-4.30	338.368	312.647	364.089	49	1018
	23740.004120	42503.17157	0.0007777	11.7338	41.1741	166.3007	101.9255
D . 212	**01012A**	**XM Radio 2 (Rock)**					
	31-DEC-14	-4.29	337.873	327.911	347.834	49	709
	23740.660718	42501.66301	0.0003273	0.2954	67.0821	257.9408	22.1119
D . 213	**96002A**	**PAS 3R**					
	26-DEC-14	-4.27	335.933	291.641	380.225	48	942
	23735.215486	42500.53604	0.0015067	4.4282	62.8003	177.3535	283.2041
D . 214	**89006A**	**Intelsat VA F-15**					
	31-DEC-14	-4.20	330.562	238.831	422.293	49	1213
	23740.078194	42495.47345	0.0018648	13.7970	31.6786	10.6480	49.0092
D . 215	**09007B**	**Ekspress MD-1**					
	25-DEC-14	-4.18	329.050	303.519	354.581	48	310
	23734.496713	42492.76080	0.0008216	1.1404	79.5426	231.8000	195.7320
D . 216	**85087A**	**Intelsat VA F-12**					
	31-DEC-14	-4.17	327.840	307.058	348.622	49	1207
	23740.729514	42491.98682	0.0008713	14.9052	21.5648	206.6488	10.8765
D . 217	**92084A**	**Superbird A1**					
	25-DEC-14	-4.16	326.932	259.981	393.883	48	1097
	23734.716192	42490.67701	0.0013515	7.2961	49.5385	59.8868	20.5268
D . 218	**98024B**	**BSAT-1b**					
	29-DEC-14	-4.16	326.743	311.773	341.713	49	838
	23738.820891	42491.90565	0.0004910	3.1123	76.4928	150.9347	79.5595
D . 219	**97016B**	**BSAT-1a**					
	30-DEC-14	-4.15	326.374	314.069	338.678	49	878
	23739.599560	42491.24573	0.0004683	3.4343	63.6079	182.7029	256.1475
D . 220	**83059B**	**Anik C2**					
	30-DEC-14	-4.14	325.632	165.169	486.095	49	1226
	23739.870521	42489.12641	0.0034071	15.1322	13.6041	10.0385	143.9760
D . 221	**97019A**	**GOES 10**					
	31-DEC-14	-4.14	325.533	211.073	439.992	49	900
	23740.835197	42490.36922	0.0029457	7.8923	50.9906	134.7359	48.6041
D . 222	**95044A**	**N-Star 1**					
	30-DEC-14	-4.12	324.198	281.836	366.559	49	947
	23739.662847	42487.38422	0.0012186	7.9052	51.7087	256.3259	166.2290
D . 223	**91026A**	**Anik E2**					
	30-DEC-14	-4.12	324.114	293.947	354.281	49	1174
	23739.231400	42489.07669	0.0006587	10.0357	45.8342	269.9313	263.8153

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D . 224	**01031A**	**GOES 12**					
	25-DEC-14	-4.09	321.461	296.379	346.543	48	688
	23734.812188	42486.70849	0.0009042	4.6399	67.8216	202.0102	71.7100
D . 225	**78044A**	**OTS 2**					
	24-DEC-14	-4.08	320.724	290.313	351.134	48	1016
	23733.268472	42484.85656	0.0009857	14.8900	345.1379	233.9084	311.5667
D . 226	**90100B**	**Gstar 4**					
	30-DEC-14	-4.07	319.995	304.958	335.032	49	1205
	23739.737118	42484.13921	0.0007618	10.5768	44.2845	214.7963	213.0518
D . 227	**73058A**	**Intelsat IV F-7**					
	26-DEC-14	-4.06	319.250	293.456	345.045	48	1074
	23735.222743	42482.64120	0.0005051	14.7568	340.4106	126.1871	342.8175
D . 228	**95043A**	**JC-Sat 3**					
	25-DEC-14	-4.05	318.375	252.578	384.172	48	947
	23734.811840	42483.53416	0.0011690	8.3569	46.2636	327.6929	59.2704
D . 229	**94040B**	**BS-3N**					
	30-DEC-14	-4.04	317.630	302.550	332.710	49	970
	23739.165718	42482.51465	0.0003267	8.2499	51.0243	245.8266	270.2552
D . 230	**07003A**	**Beidou 4**					
	25-DEC-14	-4.04	317.490	67.738	567.243	48	402
	23734.396771	42482.11961	0.0062892	0.4776	112.3670	143.9577	251.8610
D . 231	**98075A**	**PAS 6B**					
	26-DEC-14	-4.03	316.999	236.669	397.330	48	802
	23735.112870	42481.88138	0.0016465	5.7512	58.5518	70.9921	51.7600
D . 232	**98002A**	**Skynet 4D**					
	24-DEC-14	-4.03	316.890	290.028	343.751	47	821
	23733.551748	42481.78512	0.0004267	9.4364	39.1484	85.2660	234.9946
D . 233	**70003A**	**Intelsat III F-6**					
	30-DEC-14	-4.02	315.973	274.883	357.063	49	658
	23739.839063	42481.15845	0.0010196	8.4685	311.5494	325.6660	69.8537
D . 234	**83047A**	**Intelsat V F-6**					
	25-DEC-14	-3.99	313.887	253.807	373.967	46	1154
	23734.528773	42479.26457	0.0034592	15.1514	10.9860	216.3989	95.1150
D . 235	**91067A**	**Anik E1**					
	31-DEC-14	-3.97	312.150	290.277	334.023	49	1156
	23740.681921	42476.46284	0.0011563	10.0324	46.2462	212.5344	235.3145
D . 236	**01011B**	**BSAT-2a**					
	25-DEC-14	-3.95	310.172	287.076	333.269	48	695
	23734.561516	42474.69740	0.0005073	2.1965	73.0664	135.3063	225.6115
D . 237	**98044A**	**ZX 5B (ChinaSat 5B)**					
	25-DEC-14	-3.94	309.655	276.357	342.952	48	849
	23734.503935	42473.05690	0.0008491	2.6574	70.9192	133.7365	182.9627

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D . 238	**96035A**	**Intelsat VII F-6**					
	26-DEC-14	-3.94	309.272	274.185	344.358	48	934
	23735.515012	42473.05119	0.0012680	2.1790	73.6136	162.2348	197.8187
D . 239	**95001A**	**Intelsat VII F-4**					
	25-DEC-14	-3.93	309.075	288.449	329.702	48	984
	23734.115880	42472.55645	0.0002879	4.6677	62.1784	100.0500	334.9841
D . 240	**93078B**	**Thaicom 1**					
	30-DEC-14	-3.93	308.570	286.494	330.646	49	1006
	23739.628669	42473.51740	0.0005278	4.8528	61.2282	119.6185	245.5521
D . 241	**89027A**	**Tele-X**					
	26-DEC-14	-3.93	308.500	281.498	335.501	48	1120
	23735.204826	42473.24875	0.0004651	14.0863	30.2659	154.4613	215.8209
D . 242	**90100A**	**Satcom C-1**					
	26-DEC-14	-3.92	308.289	283.371	333.206	48	1204
	23735.457292	42471.49421	0.0007228	9.0761	46.4661	276.2309	151.1398
D . 243	**89067A**	**Sirius 1**					
	22-DEC-14	-3.91	307.438	278.257	336.619	47	1126
	23731.806713	42470.93071	0.0005457	12.6597	37.0336	271.5319	357.9390
D . 244	**96039A**	**Apstar 1A**					
	25-DEC-14	-3.90	306.250	220.238	392.261	47	958
	23734.227188	42470.88875	0.0021819	7.7513	47.4832	238.6911	231.7800
D . 245	**94040A**	**PAS 2**					
	31-DEC-14	-3.89	305.459	277.067	333.851	49	1041
	23740.228900	42468.93865	0.0002740	5.0849	63.5406	260.0788	338.7493
D . 246	**88098A**	**TDF 1**					
	24-DEC-14	-3.88	305.040	278.246	331.834	47	1126
	23733.062928	42470.05782	0.0009233	14.2931	28.2932	160.4469	91.0369
D . 247	**78068A**	**Comstar 3**					
	31-DEC-14	-3.87	304.411	218.790	390.033	49	1109
	23740.837060	42467.98509	0.0022990	15.0904	353.7868	205.8519	133.4432
D . 248	**04043A**	**Ekspress AM-1**					
	25-DEC-14	-3.87	304.196	279.777	328.615	48	522
	23734.139757	42468.96776	0.0008450	3.7530	65.7392	151.9805	282.8468
D . 249	**03028A**	**BSAT-2c**					
	25-DEC-14	-3.86	303.561	283.350	323.772	48	573
	23734.132106	42468.34784	0.0006539	1.2297	76.6091	193.5047	275.5590
D . 250	**92054A**	**Optus B1**					
	25-DEC-14	-3.84	302.044	259.039	345.048	48	1104
	23734.396887	42467.29385	0.0006432	7.2424	53.7835	36.6027	256.3454
D . 251	**76017A**	**Marisat 1**					
	24-DEC-14	-3.84	301.739	256.044	347.435	46	1150
	23733.470787	42466.79328	0.0009958	13.6743	336.5811	111.0085	259.1464

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D . 252	**97062A**	**Apstar 2R**					
	24-DEC-14	-3.83	300.861	265.066	336.656	46	887
	23733.585822	42464.61680	0.0013159	2.1507	73.8419	189.2429	318.1678
D . 253	**90074A**	**Thor I**					
	23-DEC-14	-3.83	300.794	286.533	315.054	48	1102
	23732.574965	42465.32904	0.0004808	11.3740	42.0862	163.4683	218.3935
D . 254	**82058A**	**Westar V**					
	25-DEC-14	-3.81	299.245	231.683	366.807	47	1073
	23734.528900	42464.14512	0.0018464	15.1427	14.9382	165.9751	100.5377
D . 255	**94013A**	**Galaxy IR-A**					
	30-DEC-14	-3.79	297.362	285.114	309.610	48	1053
	23739.221551	42461.88966	0.0003208	7.5185	51.6903	184.8737	291.7251
D . 256	**88086A**	**Sakura 3B**					
	30-DEC-14	-3.78	296.654	275.864	317.443	49	1097
	23739.359039	42461.23491	0.0005712	13.8600	31.4236	215.7614	219.8482
D . 257	**82017A**	**Intelsat V F-4**					
	24-DEC-14	-3.76	295.299	163.549	427.049	48	1155
	23733.783738	42460.86033	0.0032673	15.1158	4.8515	134.1432	92.7456
D . 258	**96040A**	**Arabsat 2A**					
	30-DEC-14	-3.76	295.247	256.898	333.596	49	926
	23739.234792	42459.90807	0.0003014	10.7376	43.3055	296.1748	289.6620
D . 259	**80074A**	**GOES 4**					
	25-DEC-14	-3.76	295.055	148.004	442.107	48	1022
	23734.655995	42458.22108	0.0030079	14.9356	344.7311	348.1243	158.8028
D . 260	**06022A**	**KAZSAT**					
	25-DEC-14	-3.74	294.080	275.498	312.662	48	441
	23734.192512	42457.75415	0.0004530	4.6213	62.8761	108.5788	322.0133
D . 261	**04015A**	**Ekspress AM-11**					
	31-DEC-14	-3.73	293.163	271.764	314.562	49	540
	23740.575567	42458.42560	0.0006572	7.4202	53.1055	196.8095	88.9808
D . 262	**92043A**	**Gorizont 26**					
	30-DEC-14	-3.71	291.422	161.694	421.150	49	1134
	23739.662407	42454.57040	0.0034470	14.5118	21.8793	160.8276	158.7052
D . 263	**90030A**	**AsiaSat 1**					
	24-DEC-14	-3.71	291.274	278.107	304.442	47	1146
	23733.162176	42455.99322	0.0003785	12.9597	36.1814	202.9084	285.7014
D . 264	**94049A**	**Brazilsat B1**					
	26-DEC-14	-3.69	289.691	263.571	315.811	47	1008
	23735.594907	42454.08732	0.0004091	6.6642	55.6786	110.9449	216.6850
D . 265	**77065A**	**Himawari**					
	26-DEC-14	-3.69	289.555	218.834	360.276	48	1043
	23735.067315	42454.71984	0.0018426	14.3953	337.2325	137.0024	62.0932

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 . 266	**93015A**	**USA 98 (UFO F1)**					
	25-DEC-14	-3.68	288.891	260.468	317.313	48	986
	23734.945058	42453.96897	0.0008695	17.4800	149.3311	128.4229	86.9438
D . 267	**00082A**	**Beidou 1B**					
	26-DEC-14	-3.68	288.719	-50.556	627.994	48	720
	23735.323484	42453.94587	0.0080762	6.4808	55.8020	345.9005	255.9107
D . 268	**75042A**	**Intelsat IV F-1**					
	29-DEC-14	-3.65	286.338	233.776	338.901	49	1106
	23738.469282	42449.51522	0.0014216	14.8972	346.7326	163.1330	151.7932
D . 269	**96007A**	**N-Star 2**					
	25-DEC-14	-3.65	286.296	262.119	310.474	48	923
	23734.529850	42449.89269	0.0009769	6.8497	55.0919	184.8119	137.2589
D . 270	**98056A**	**Eutelsat W2**					
	23-DEC-14	-3.64	285.914	265.802	306.027	48	811
	23732.669769	42449.43654	0.0004558	4.1303	64.9385	106.3509	134.2094
D . 271	**04036A**	**GSAT 3 (EDUSAT)**					
	31-DEC-14	-3.62	284.577	268.309	300.844	49	525
	23740.445081	42448.80621	0.0002667	3.4894	67.6048	81.4258	211.2806
D . 272	**02029D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	21-DEC-14	-3.62	284.198	229.859	338.537	48	629
	23730.544838	42448.27853	0.0009851	10.4913	44.2092	268.6147	112.4966
D . 273	**92013A**	**Galaxy V**					
	30-DEC-14	-3.55	278.454	215.689	341.219	49	1158
	23739.196516	42441.75532	0.0012586	8.5831	49.9393	348.7179	344.2670
D . 274	**86016A**	**Yuri 2B**					
	31-DEC-14	-3.54	277.704	200.589	354.820	49	1125
	23740.526447	42443.18219	0.0014975	15.1756	9.7969	124.0233	77.6643
D . 275	**91083A**	**Eutelsat II F-3**					
	25-DEC-14	-3.52	276.058	262.217	289.898	48	1085
	23734.394398	42439.12759	0.0003366	12.4053	38.2131	181.6759	161.6914
D . 276	**94064A**	**Intelsat VII F-3 (NSS 703)**					
	24-DEC-14	-3.49	274.283	256.912	291.654	48	955
	23733.790417	42438.55462	0.0005559	4.3936	63.1465	205.9115	45.1426
D . 277	**95064A**	**AsiaSat 2**					
	30-DEC-14	-3.49	273.642	243.358	303.926	49	958
	23739.609375	42436.95521	0.0011571	3.4025	67.5286	213.1480	180.2647
D . 278	**95016B**	**Hot Bird 1**					
	21-DEC-14	-3.45	270.766	254.820	286.711	48	780
	23730.545347	42434.38263	0.0002804	7.5673	53.1648	85.4251	132.0816
D . 279	**92060A**	**Hispasat 1A**					
	26-DEC-14	-3.44	270.246	249.023	291.468	48	1032
	23735.280775	42433.92575	0.0008735	10.4665	44.4822	187.7259	11.9749

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 280	**91055A**	**Intelsat VI F-5**					
	27-DEC-14	-3.41	267.992	256.854	279.131	49	1158
	23736.359479	42431.19614	0.0003116	8.7779	49.5733	164.5011	343.8214
D . 281	**68081Q**	**Transtage 5 debris**					
	31-DEC-14	-3.40	266.563	-862.729	1395.855	48	125
	23740.488472	42431.51738	0.0274142	8.0678	323.8967	314.1863	46.0555
D . 282	**98063B**	**GE 5 (AMC-5)**					
	26-DEC-14	-3.39	265.785	250.936	280.634	48	811
	23735.492326	42430.36003	0.0002366	3.7005	66.3728	229.3102	219.6590
D . 283	**87070A**	**Kiku-5**					
	31-DEC-14	-3.38	265.454	231.676	299.233	49	1181
	23740.206586	42429.84545	0.0005683	15.1467	12.9689	283.1300	34.1786
D . 284	**90079B**	**Eutelsat II F-1**					
	25-DEC-14	-3.34	261.867	241.366	282.367	48	1048
	23734.190567	42426.91976	0.0006922	13.1127	35.2905	175.3293	239.6795
D . 285	**06053C**	**Fengyun 2D AKM (FG-36 AKM)**					
	25-DEC-14	-3.30	259.232	-173.126	691.589	47	407
	23734.529757	42422.83915	0.0099303	4.2944	65.9078	305.5176	133.0319
D . 286	**81057F**	**Mage 1 (Meteosat 2 AKM)**					
	29-DEC-14	-3.24	254.454	-60.745	569.652	48	879
	23738.409433	42420.67712	0.0073525	14.9075	341.9727	97.8846	249.9089
D . 287	**94043A**	**Apstar 1**					
	29-DEC-14	-3.23	253.210	239.152	267.269	49	1062
	23738.600926	42417.34153	0.0003596	8.5480	48.9163	265.5150	118.9647
D . 288	**78071A**	**ESA GEOS 2**					
	30-DEC-14	-3.22	253.030	231.251	274.808	49	1047
	23739.325718	42416.20819	0.0005203	13.8565	333.1152	230.4500	347.0246
D . 289	**82106D**	**IUS second stage**					
	31-DEC-14	-3.21	251.751	61.230	442.272	48	1070
	23740.015035	42417.23539	0.0042594	15.4396	351.1689	312.1754	70.4158
D . 290	**97002B**	**Nahuel 1A**					
	24-DEC-14	-3.19	250.643	225.525	275.761	48	905
	23733.842697	42415.07322	0.0004717	6.2245	56.9473	119.8490	114.7837
D . 291	**88051C**	**PAS 1**					
	24-DEC-14	-3.17	248.987	230.856	267.118	48	1164
	23733.477396	42413.85155	0.0004790	11.7028	40.4746	215.5473	228.2496
D . 292	**12002C**	**Fengyun 2F AKM (FG-36 AKM)**					
	31-DEC-14	-3.17	248.767	13.047	484.487	49	151
	23740.438495	42413.43847	0.0056973	0.2474	322.0696	229.4265	282.6585
D . 293	**07058A**	**Cosmos-2434 (Raduga-1M1)**					
	24-DEC-14	-3.15	247.396	237.138	257.655	48	368
	23733.667963	42410.32645	0.0001338	1.2591	76.4243	186.4828	154.2261

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 294	**77048A**	**GOES 2**					
	26-DEC-14	-3.15	247.379	184.768	309.990	48	1215
	23735.133681	42411.21676	0.0014449	14.2393	337.5200	286.5825	21.6352
D . 295	**89052A**	**Gorizont 18**					
	29-DEC-14	-3.14	246.589	101.658	391.520	49	1153
	23738.230637	42410.28009	0.0036486	14.9471	11.6014	236.4867	317.1017
D . 296	**85016F**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-14	-3.13	245.547	136.874	354.220	48	1134
	23734.177998	42410.88737	0.0028023	15.0499	354.9336	141.7832	268.8073
D . 297	**97071A**	**Sirius 2**					
	26-DEC-14	-3.13	245.267	227.122	263.412	48	859
	23735.352512	42408.57555	0.0001533	5.0298	61.2803	184.5432	345.2388
D . 298	**95011B**	**Himawari-5**					
	24-DEC-14	-3.12	245.095	211.506	278.683	48	926
	23733.858519	42408.06647	0.0006374	11.5398	39.4249	56.8493	166.4231
D . 299	**83006A**	**Sakura 2A**					
	30-DEC-14	-3.12	244.923	204.690	285.155	49	1071
	23739.948102	42410.44449	0.0011952	15.1041	358.5239	212.3819	71.7909
D . 300	**96063A**	**Arabsat 2B**					
	25-DEC-14	-3.10	243.246	228.339	258.153	48	876
	23734.884965	42408.63187	0.0004627	1.9212	75.5104	181.2123	90.0380
D . 301	**83094A**	**RCA Satcom IIR**					
	30-DEC-14	-3.10	242.864	174.421	311.307	49	1206
	23739.256759	42407.69306	0.0013270	14.6858	24.1045	313.1810	218.0104
D . 302	**84031F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-3.06	239.746	172.687	306.804	49	1110
	23740.162940	42403.62361	0.0017188	14.9604	351.7691	142.1430	18.3120
D . 303	**94038D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	-3.03	238.012	132.314	343.711	48	947
	23734.212153	42402.25010	0.0023807	13.2690	30.2035	41.0658	34.1100
D . 304	**00031D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	22-DEC-14	-3.00	235.571	177.891	293.250	48	726
	23731.793102	42400.72802	0.0010554	11.9551	39.5062	6.9843	59.3245
D . 305	**77041A**	**Intelsat IVA F-4**					
	31-DEC-14	-2.99	234.576	180.608	288.543	49	1117
	23740.219155	42397.68683	0.0014665	14.9565	350.6678	159.1574	355.4459
D . 306	**04011A**	**Superbird A2 (Superbird 6)**					
	26-DEC-14	-2.92	229.044	166.156	291.933	48	541
	23735.363241	42394.43874	0.0026342	8.6709	49.3751	290.0241	240.5989
D . 307	**85048B**	**Morelos 1**					
	30-DEC-14	-2.90	227.178	209.919	244.438	49	1138
	23739.255347	42391.15121	0.0002216	14.8657	21.1222	72.9798	204.4924

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 308	**94002D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	30-DEC-14	-2.90	227.116	57.540	396.692	48	970
	23739.469329	42391.43334	0.0041118	14.6782	21.9149	37.6553	296.4843
D . 309	**81119A**	**Intelsat V F-3**					
	31-DEC-14	-2.89	226.641	126.119	327.164	49	1172
	23740.415718	42391.50579	0.0025040	15.0580	4.5264	135.3620	296.2747
D . 310	**78062D**	**Aerojet SVM-5 (GOES 3 AKM)**					
	31-DEC-14	-2.87	224.784	-250.722	700.290	49	963
	23740.271713	42388.14100	0.0111415	14.7124	334.1866	327.3797	341.6966
D . 311	**69069A**	**ATS 5**					
	23-DEC-14	-2.81	220.613	200.331	240.895	48	1004
	23732.058391	42385.14069	0.0006354	9.3764	314.0693	231.2546	37.0722
D . 312	**68081W**	**Transtage 5 debris**					
	31-DEC-14	-2.81	220.131	-678.657	1118.918	29	72
	23740.924884	42384.93166	0.0222622	7.6280	322.9265	268.4701	247.2332
D . 313	**75011A**	**SMS 2**					
	28-DEC-14	-2.75	215.330	158.302	272.359	49	993
	23737.326690	42378.88246	0.0013929	13.8931	331.9135	156.5141	195.7127
D . 314	**83077A**	**Arabsat 1D-R**					
	21-DEC-14	-2.70	211.275	102.154	320.397	46	1176
	23730.006574	42376.10662	0.0024487	14.8809	20.2029	63.2920	108.8635
D . 315	**90034A**	**Palapa B-2R**					
	24-DEC-14	-2.68	210.125	164.283	255.967	48	1130
	23733.871644	42375.19062	0.0008453	12.1295	39.5984	41.2505	102.6671
D . 316	**92021A**	**Telecom 2B**					
	25-DEC-14	-2.68	209.651	167.987	251.314	48	1096
	23734.190509	42375.77053	0.0008215	11.8380	39.7366	8.8561	236.7041
D . 317	**89020A**	**JC-Sat 1**					
	24-DEC-14	-2.66	208.392	189.259	227.524	48	1139
	23733.929583	42374.09046	0.0002003	13.8716	31.2925	109.2629	67.9297
D . 318	**96033A**	**Galaxy IX**					
	30-DEC-14	-2.64	206.830	162.165	251.494	49	935
	23739.358125	42370.23593	0.0008169	5.3126	59.8887	70.5676	197.6419
D . 319	**90063B**	**DFS-Kopernikus 2**					
	30-DEC-14	-2.61	204.504	189.453	219.554	49	1115
	23739.328183	42367.70211	0.0003836	11.8756	39.7200	188.0271	0.1784
D . 320	**85015B**	**Brazilsat 1**					
	26-DEC-14	-2.61	204.278	187.747	220.809	48	1226
	23735.184259	42369.07481	0.0005149	14.6738	23.0811	217.0905	288.9605
D . 321	**81076A**	**Himawari-2**					
	31-DEC-14	-2.60	203.356	158.830	247.881	49	1041
	23740.209225	42366.64527	0.0012276	14.7940	345.4994	203.5294	8.4485

D .nn	COSPAR	NAME					
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D . 322	**86003B**	**Satcom Ku-1**					
	24-DEC-14	-2.59	202.945	185.014	220.875	48	1207
	23733.222245	42365.96865	0.0003433	14.0945	29.2960	165.3612	329.4151
D . 323	**00019D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	22-DEC-14	-2.58	201.933	144.272	259.594	48	731
	23731.358600	42364.75562	0.0016019	12.2841	38.6943	205.1538	343.7160
D . 324	**85109B**	**Morelos 2**					
	31-DEC-14	-2.55	200.074	175.226	224.922	49	1265
	23740.505949	42363.25081	0.0003576	13.2111	34.0927	58.5756	138.2861
D . 325	**91028A**	**Spacenet 4**					
	24-DEC-14	-2.54	198.581	186.938	210.223	48	1172
	23733.876991	42362.99865	0.0004664	9.5134	46.8897	213.6072	33.1324
D . 326	**01014A**	**Ekran 21 (Ekran-M)**					
	23-DEC-14	-2.47	193.374	66.793	319.956	48	704
	23732.238715	42356.24928	0.0027118	10.2729	49.5519	321.9560	356.5089
D . 327	**82004A**	**RCA Satcom IV**					
	23-DEC-14	-2.46	192.960	172.094	213.826	48	1116
	23732.969595	42358.04242	0.0007634	15.0659	13.5375	91.0827	100.0424
D . 328	**91075A**	**Intelsat VI F-1**					
	31-DEC-14	-2.46	192.641	182.779	202.502	49	1114
	23740.593727	42358.40878	0.0003793	8.7413	48.5313	205.1117	65.6218
D . 329	**94065B**	**Thaicom 2**					
	24-DEC-14	-2.46	192.525	175.213	209.837	48	948
	23733.322905	42356.93997	0.0003173	3.9597	64.5454	122.5220	300.7347
D . 330	**96006A**	**Palapa C1**					
	25-DEC-14	-2.45	191.887	155.156	228.618	48	954
	23734.190845	42357.06189	0.0006345	2.5027	72.4165	97.9890	279.1992
D . 331	**75117A**	**RCA Satcom I**					
	24-DEC-14	-2.43	189.990	95.102	284.879	48	1061
	23733.487153	42352.48214	0.0021163	14.7610	345.8350	164.9799	188.4665
D . 332	**85109D**	**Satcom Ku-2**					
	24-DEC-14	-2.40	188.106	153.089	223.122	47	1249
	23733.359988	42352.63635	0.0012027	13.8927	30.4938	174.3568	220.2281
D . 333	**71116A**	**Intelsat IV F-3**					
	29-DEC-14	-2.35	183.740	131.366	236.114	49	1094
	23738.468935	42348.13261	0.0008674	14.3282	336.6551	354.9415	214.2956
D . 334	**97070D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	31-DEC-14	-2.30	180.254	114.055	246.453	49	825
	23740.888843	42344.17887	0.0014906	13.6016	32.0466	54.1043	116.0746
D . 335	**86026B**	**Brazilsat 2**					
	25-DEC-14	-2.28	178.213	163.688	192.738	48	1254
	23734.142512	42341.21013	0.0004187	14.0811	28.4836	213.2913	333.7945

D .nn	COSPAR	NAME					
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D . 336	**00002A**	**Galaxy 10R**					
	25-DEC-14	-2.28	178.168	159.781	196.555	48	769
	23734.395961	42342.95068	0.0002804	5.5583	59.0926	111.2582	220.5448
D . 337	**93069A**	**Gorizont 28**					
	25-DEC-14	-2.24	175.021	29.358	320.684	46	1091
	23734.783507	42337.78620	0.0031924	14.1532	25.6080	61.8361	356.3937
D . 338	**99016A**	**Insat 2E**					
	26-DEC-14	-2.22	174.069	149.392	198.746	48	793
	23735.165440	42337.90005	0.0007730	3.6208	66.6038	161.7734	307.8629
D . 339	**00016B**	**Insat 3B**					
	25-DEC-14	-2.21	173.268	155.064	191.472	48	750
	23734.598993	42338.99786	0.0005209	2.5494	71.6812	137.2289	84.8034
D . 340	**88018A**	**Spacenet 3R**					
	23-DEC-14	-2.20	172.256	156.328	188.184	48	1164
	23732.755995	42336.11046	0.0004357	12.6314	36.7531	159.5954	24.6461
D . 341	**85028B**	**Anik C1**					
	30-DEC-14	-2.20	171.840	107.449	236.231	49	1194
	23739.400012	42334.96356	0.0013112	13.9777	30.4147	40.9288	326.8828
D . 342	**95041A**	**Mugunghwa 1 (Koreasat 1)**					
	24-DEC-14	-2.18	170.465	152.465	188.466	48	918
	23733.704977	42336.55933	0.0000934	12.8303	35.8620	120.1038	86.0024
D . 343	**88109A**	**Skynet 4B**					
	24-DEC-14	-2.12	166.125	148.359	183.890	48	1149
	23733.226296	42330.77848	0.0006971	15.1068	15.2496	196.2452	199.1865
D . 344	**76010A**	**Intelsat IVA F-2**					
	26-DEC-14	-2.11	165.145	141.332	188.959	48	1084
	23735.222442	42327.69321	0.0007803	14.7290	345.3793	186.2215	351.7400
D . 345	**83105A**	**Intelsat V F-7**					
	26-DEC-14	-2.08	162.764	135.065	190.462	48	1151
	23735.002731	42327.26863	0.0002304	15.0444	8.9235	306.8148	115.9192
D . 346	**97078A**	**Galaxy VIII-i**					
	24-DEC-14	-2.06	161.503	133.364	189.641	48	862
	23733.392002	42326.51971	0.0005293	10.3902	44.2548	277.1689	224.6618
D . 347	**92072A**	**Galaxy VII**					
	25-DEC-14	-2.06	161.475	125.655	197.294	48	1086
	23734.056782	42327.33175	0.0009663	11.8708	39.5000	249.4170	101.4970
D . 348	**91074D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-2.04	159.838	145.738	173.938	49	990
	23740.459109	42324.61982	0.0003227	14.7010	19.0907	130.6911	110.9493
D . 349	**93048A**	**Hispasat 1B**					
	31-DEC-14	-1.98	154.680	126.018	183.342	49	988
	23740.053738	42319.84512	0.0010111	9.6179	46.1907	217.3127	287.2853

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 350	**92066A**	**DFS-Kopernikus 3**					
	25-DEC-14	-1.95	152.798	134.818	170.777	48	1042
	23734.467199	42318.66538	0.0003800	11.0173	42.2177	178.8437	242.6026
D . 351	**89041A**	**Superbird A**					
	30-DEC-14	-1.89	148.251	122.337	174.165	48	1074
	23739.114745	42312.64404	0.0007065	15.0399	10.1519	261.5322	203.5703
D . 352	**84080E**	**Star 27 (Himawari-3 AKM)**					
	30-DEC-14	-1.89	148.144	-431.149	727.437	48	691
	23739.353900	42312.30807	0.0131945	14.9105	354.8731	355.2506	194.1137
D . 353	**84114A**	**Spacenet 2**					
	31-DEC-14	-1.86	145.499	106.303	184.696	49	1187
	23740.078796	42310.43550	0.0005888	13.9094	30.2010	324.5870	41.1212
D . 354	**90091B**	**Galaxy VI**					
	29-DEC-14	-1.84	143.975	126.575	161.375	48	1143
	23738.548183	42306.50638	0.0005153	10.3568	44.3241	139.4931	183.3479
D . 355	**85076B**	**Optus A1**					
	30-DEC-14	-1.84	143.781	125.853	161.709	49	1046
	23739.238993	42309.71475	0.0003226	14.9564	17.0572	232.7142	266.8649
D . 356	**82014A**	**Westar IV**					
	22-DEC-14	-1.81	141.387	123.994	158.779	48	1130
	23731.659144	42303.51400	0.0005584	15.0152	13.0289	186.1185	153.0868
D . 357	**03021A**	**Beidou 3**					
	24-DEC-14	-1.80	140.446	117.691	163.202	48	596
	23733.502488	42304.76307	0.0009359	3.4968	69.2557	138.0608	211.8055
D . 358	**84093D**	**Telstar 3C**					
	30-DEC-14	-1.78	138.987	118.718	159.256	47	1203
	23739.198912	42303.58297	0.0002566	14.5890	23.7372	92.1018	213.5749
D . 359	**95067B**	**Insat-IIC**					
	25-DEC-14	-1.77	138.330	119.971	156.688	48	914
	23734.461551	42302.77941	0.0003883	10.8524	43.6796	227.0583	213.2573
D . 360	**74093A**	**Intelsat IV F-8**					
	24-DEC-14	-1.75	136.988	113.761	160.214	48	1089
	23733.197222	42299.49860	0.0003144	14.7214	345.9493	120.7333	1.0859
D . 361	**88081B**	**SBS V**					
	25-DEC-14	-1.73	135.654	112.194	159.113	48	1202
	23734.114074	42301.77128	0.0007804	12.3357	37.7746	206.1758	260.6054
D . 362	**86026A**	**Gstar 2**					
	24-DEC-14	-1.72	134.646	116.461	152.831	48	1190
	23733.858218	42296.09157	0.0001871	14.5558	24.3486	291.5290	158.6807
D . 363	**73023A**	**Anik A2**					
	26-DEC-14	-1.71	133.765	78.565	188.965	48	1031
	23735.269063	42296.58939	0.0010615	14.4692	339.9766	302.7503	326.1717

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 364	**92059D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	29-DEC-14	-1.71	133.629	85.178	182.081	48	995
	23738.222141	42296.12209	0.0012402	14.6462	21.6313	212.6975	155.1039
D . 365	**78116A**	**Anik B1**					
	25-DEC-14	-1.65	128.840	88.460	169.219	48	1106
	23734.396354	42291.62291	0.0025324	14.9014	354.9202	213.3133	334.4968
D . 366	**80091A**	**SBS I**					
	29-DEC-14	-1.62	126.919	96.150	157.687	48	1159
	23738.458113	42288.83620	0.0005385	15.1105	356.9032	90.9829	153.6217
D . 367	**76042A**	**Comstar 1A**					
	24-DEC-14	-1.62	126.822	109.468	144.176	48	1087
	23733.881169	42292.24346	0.0005305	14.7088	346.0180	222.2254	104.2450
D . 368	**94067A**	**Ekspress 1**					
	26-DEC-14	-1.61	125.960	106.506	145.414	48	1023
	23735.322014	42289.50494	0.0006979	12.0838	38.5380	144.5417	201.1725
D . 369	**72003A**	**Intelsat IV F-4**					
	24-DEC-14	-1.60	124.755	105.331	144.179	48	1106
	23733.087766	42286.91399	0.0000543	14.4014	339.0265	158.7260	346.7204
D . 370	**84080A**	**Himawari-3**					
	26-DEC-14	-1.59	124.021	93.188	154.853	48	1048
	23735.279641	42286.49043	0.0004264	14.9367	1.5774	52.8325	3.9085
D . 371	**00020A**	**Galaxy IVR**					
	26-DEC-14	-1.58	123.200	105.699	140.701	48	755
	23735.545498	42289.35018	0.0005074	7.0856	53.8803	141.4959	241.6680
D . 372	**84101A**	**Galaxy III**					
	31-DEC-14	-1.57	122.335	92.970	151.701	49	1219
	23740.011412	42288.03589	0.0005400	14.5985	23.5307	266.2793	102.2366
D . 373	**76035A**	**NATO IIIA**					
	22-DEC-14	-1.55	120.867	17.807	223.927	48	1106
	23731.984363	42287.74842	0.0026585	12.7132	336.0498	210.4105	69.9935
D . 374	**89062A**	**TV-Sat 2**					
	31-DEC-14	-1.53	119.199	87.815	150.584	49	1103
	23740.956620	42283.04312	0.0004520	13.2848	33.5322	150.4683	124.5690
D . 375	**03018A**	**GSAT-2**					
	25-DEC-14	-1.53	119.203	106.073	132.333	48	596
	23734.667315	42281.37730	0.0002899	3.2989	67.9492	233.7805	184.0976
D . 376	**92017A**	**Gorizont 25**					
	30-DEC-14	-1.52	119.062	5.476	232.648	48	1177
	23739.492697	42283.15406	0.0023826	14.5475	20.3512	3.9692	304.2203
D . 377	**74075A**	**Westar II**					
	26-DEC-14	-1.51	117.964	97.217	138.710	48	1000
	23735.133681	42281.46622	0.0004182	14.4832	342.3255	153.4853	21.8511

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 378	**83030A**	**RCA Satcom IR**					
	26-DEC-14	-1.49	116.787	74.282	159.292	47	1124
	23735.338160	42279.88270	0.0004413	14.9257	16.7896	31.0370	138.5477
D . 379	**99047A**	**Yamal-100 No. 1**					
	30-DEC-14	-1.47	114.744	-264.451	493.939	49	746
	23739.660822	42277.24383	0.0083557	12.5883	36.5840	309.9848	188.0123
D . 380	**84022F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-1.46	113.748	14.135	213.361	49	1108
	23739.163079	42277.72106	0.0019907	15.9339	349.2236	36.7409	303.7234
D . 381	**87028D**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	-1.45	113.402	-2.030	228.834	48	1112
	23733.729433	42275.27130	0.0023183	15.6807	1.1664	1.4888	180.3206
D . 382	**85048D**	**Telstar 3D**					
	30-DEC-14	-1.43	111.644	97.940	125.349	49	1208
	23739.585903	42278.17882	0.0004038	14.4823	24.7155	155.6055	251.6892
D . 383	**95063A**	**Gals 2**					
	25-DEC-14	-1.39	108.751	82.851	134.650	48	983
	23734.124352	42275.84356	0.0007054	11.9484	39.0649	220.8821	75.6229
D . 384	**96005A**	**Gorizont 31**					
	30-DEC-14	-1.38	107.501	19.765	195.237	49	972
	23739.944954	42271.07048	0.0022564	13.2605	31.8397	129.8673	124.8839
D . 385	**91064B**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-1.36	106.373	89.337	123.409	49	999
	23739.851169	42269.07610	0.0002087	14.7997	18.0472	236.1917	330.8322
D . 386	**74022A**	**Westar I**					
	24-DEC-14	-1.35	105.402	78.878	131.926	48	1024
	23733.354780	42270.55423	0.0006240	14.4687	341.3345	257.3756	221.0466
D . 387	**87022A**	**GOES 7**					
	24-DEC-14	-1.34	104.939	92.784	117.095	48	1246
	23733.391447	42268.29308	0.0002127	14.8310	15.6144	253.6656	316.5920
D . 388	**82110C**	**Anik C3**					
	31-DEC-14	-1.32	103.307	87.126	119.487	49	1206
	23740.003704	42270.44788	0.0001346	14.9867	12.2298	197.8820	85.1257
D . 389	**78002A**	**Intelsat IVA F-3**					
	26-DEC-14	-1.31	102.369	84.848	119.890	48	1081
	23735.294225	42264.56268	0.0005487	14.8201	352.1563	178.7112	330.5385
D . 390	**87029A**	**Agila 1**					
	28-DEC-14	-1.30	101.808	82.149	121.467	47	1195
	23737.721331	42265.91209	0.0002329	14.2995	26.6587	263.9003	29.8612
D . 391	**75091A**	**Intelsat IVA F-1**					
	30-DEC-14	-1.24	96.743	72.019	121.467	49	1099
	23739.867998	42262.59698	0.0006605	14.6362	345.6819	151.3113	104.9179

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 392	**82110B**	**SBS III**					
	20-DEC-14	-1.22	95.459	59.612	131.306	48	1228
	23729.563206	42262.68805	0.0003633	14.9716	12.5515	348.9126	232.1555
D . 393	**92027A**	**Palapa B4**					
	30-DEC-14	-1.20	93.745	76.803	110.687	48	1060
	23739.198692	42255.35258	0.0002535	8.5493	48.8888	236.2334	359.0473
D . 394	**82009A**	**Ekran 8**					
	26-DEC-14	-1.20	93.447	-22.524	209.419	48	1139
	23735.209144	42260.08090	0.0029810	14.5281	340.6014	223.9705	280.2369
D . 395	**85109C**	**Optus A2**					
	31-DEC-14	-1.18	92.510	77.573	107.446	49	1226
	23740.281898	42253.98822	0.0005364	14.7926	18.3287	199.7377	351.8086
D . 396	**79072A**	**Westar III**					
	30-DEC-14	-1.17	91.674	74.586	108.763	49	1051
	23739.097650	42258.79143	0.0004480	14.9264	359.4226	209.4572	57.8938
D . 397	**74101A**	**Symphonie A**					
	30-DEC-14	-1.13	88.645	69.774	107.515	48	1007
	23739.012662	42256.51072	0.0004922	13.2590	328.4446	221.9216	49.1349
D . 398	**91003A**	**Italsat 1**					
	31-DEC-14	-1.11	86.514	26.609	146.419	49	1061
	23740.692801	42247.57150	0.0012368	13.8851	29.7809	294.6682	168.5242
D . 399	**80081F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	-1.11	86.392	63.554	109.230	48	1105
	23733.197326	42248.50654	0.0004548	14.1225	336.3370	262.3421	6.5501
D . 400	**75077A**	**Symphonie B**					
	29-DEC-14	-1.09	84.966	62.718	107.213	48	1042
	23738.169421	42247.69940	0.0006009	12.8414	326.7015	261.1069	315.4912
D . 401	**93048B**	**Insat-IIB**					
	29-DEC-14	-1.09	84.926	18.799	151.053	49	994
	23738.583750	42251.71350	0.0015777	11.9223	39.0516	116.5338	94.8796
D . 402	**88071A**	**Gorizont 16**					
	31-DEC-14	-1.07	83.819	23.676	143.963	49	1138
	23740.162998	42246.85624	0.0010807	14.8449	7.3669	329.7811	21.3202
D . 403	**76073A**	**Comstar 2**					
	27-DEC-14	-1.06	82.957	67.248	98.666	49	1199
	23736.986377	42250.97017	0.0002252	14.6047	346.2493	176.4231	76.3358
D . 404	**84049A**	**Chinasat 5 (Spacenet 1)**					
	30-DEC-14	-1.04	80.927	61.872	99.982	49	1226
	23739.674410	42242.67712	0.0005520	14.2566	26.8013	177.7919	186.1623
D . 405	**93073E**	**Mage 1 (Meteosat 6 AKM)**					
	23-DEC-14	-1.03	80.624	-201.766	363.014	48	780
	23732.305185	42241.17580	0.0063005	14.3319	25.5923	356.0445	345.7696

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 406	**99047B**	**Yamal-100 No. 2**					
	25-DEC-14	-1.03	80.439	69.490	91.388	47	789
	23734.190567	42247.46388	0.0004199	9.6321	46.1769	214.8856	239.5182
D . 407	**97041D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-0.97	75.678	-1392.955	1544.311	49	845
	23740.293310	42236.90631	0.0360367	12.7190	35.3466	190.5607	3.8104
D . 408	**09010B**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-0.95	74.687	65.169	84.205	49	298
	23740.622616	42240.81901	0.0002568	3.9613	78.8580	143.8127	225.7912
D . 409	**77014A**	**Kiku-2**					
	23-DEC-14	-0.95	74.171	56.597	91.745	48	960
	23732.965405	42241.17608	0.0003978	13.6602	331.9691	225.3898	100.0099
D . 410	**90016D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	-0.89	69.236	-101.051	239.523	48	1032
	23734.261250	42231.51939	0.0042474	14.8130	13.0552	130.2119	10.5732
D . 411	**90112D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-0.88	69.103	-44.223	182.429	48	1059
	23733.463958	42233.52707	0.0026681	14.7258	15.9979	73.8164	304.2002
D . 412	**81057B**	**APPLE**					
	24-DEC-14	-0.85	66.584	-34.834	168.001	47	1048
	23733.344329	42226.89527	0.0025500	14.4636	340.8262	116.3258	144.4061
D . 413	**77092J**	**Ekran 2 fragmentation debris**					
	22-DEC-14	-0.83	65.200	-1.294	131.694	48	539
	23731.280556	42224.43036	0.0012698	13.0753	327.4282	174.5420	164.6269
D . 414	**03053E**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	31-DEC-14	-0.83	64.905	-853.061	982.872	49	550
	23740.864583	42225.17506	0.0229008	9.5133	46.8278	195.2453	339.8776
D . 415	**77018A**	**Palapa 2**					
	25-DEC-14	-0.83	64.951	42.258	87.643	48	1024
	23734.512801	42232.13408	0.0001030	14.7580	350.4098	319.1802	233.0698
D . 416	**87084D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	-0.81	63.719	-57.893	185.332	49	1120
	23739.356053	42228.92830	0.0031174	14.7895	4.2361	135.8252	298.3957
D . 417	**83028F**	**Proton-K/DM fourth stage (Blok-DM)**					
	22-DEC-14	-0.81	63.466	-42.794	169.726	48	1109
	23731.401042	42229.27696	0.0026523	14.7476	347.6232	112.4448	110.0586
D . 418	**98025D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-0.81	63.159	-72.013	198.330	48	816
	23733.260729	42231.10594	0.0030812	11.3440	38.9289	24.7506	248.1756
D . 419	**75038A**	**Anik A3**					
	30-DEC-14	-0.80	62.897	44.345	81.448	49	1048
	23739.888021	42230.21971	0.0002638	14.5957	344.7446	218.0007	100.4388

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 420	**92088D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	23-DEC-14	-0.75	58.698	15.161	102.235	48	1003
	23732.116620	42223.25810	0.0008973	13.7512	25.5499	59.7090	207.8840
D . 421	**94060D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-0.71	55.624	20.435	90.813	48	915
	23733.408241	42224.77162	0.0007387	13.8725	28.1489	49.2860	259.6590
D . 422	**94087D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	-0.70	54.776	8.893	100.659	48	926
	23735.112894	42223.26739	0.0008657	13.7798	29.0369	34.2414	52.0687
D . 423	**00032A**	**Fengyun 2B**					
	26-DEC-14	-0.67	52.233	39.269	65.197	48	739
	23735.322917	42220.61878	0.0003446	8.6190	48.9384	187.1704	235.2686
D . 424	**76066A**	**Palapa 1**					
	24-DEC-14	-0.65	51.026	30.683	71.370	48	1002
	23733.386586	42220.45199	0.0005131	14.5750	346.2951	154.5693	252.8651
D . 425	**85055A**	**Intelsat VA F-11**					
	24-DEC-14	-0.63	49.105	-4.417	102.628	47	1188
	23733.022384	42218.18262	0.0009561	14.8484	17.2668	334.4965	271.0634
D . 426	**88034D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	-0.61	47.470	-57.438	152.378	48	1112
	23735.225405	42217.46551	0.0024247	14.9139	5.6255	83.0451	240.9822
D . 427	**75097F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	-0.58	45.619	-50.773	142.011	49	1084
	23740.068414	42216.27602	0.0021891	11.5036	320.5429	103.9320	62.5969
D . 428	**72041A**	**Intelsat IV F-5**					
	23-DEC-14	-0.58	45.504	26.610	64.399	48	1075
	23732.457813	42216.82098	0.0005523	13.8917	334.2716	177.3227	77.5683
D . 429	**81114A**	**RCA Satcom IIIR**					
	28-DEC-14	-0.56	44.131	26.562	61.699	48	1062
	23737.750914	42215.14341	0.0005916	14.9760	10.1581	207.0592	61.9902
D . 430	**04010F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	-0.56	43.880	-78.438	166.198	48	537
	23735.019375	42215.66978	0.0026031	8.2556	55.7687	256.5645	68.5162
D . 431	**82082A**	**Anik D1**					
	30-DEC-14	-0.56	43.733	19.330	68.137	49	1119
	23739.238993	42213.72410	0.0007005	14.9269	11.0745	221.9900	267.2841
D . 432	**93003D**	**IUS second stage**					
	31-DEC-14	-0.55	43.194	-245.501	331.889	48	972
	23740.735428	42208.88646	0.0066075	12.9790	17.4685	18.1971	116.0087
D . 433	**94069D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	27-DEC-14	-0.55	43.203	-54.948	141.355	49	913
	23736.235301	42206.98512	0.0021827	14.1649	28.1399	42.3122	25.2121

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 . 434	**91010F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	23-DEC-14	-0.52	41.145	-28.598	110.889	48	1048
	23732.157986	42207.08798	0.0019008	14.2561	19.7186	120.1809	213.8588
D . 435	**83065A**	**Galaxy I**					
	26-DEC-14	-0.52	40.555	26.334	54.776	48	1181
	23735.209144	42209.62429	0.0003588	14.7098	20.2873	188.2197	280.5569
D . 436	**77092K**	**Ekran 2 fragmentation debris**					
	26-DEC-14	-0.51	40.271	-32.509	113.051	48	431
	23735.333715	42198.01140	0.0020220	12.9192	326.9605	213.3658	146.4780
D . 437	**04043D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	24-DEC-14	-0.50	39.572	7.025	72.119	48	516
	23733.942106	42206.05884	0.0007242	8.6478	48.3204	56.4775	35.4941
D . 438	**99047E**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	30-DEC-14	-0.49	38.506	-404.865	481.878	49	746
	23739.523565	42209.37497	0.0098208	12.5379	36.4645	308.9051	240.4296
D . 439	**91015E**	**Mage 1 (Meteosat 5 AKM)**					
	31-DEC-14	-0.48	38.200	-638.522	714.922	48	778
	23740.156400	42202.10446	0.0158467	14.1833	14.7135	122.9706	29.8615
D . 440	**81096A**	**SBS II**					
	26-DEC-14	-0.48	38.026	12.572	63.481	48	1210
	23735.182813	42202.36070	0.0005662	14.8648	359.8644	146.4262	307.6430
D . 441	**93072A**	**Gorizont 29**					
	30-DEC-14	-0.48	37.423	-10.426	85.273	49	1077
	23739.407616	42208.95926	0.0011329	14.1139	25.3813	243.9689	253.1654
D . 442	**68081AJ**	**Transtage 5 debris**					
	29-DEC-14	-0.45	37.681	-697.213	772.576	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 443	**99009A**	**Arabsat 3A**					
	31-DEC-14	-0.45	34.968	15.350	54.587	49	790
	23740.437593	42207.11412	0.0005691	5.1860	60.3327	222.4735	245.6535
D . 444	**85107A**	**Raduga 17**					
	31-DEC-14	-0.41	32.337	-17.668	82.341	49	1122
	23740.219155	42189.97200	0.0012946	14.6904	356.6605	125.9546	354.9736
D . 445	**95045D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	-0.40	32.004	-55.873	119.881	49	898
	23740.888843	42199.15635	0.0017203	13.4981	30.9470	300.3900	115.0742
D . 446	**79035E**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-0.38	30.147	-95.555	155.849	49	1085
	23739.729005	42185.24305	0.0030335	13.6350	331.5193	134.6351	169.5073
D . 447	**00032C**	**Fengyun 2B AKM**					
	24-DEC-14	-0.37	30.136	-74.659	134.932	47	632
	23733.157674	42199.93223	0.0022119	11.2521	42.8014	285.8420	287.0515

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 . 448	**83059C**	**Palapa Pacific System**					
	25-DEC-14	-0.33	26.446	5.247	47.645	47	1129
	23734.142211	42183.94777	0.0000571	14.8983	7.6448	339.2186	337.2883
D . 449	**96034A**	**Gorizont 32**					
	22-DEC-14	-0.32	26.767	-4.003	57.537	48	960
	23731.989398	42202.36884	0.0008548	13.1340	32.6574	244.3925	64.9660
D . 450	**00036D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-0.30	24.914	-57.621	107.449	48	713
	23733.426169	42199.13022	0.0016102	10.7109	42.3497	326.6596	234.3952
D . 451	**92082A**	**Gorizont 27**					
	30-DEC-14	-0.30	24.628	-28.894	78.150	49	1122
	23739.412245	42193.35629	0.0011535	14.4321	22.2931	268.7790	211.9598
D . 452	**87091D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	-0.29	6.678	-80.488	93.845	48	1122
	23733.184398	42190.03012	0.0023449	14.7517	3.6106	150.3942	30.3163
D . 453	**68081AH**	**Transtage 5 debris**					
	15-DEC-14	-0.28	17.062	-1079.260	1113.384	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 454	**83098A**	**Galaxy II**					
	29-DEC-14	-0.27	22.249	-4.733	49.231	49	1221
	23738.970023	42181.47846	0.0002582	14.6661	20.6115	335.9428	332.6541
D . 455	**92041A**	**Insat-IIA**					
	22-DEC-14	-0.25	20.887	2.660	39.114	48	1069
	23731.056470	42195.98181	0.0008189	13.7432	30.3810	174.6678	284.9032
D . 456	**81102F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	-0.24	20.507	-29.706	70.720	49	1096
	23739.652593	42176.69186	0.0011013	14.2242	339.0596	116.7711	177.9502
D . 457	**64047A**	**Syncom 3**					
	27-DEC-14	-0.22	16.250	4.016	28.483	46	286
	23736.986088	42199.25860	0.0003560	2.5113	296.1789	249.4351	92.7544
D . 458	**67001A**	**Intelsat II F-2**					
	26-DEC-14	-0.21	16.690	-45.912	79.292	49	774
	23735.788299	42200.52836	0.0013790	6.2796	306.0119	256.3360	83.3440
D . 459	**00029B**	**Proton-K/Briz-M fourth stage (Briz-M)**					
	30-DEC-14	0.24	-21.658	-1135.693	1092.378	49	718
	23739.641863	42145.31879	0.0271467	10.4952	40.6419	226.9110	134.3435
D . 460	**66110A**	**ATS 1**					
	31-DEC-14	0.26	-16.984	-47.730	13.763	49	1023
	23740.517407	42145.56325	0.0007604	4.5166	302.3942	226.2345	194.7030
D . 461	**82103E**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-14	0.30	-24.627	-79.546	30.292	48	1096
	23735.479155	42128.74929	0.0011824	14.2968	343.7921	90.5522	245.8368

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	**81027A**	**Raduga 8**					
	29-DEC-14	0.37	-29.740	-392.419	332.939	49	1109
	23738.873403	42125.27333	0.0088568	14.2117	336.6006	150.1726	93.2598
D . 463	**68081AK**	**Transtage 5 debris**					
	29-DEC-14	0.47	-37.838	-515.615	439.939	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 464	**85048C**	**Arabsat 1B**					
	29-DEC-14	0.50	-39.002	-99.228	21.224	49	1132
	23738.444201	42133.22150	0.0016230	14.8509	12.5983	266.2702	162.3339
D . 465	**85015A**	**Arabsat 1A**					
	30-DEC-14	0.53	-41.621	-64.852	-18.390	49	1036
	23739.622280	42126.47097	0.0004308	14.8418	9.4362	211.9471	189.0673
D . 466	**69013A**	**TACSAT 1**					
	30-DEC-14	0.54	-41.930	-120.734	36.874	49	908
	23739.506597	42118.07896	0.0020293	6.5673	308.8468	225.6050	227.3893
D . 467	**89020E**	**Mage 1 (Meteosat 4 AKM)**					
	23-DEC-14	0.61	-48.142	-606.299	510.014	46	732
	23732.124132	42116.53725	0.0130797	14.1625	7.5456	141.4232	313.2905
D . 468	**03015A**	**Cosmos-2397**					
	31-DEC-14	0.71	-55.255	-238.113	127.603	49	594
	23740.435949	42112.50850	0.0041617	7.6859	50.2177	257.5845	186.4110
D . 469	**88091D**	**IUS second stage**					
	29-DEC-14	0.71	-55.570	-134.051	22.912	49	1121
	23738.531505	42104.39886	0.0019668	15.1494	10.2909	188.4918	243.6692
D . 470	**79087C**	**Proton-K/DM fourth stage (Blok-DM)**					
	21-DEC-14	0.73	-56.782	-223.305	109.741	48	1079
	23730.808519	42110.05550	0.0043913	13.6502	332.5848	233.2485	135.6775
D . 471	**93069D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	0.76	-59.548	-84.712	-34.385	48	949
	23735.344201	42102.96482	0.0002727	14.0747	25.0707	273.6444	291.5445
D . 472	**75123F**	**Proton-K/DM fourth stage (Blok-DM)**					
	29-DEC-14	0.80	-62.038	-126.565	2.489	49	1112
	23738.873403	42097.60095	0.0013991	11.6055	321.6796	99.5366	92.1872
D . 473	**95035D**	**IUS second stage**					
	30-DEC-14	0.80	-62.340	-108.193	-16.488	49	892
	23739.868900	42106.94240	0.0010542	16.3315	25.0241	67.1719	159.9360
D . 474	**90054D**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	0.83	-65.130	-131.794	1.533	48	1061
	23739.560162	42094.54263	0.0012111	14.7571	13.9158	352.0896	73.3339
D . 475	**88071D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	23-DEC-14	0.99	-77.001	-158.036	4.034	48	1131
	23732.343252	42088.39501	0.0021370	14.6492	7.0005	127.0338	311.0654

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 . 476	**87096D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	1.07	-82.901	-176.139	10.337	48	1141
	23734.144016	42078.82287	0.0024375	14.6750	4.2755	133.4855	254.9958
D . 477	**77048G**	**Aerojet SVM-5 (GOES 2 AKM)**					
	26-DEC-14	1.08	-84.101	-1014.227	846.024	48	798
	23735.387072	42084.20141	0.0222648	12.8071	327.6375	337.8023	150.6108
D . 478	**68081AG**	**Transtage 5 debris**					
	16-DEC-14	1.14	-88.904	-792.812	615.005	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 479	**89081D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	1.21	-94.257	-214.351	25.837	48	1063
	23734.394271	42073.53890	0.0024263	14.6106	10.8854	14.1391	157.4937
D . 480	**89021D**	**IUS second stage**					
	24-DEC-14	1.21	-94.337	-200.190	11.515	48	1088
	23733.667106	42073.02922	0.0025074	13.7086	355.9011	89.7568	148.7685
D . 481	**85102D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	1.27	-98.859	-187.710	-10.007	48	1093
	23735.135741	42065.91510	0.0018181	14.5382	356.6341	51.6993	28.2851
D . 482	**97049E**	**Mage 1 (Meteosat 7 AKM)**					
	30-DEC-14	1.34	-104.242	-419.092	210.608	48	724
	23739.115926	42058.27024	0.0079039	12.2194	36.2649	221.7998	230.5104
D . 483	**89041B**	**DFS-Kopernikus 1**					
	24-DEC-14	1.40	-108.704	-159.193	-58.215	48	1057
	23733.785683	42052.77801	0.0015819	14.1756	25.5394	196.4421	81.9368
D . 484	**74039C**	**Titan IIIC stage 3 (Transtage 27)**					
	25-DEC-14	1.41	-109.519	-211.910	-7.128	48	1094
	23734.116817	42056.16828	0.0026120	11.8318	321.2197	226.3419	14.6659
D . 485	**88034A**	**Cosmos 1940**					
	31-DEC-14	1.41	-109.768	-194.717	-24.818	49	1062
	23740.725567	42057.47020	0.0022039	14.7295	4.9098	176.4788	356.7760
D . 486	**68081R**	**Transtage 5 debris**					
	30-DEC-14	1.57	-121.774	-922.057	678.510	49	128
	23739.749676	42042.66613	0.0196252	6.9149	319.4582	278.6428	308.3472
D . 487	**04015D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	30-DEC-14	1.58	-122.683	-198.461	-46.905	49	542
	23739.435637	42044.03604	0.0018570	9.0397	47.5663	218.9194	163.8976
D . 488	**00013D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	24-DEC-14	1.76	-136.168	-169.877	-102.460	48	724
	23733.521539	42026.46784	0.0004934	12.0548	38.3359	322.0177	248.1522
D . 489	**68081M**	**Transtage 5 debris**					
	29-DEC-14	1.80	-139.583	-757.340	478.174	43	255
	23738.994525	42022.60375	0.0162965	7.6696	320.7231	319.3248	62.6557

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 490	**74017A**	**Cosmos 637**					
	25-DEC-14	1.82	-141.217	-306.246	23.812	48	1108
	23734.034016	42021.56470	0.0039754	10.0290	317.4705	299.0300	272.9951
D . 491	**96044A**	**Italsat 2**					
	25-DEC-14	1.84	-142.763	-251.286	-34.240	48	868
	23734.529502	42022.05781	0.0022673	10.6398	42.1506	42.0583	124.3247
D . 492	**94082D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	1.89	-146.402	-266.923	-25.880	49	933
	23739.597326	42016.55822	0.0027632	13.3802	33.1554	27.7275	273.9630
D . 493	**03043E**	**Insat 3E**					
	26-DEC-14	1.90	-147.195	-214.133	-80.256	48	558
	23735.168576	42017.31546	0.0018966	0.6710	83.3397	147.9127	204.5587
D . 494	**05023H**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	1.94	-150.135	-207.417	-92.853	48	481
	23733.021771	42015.84798	0.0013919	7.9887	50.6657	219.1350	354.1072
D . 495	**87109D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	29-DEC-14	2.02	-156.623	-428.808	115.561	49	1123
	23738.381331	42007.39124	0.0067097	14.6320	4.9783	162.6705	283.4936
D . 496	**68081Z**	**Transtage 5 debris**					
	29-DEC-14	2.10	-163.273	-603.714	277.169	17	53
	23738.790648	42000.93030	0.0109422	7.3886	320.0723	285.9563	296.1625
D . 497	**90094D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	2.12	-164.099	-312.958	-15.241	49	1088
	23740.949583	41999.41483	0.0033349	14.6096	14.6288	44.6175	104.0319
D . 498	**68081J**	**Transtage 5 debris**					
	28-DEC-14	2.26	-175.582	-726.455	375.292	47	349
	23737.949699	41986.78616	0.0143183	7.4142	320.0405	317.6610	239.8063
D . 499	**68081N**	**Transtage 5 debris**					
	20-NOV-14	2.36	-183.171	-1158.539	792.197	30	173
	23699.858206	41981.64279	0.0282703	7.3894	320.2140	304.0043	308.7384
D . 500	**91046D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	2.37	-183.365	-253.986	-112.745	48	1057
	23734.352801	41980.50007	0.0019995	14.4829	17.2727	137.2093	288.6105
D . 501	**94080A**	**Zongxing 6 (A)**					
	24-DEC-14	2.49	-193.117	-590.439	204.205	48	960
	23733.257095	41971.95828	0.0096534	14.2163	23.6869	266.0152	17.5663
D . 502	**82009F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	2.55	-197.476	-357.929	-37.023	48	1101
	23733.601840	41966.57010	0.0037293	14.0273	339.2384	85.2578	208.6292
D . 503	**74017F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	2.62	-202.957	-396.008	-9.906	49	1107
	23739.322037	41961.89851	0.0046641	9.8720	317.1009	309.5193	318.0984

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 504	**06022D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	25-DEC-14	2.64	-204.092	-419.552	11.369	48	440
	23734.117407	41959.41476	0.0047702	7.1103	53.0840	291.9375	39.9195
D . 505	**81061F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	2.64	-204.584	-221.628	-187.540	49	1132
	23739.819190	41959.90938	0.0002002	13.8030	337.0129	246.2301	121.6354
D . 506	**68081G**	**Transtage 5 debris**					
	30-DEC-14	2.74	-211.681	-699.110	275.748	49	812
	23739.964803	41952.39701	0.0120593	7.3892	319.8013	298.4578	34.4206
D . 507	**83100F**	**Proton-K/DM fourth stage (Blok-DM)**					
	23-DEC-14	2.80	-216.737	-300.812	-132.662	47	1119
	23732.618519	41946.36784	0.0016643	14.0991	344.6701	49.7447	70.7502
D . 508	**97065C**	**IABS (Integrated Apogee Boost System)**					
	24-DEC-14	2.84	-219.447	-329.317	-109.577	48	824
	23733.248461	41945.38606	0.0034503	13.3613	30.9421	45.1192	27.1857
D . 509	**92017D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	23-DEC-14	2.94	-227.046	-321.987	-132.105	48	1018
	23732.237593	41937.71009	0.0019365	14.3413	19.4816	311.8131	26.5632
D . 510	**83016F**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	2.97	-229.614	-288.380	-170.848	49	1086
	23740.074213	41933.05206	0.0016799	13.9466	340.7631	201.1570	83.3792
D . 511	**88036E**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	3.04	-234.991	-330.460	-139.522	49	1110
	23740.615729	41929.69346	0.0022370	14.5085	1.2830	77.4994	215.0658
D . 512	**92074D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	3.13	-242.339	-333.950	-150.729	48	981
	23734.189919	41922.01887	0.0020168	14.1484	21.6032	39.2896	301.7607
D . 513	**68081AB**	**Transtage 5 debris**					
	29-DEC-14	3.19	-246.668	-1088.199	594.863	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 514	**05049E**	**MSG-2 operational debris (SEVIRI Cooler Cover)**					
	30-DEC-14	3.23	-249.523	-288.720	-210.326	37	288
	23739.480127	41916.28539	0.0016577	6.3230	63.9359	157.7031	152.2097
D . 515	**85024D**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	3.44	-265.454	-325.747	-205.162	49	1117
	23740.961817	41897.38982	0.0016411	14.3204	349.6702	137.6797	85.3957
D . 516	**82093F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	3.53	-272.762	-298.317	-247.207	48	1127
	23739.097164	41891.55388	0.0008989	13.8059	340.5860	185.7597	36.4232
D . 517	**95011D**	**Star 27 (Himawari-5 AKM)**					
	28-DEC-14	3.53	-273.037	-1231.562	685.489	49	750
	23737.634965	41890.68425	0.0226998	13.5469	26.6543	258.2353	119.4394

D .nn	COSPAR	NAME					
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D . 518	**84090F**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-14	3.57	-275.477	-347.008	-203.946	48	1130
	23735.012199	41887.95761	0.0014343	14.1812	347.7434	60.8922	69.4777
D . 519	**77092G**	**Proton-K/DM fourth stage (Blok-DM)**					
	25-DEC-14	3.63	-280.671	-326.734	-234.608	48	1142
	23734.254838	41884.34280	0.0007953	12.3449	325.3379	69.5178	334.7426
D . 520	**79015D**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	3.84	-296.278	-334.702	-257.854	49	1100
	23739.956250	41866.56855	0.0011701	12.9030	329.1798	195.6557	71.0109
D . 521	**80104E**	**Proton-K/DM fourth stage (Blok-DM)**					
	26-DEC-14	3.84	-296.747	-429.946	-163.548	48	1128
	23735.133681	41868.11530	0.0030113	13.5132	334.9181	82.5216	20.1175
D . 522	**04042C**	**Fengyun 2C AKM**					
	29-DEC-14	3.85	-296.907	-391.792	-202.023	49	506
	23738.179664	41866.90041	0.0023167	7.6983	49.5163	225.2875	50.4937
D . 523	**76023K**	**LES 8, LES 9 operational debris**					
	29-DEC-14	3.85	-297.391	-313.220	-281.562	49	1101
	23738.866898	41866.10972	0.0003292	13.1801	331.2475	241.0241	74.5569
D . 524	**89053A**	**Olympus 1**					
	26-DEC-14	3.95	-304.612	-367.654	-241.570	48	1168
	23735.221794	41859.06154	0.0016469	14.6412	13.3637	224.7647	215.1456
D . 525	**86038D**	**Proton-K/DM fourth stage (Blok-DM)**					
	29-DEC-14	3.96	-305.288	-393.878	-216.698	49	1062
	23738.943958	41858.57540	0.0020121	14.3035	353.5083	73.6931	92.8152
D . 526	**87073D**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	4.00	-308.302	-384.390	-232.213	49	1133
	23740.524456	41855.32251	0.0015083	14.3583	358.5821	51.1630	69.5820
D . 527	**68081P**	**Transtage 5 debris**					
	24-DEC-14	4.04	-311.562	-682.793	59.669	38	240
	23733.355058	41852.06366	0.0092048	7.1710	318.7094	301.9742	97.2964
D . 528	**84028F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	4.15	-320.441	-403.353	-237.529	47	1117
	23733.907326	41843.02352	0.0018809	13.9436	343.8052	290.2532	48.9301
D . 529	**76107F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	4.27	-329.160	-376.458	-281.862	48	1126
	23733.404780	41835.39429	0.0008834	11.7325	322.2456	86.4585	302.5620
D . 530	**68081X**	**Transtage 5 debris**					
	30-DEC-14	4.30	-331.600	-2160.500	-1497.200	48	119
	23739.510787	41835.88196	0.0461975	5.6240	328.7797	7.6793	156.4525
D . 531	**88108D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	4.47	-344.618	-407.900	-281.335	49	1139
	23740.186123	41819.73430	0.0015867	14.5989	7.1495	95.6532	220.0786

D .nn	COSPAR	NAME					
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	MJD	a	e	i	Ω	ω	λ
D . 532	**68081E**	**Titan IIIC stage 3 (Transtage 5)**					
	31-DEC-14	4.48	-345.416	-744.557	53.724	49	1100
	23740.436840	41818.82665	0.0098537	7.2232	318.5515	294.4046	218.5618
D . 533	**79007A**	**Scatha**					
	26-DEC-14	4.52	-348.260	-7907.732	7211.212	47	1133
	23735.142176	41815.47303	0.1792915	17.9999	339.9666	356.8153	240.9992
D . 534	**68081A**	**OV2 5**					
	30-DEC-14	4.62	-356.246	-701.125	-11.367	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 535	**79007C**	**Scatha AKM**					
	24-DEC-14	4.73	-364.787	-7819.489	7089.915	46	421
	23733.375486	41800.37014	0.1773477	17.9359	340.0424	356.5285	168.2826
D . 536	**80060F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	4.80	-369.442	-444.486	-294.398	49	1092
	23739.881424	41793.95889	0.0020696	13.2958	332.9808	168.7800	73.4629
D . 537	**68081H**	**Transtage 5 debris**					
	26-DEC-14	5.16	-396.851	-698.113	-95.589	47	601
	23735.579236	41769.91336	0.0071728	7.1224	318.0338	353.9385	153.2707
D . 538	**68081L**	**Transtage 5 debris**					
	22-DEC-14	5.60	-430.450	-721.533	-139.366	26	174
	23731.988356	41732.64728	0.0082485	7.1038	317.8353	322.2542	46.2118
D . 539	**75100F**	**Aerojet SVM-5 (GOES 1 AKM)**					
	23-DEC-14	5.97	-458.668	-1641.543	724.207	48	924
	23732.508090	41705.11110	0.0291721	11.3535	320.1044	311.4109	273.8004
D . 540	**02040F**	**MSG-1 operational debris (SEVIRI Entry Baffle Cover)**					
	24-DEC-14	6.11	-469.254	-823.093	-115.415	15	15
	23733.781435	41695.14909	0.0079882	8.1876	44.3262	23.6257	30.1292
D . 541	**74039A**	**ATS 6**					
	24-DEC-14	6.15	-471.974	-599.144	-344.804	48	1152
	23733.670637	41692.82592	0.0032196	10.9965	318.8383	196.9624	202.0847
D . 542	**68081AF**	**Transtage 5 debris**					
	25-DEC-14	6.36	-487.828	-1445.179	469.524	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 543	**68081K**	**Transtage 5 debris**					
	28-DEC-14	6.43	-493.543	-706.248	-280.837	45	275
	23737.124005	41669.10625	0.0061830	7.2373	317.6091	16.2535	280.3166
D . 544	**08066C**	**Fengyun 2E AKM (FG-36 AKM)**					
	23-DEC-14	6.55	-502.705	-651.941	-353.470	48	309
	23732.666632	41660.82125	0.0036424	2.1262	58.0084	225.8069	85.1298
D . 545	**68081AC**	**Transtage 5 debris**					
	14-DEC-14	6.94	-532.163	-1356.480	292.154	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319

D .nn	COSPAR	NAME					
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D . 546	**68081AE**	**Transtage 5 debris**					
	25-DEC-14	6.96	-533.393	-1292.849	226.063	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 547	**05049F**	**MSG-2 operational debris (SEVIRI Entry Baffle Cover)**					
	24-DEC-14	7.05	-540.007	-778.244	-301.770	32	271
	23733.630984	41623.73950	0.0046991	6.2524	63.8002	294.2636	77.6314
D . 548	**70055A**	**Intelsat III F-8**					
	24-DEC-14	7.16	-548.660	-1952.839	855.519	48	1098
	23733.569572	41615.82728	0.0349701	3.9232	299.2852	165.4843	149.3130
D . 549	**97049A**	**Hot Bird 3**					
	23-DEC-14	7.94	-607.317	-707.443	-507.191	48	715
	23732.747836	41556.51672	0.0022698	4.7546	60.8772	291.2821	95.5026
D . 550	**68081AA**	**Transtage 5 debris**					
	31-DEC-14	8.84	-674.567	-1139.238	-209.897	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 551	**11001B**	**Zenit-3SLBF third stage (Fregat-SB)**					
	31-DEC-14	9.09	-693.204	-1310.226	-76.182	49	210
	23740.683102	41470.74925	0.0150459	2.5617	65.7327	333.0755	201.0770
D . 552	**68081T**	**Transtage 5 debris**					
	30-DEC-14	9.18	-699.729	-1145.098	-254.361	38	103
	23739.145498	41465.07686	0.0106443	6.0211	313.3975	238.3496	161.5961
D . 553	**97029C**	**Fengyun 2A AKM**					
	30-DEC-14	9.38	-714.600	-1643.453	214.253	48	732
	23739.872697	41450.01566	0.0215402	12.7215	33.6427	320.7669	145.9340
D . 554	**87040D**	**Proton-K/DM fourth stage (Blok-DM)**					
	31-DEC-14	9.88	-752.262	-814.942	-689.582	48	1117
	23740.688218	41412.52802	0.0017854	13.7287	350.1432	197.2906	183.0999
D . 555	**85007D**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	9.90	-753.858	-819.981	-687.735	49	1145
	23739.875787	41410.90053	0.0018820	13.5441	351.4128	178.9776	122.3450
D . 556	**89052D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	10.04	-764.071	-892.560	-635.583	48	1106
	23735.343900	41400.87518	0.0033675	13.9049	8.1535	155.9918	322.1395
D . 557	**93072D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	10.41	-791.704	-870.099	-713.310	49	963
	23740.834421	41373.06165	0.0018355	13.4669	23.0871	59.0626	165.8159
D . 558	**84063F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	10.86	-825.062	-896.099	-754.024	49	1135
	23739.376806	41339.43387	0.0019717	13.3871	347.8817	143.2227	285.5807
D . 559	**87100D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	11.26	-854.538	-919.869	-789.206	48	1130
	23734.376620	41310.39316	0.0018495	14.1926	1.3117	148.3267	125.1640

D .nn	COSPAR	NAME					
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D . 560	**91014D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	11.37	-863.103	-969.335	-756.871	49	1093
	23740.529236	41301.97462	0.0023415	14.4204	13.3850	32.1033	191.7259
D . 561	**68081U**	**Transtage 5 debris**					
	30-DEC-14	11.64	-882.696	-1249.514	-515.879	32	86
	23739.663831	41281.32843	0.0082085	7.1440	314.4879	125.7709	337.3690
D . 562	**01015A**	**GSAT-1**					
	22-DEC-14	12.78	-966.646	-1905.401	-27.891	48	702
	23731.244190	41197.76788	0.0237339	10.1293	40.7691	179.4936	301.6749
D . 563	**94030D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	30-DEC-14	12.84	-971.281	-1158.213	-784.348	49	962
	23739.914965	41193.42710	0.0046629	13.2659	23.6627	73.9669	2.7881
D . 564	**08003B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	23-DEC-14	13.43	-1014.117	-1765.229	-263.005	48	340
	23732.606782	41149.72387	0.0185932	5.4252	57.2354	129.6531	88.0704
D . 565	**10002B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	26-DEC-14	13.57	-1024.416	-1846.676	-202.156	48	258
	23735.323866	41139.53553	0.0208375	3.7449	67.7287	146.8949	274.3320
D . 566	**13062B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	30-DEC-14	14.16	-1067.902	-2115.896	-19.909	49	60
	23739.327002	41096.27918	0.0254517	0.7774	86.7755	359.9396	146.5095
D . 567	**11048B**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	24-DEC-14	14.36	-1082.651	-2039.943	-125.360	48	171
	23733.657940	41081.18963	0.0234926	2.3158	69.4662	341.2534	241.1609
D . 568	**68081Y**	**Transtage 5 debris**					
	26-DEC-14	14.82	-1115.688	-1708.062	-523.314	47	126
	23735.348623	41047.77527	0.0156028	5.4992	308.6892	251.8530	86.9642
D . 569	**07058C**	**Proton-M/Briz-M fourth stage (Briz-M)**					
	30-DEC-14	14.96	-1126.037	-2112.291	-139.784	49	364
	23739.509676	41038.17649	0.0235318	5.6640	55.9831	104.0546	122.0810
D . 570	**97027B**	**Insat-IID**					
	25-DEC-14	16.26	-1220.723	-2555.376	113.931	48	859
	23734.518877	40943.24879	0.0324399	12.8494	27.1814	8.0525	184.7146
D . 571	**68081AD**	**Transtage 5 debris**					
	28-DEC-14	18.54	-1384.316	-2440.488	-328.145	48	887
	23739.006400	41808.25896	0.0085083	7.1801	318.6274	300.1445	21.1319
D . 572	**68050J**	**Titan IIIC stage 3 (Transtage 16)**					
	24-DEC-14	19.16	-1429.165	-2125.658	-732.672	48	1090
	23733.815532	40735.18946	0.0163530	1.1596	331.3335	1.9014	87.0399
D . 573	**66053J**	**Titan IIIC stage 3 (Transtage 11)**					
	26-DEC-14	23.21	-1715.573	-2379.742	-1051.404	48	1107
	23735.074572	40448.38458	0.0164891	0.9410	31.3221	97.9388	54.1858

D .nn	COSPAR	NAME					
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D . 574	**68050H**	**OPS 9348 (IDSCS 27)**					
	27-DEC-14	23.37	-1727.172	-2049.312	-1405.032	47	541
	23736.110324	40436.73650	0.0081002	1.6983	316.6742	146.4376	286.8295
D . 575	**66053H**	**IDCSP 7**					
	16-DEC-14	23.74	-1753.212	-2089.153	-1417.271	41	496
	23725.421157	40411.00062	0.0080918	1.0450	34.1221	99.3159	201.9085
D . 576	**68050G**	**OPS 9347 (IDSCS 26)**					
	31-DEC-14	24.34	-1794.816	-2057.859	-1531.773	48	541
	23740.480313	40369.07457	0.0064732	1.6143	319.3633	145.5232	250.7825
D . 577	**66053G**	**IDCSP 6**					
	21-DEC-14	24.78	-1825.361	-2092.430	-1558.292	48	526
	23730.208924	40338.64553	0.0064185	1.1412	38.3602	101.3963	252.3910
D . 578	**67003H**	**IDCSP 15**					
	24-DEC-14	25.04	-1843.796	-2128.231	-1559.361	47	597
	23733.141771	40320.43115	0.0066205	1.0132	14.5465	347.6202	305.9291
D . 579	**68050F**	**OPS 9346 (IDSCS 25)**					
	24-DEC-14	25.25	-1858.041	-2049.899	-1666.182	48	561
	23733.877431	40305.92709	0.0048665	1.4900	322.2270	144.8913	34.3499
D . 580	**66053F**	**IDCSP 5**					
	24-DEC-14	25.65	-1885.815	-2101.074	-1670.557	46	486
	23733.118356	40278.10438	0.0050953	1.2421	43.9725	104.1576	293.9151
D . 581	**68050E**	**OPS 9345 (IDSCS 24)**					
	27-DEC-14	25.93	-1905.751	-2060.302	-1751.201	47	554
	23736.192025	40258.12774	0.0037245	1.4515	324.4951	144.3416	242.2596
D . 582	**67003G**	**IDCSP 14**					
	18-DEC-14	26.05	-1913.978	-2141.387	-1686.569	45	562
	23727.244294	40249.93427	0.0052263	1.0289	22.5164	351.5916	241.0847
D . 583	**66053E**	**IDCSP 4**					
	18-DEC-14	26.32	-1932.543	-2100.611	-1764.474	43	458
	23727.623947	40231.81585	0.0041750	1.2968	44.8281	111.8917	156.8120
D . 584	**68050D**	**OPS 9344 (IDSCS 23)**					
	22-DEC-14	26.52	-1946.119	-2052.531	-1839.707	47	552
	23731.222488	40217.85213	0.0027003	1.3663	326.9930	145.8712	298.7037
D . 585	**67003F**	**IDCSP 13**					
	29-DEC-14	26.91	-1973.224	-2154.679	-1791.770	43	492
	23738.999444	40190.64732	0.0042631	1.1189	27.5588	1.4409	66.2386
D . 586	**66053D**	**IDCSP 3**					
	20-DEC-14	26.93	-1974.599	-2116.029	-1833.169	48	561
	23729.213889	40189.37818	0.0034229	1.3805	48.3318	120.6728	217.2113
D . 587	**68050C**	**OPS 9343 (IDSCS 22)**					
	23-DEC-14	26.94	-1975.364	-2054.770	-1895.958	48	584
	23732.094803	40188.66457	0.0019858	1.3261	328.9014	147.3390	299.9322

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 . 588	**68050B**	**OPS 9342 (IDSCS 21)**					
	25-DEC-14	27.16	-1990.815	-2055.961	-1925.670	48	536
	23734.602361	40173.56104	0.0016231	1.3048	330.0512	149.1960	173.6983
D . 589	**66053C**	**IDCSP 2**					
	22-DEC-14	27.27	-1998.467	-2126.061	-1870.874	47	557
	23731.213171	40165.44453	0.0030767	1.4239	49.4074	128.5367	285.9324
D . 590	**68050A**	**OPS 9341 (IDSCS 20)**					
	30-DEC-14	27.29	-1999.520	-2057.606	-1941.434	47	687
	23739.138322	40164.58204	0.0014470	1.3233	330.2647	148.4182	283.0469
D . 591	**66053B**	**IDCSP 1**					
	30-DEC-14	27.49	-2013.210	-2129.010	-1897.411	46	711
	23739.285104	40150.92438	0.0028935	1.4615	50.2207	134.0800	289.7343
D . 592	**67003E**	**IDCSP 12**					
	29-DEC-14	27.61	-2021.377	-2206.009	-1836.745	43	512
	23738.992153	40142.43651	0.0037614	1.1498	32.9052	12.6637	69.1944
D . 593	**66053A**	**GGTS 1**					
	29-DEC-14	27.72	-2028.984	-2138.935	-1919.033	49	585
	23738.010868	40134.62043	0.0027906	1.4796	49.6369	148.5005	8.3045
D . 594	**67003D**	**IDCSP 11**					
	29-DEC-14	28.19	-2061.740	-2206.339	-1917.140	46	441
	23738.207963	40102.56787	0.0035411	1.2193	34.3732	27.7512	187.7033
D . 595	**67003C**	**IDCSP 10**					
	25-DEC-14	28.61	-2090.475	-2235.650	-1945.300	44	452
	23734.131655	40073.50424	0.0035510	1.2518	36.1048	38.2058	235.6137
D . 596	**67003B**	**IDCSP 9**					
	20-DEC-14	28.83	-2105.400	-2248.542	-1962.258	48	535
	23729.106563	40058.69854	0.0036191	1.2654	36.8253	43.7597	263.7703
D . 597	**67003A**	**IDCSP 8**					
	24-DEC-14	28.96	-2114.032	-2260.964	-1967.100	48	561
	23733.703368	40050.01726	0.0037170	1.2645	39.0942	44.3718	85.1692
D . 598	**67066G**	**Titan IIIC stage 3 (Transtage 14)**					
	25-DEC-14	31.08	-2258.745	-2569.768	-1947.722	48	1133
	23734.396354	39905.51837	0.0077469	6.8332	307.2239	239.9276	334.2666
D . 599	**67066F**	**DODGE 1**					
	24-DEC-14	32.02	-2322.458	-2526.311	-2118.604	48	1112
	23733.417315	39841.73548	0.0051629	6.7377	306.2973	260.8277	221.4527
D . 600	**67066E**	**LES 5**					
	31-DEC-14	32.92	-2383.493	-2592.850	-2174.135	49	1124
	23740.177894	39780.70094	0.0053931	6.5930	305.5994	281.5309	304.0632
D . 601	**67066D**	**IDCSP 19**					
	24-DEC-14	33.66	-2433.060	-2651.553	-2214.568	45	758
	23733.135694	39731.07421	0.0056313	6.5063	305.1530	292.8844	272.8017

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 . 602	**67066C**	**IDCSP 18**					
	24-DEC-14	34.24	-2472.051	-2706.254	-2237.849	44	730
	23733.131250	39692.08365	0.0061431	6.4639	304.6854	302.7339	279.7312
D . 603	**67066B**	**IDCSP 17**					
	24-DEC-14	34.64	-2498.786	-2748.121	-2249.451	48	590
	23733.883924	39665.36108	0.0065575	6.3707	304.4348	308.5608	40.1352
D . 604	**67066A**	**IDCSP 16**					
	24-DEC-14	34.85	-2512.825	-2769.695	-2255.954	47	791
	23733.821979	39651.21643	0.0067243	6.3813	304.2267	311.3073	76.5447

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 106 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 35.

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	**91087A**	**Raduga 28**					
	24-DEC-14	9	87.9	30.1	117.9	48	1148
	23733.991563	42175.86598	0.0004825	14.6136	19.3489	84.6800	112.6334
L1 . 2	**91014A**	**Raduga 27**					
	26-DEC-14	10	110.9	17.6	128.5	48	1172
	23735.003032	42140.53656	0.0001703	15.2297	16.4242	132.4865	103.5486
L1 . 3	**95054A**	**Luch 1-1**					
	25-DEC-14	740	5.0	72.5	77.5	48	963
	23734.124352	42162.87134	0.0005179	12.9282	37.9236	49.2495	75.2023
L1 . 4	**93039A**	**Galaxy IV**					
	23-DEC-14	741	6.3	71.9	78.2	48	1052
	23732.606470	42162.61963	0.0013389	13.2630	33.1129	195.5056	74.2633
L1 . 5	**00036A**	**Cosmos-2371**					
	26-DEC-14	742	10.0	70.1	80.1	48	743
	23735.024248	42162.76090	0.0002597	10.7306	42.3866	111.7023	79.0882
L1 . 6	**90061A**	**Cosmos 2085**					
	23-DEC-14	742	10.2	70.0	80.2	48	1094
	23732.606551	42161.79781	0.0002660	14.7714	14.4959	133.4511	78.4321
L1 . 7	**94087A**	**Raduga 32**					
	26-DEC-14	742	10.3	69.9	80.2	48	1010
	23735.139398	42164.52663	0.0009220	13.7638	28.9949	160.2819	69.9718
L1 . 8	**88066A**	**Cosmos 1961**					
	25-DEC-14	742	10.5	69.8	80.3	48	1199
	23734.885266	42163.86562	0.0002579	14.7815	7.3394	88.0212	69.9296
L1 . 9	**84022A**	**Cosmos 1540**					
	25-DEC-14	742	10.8	69.6	80.5	48	1001
	23734.511725	42167.83208	0.0011002	15.8059	348.9995	157.7160	76.3225
L1 . 10	**08033A**	**Cosmos-2440**					
	25-DEC-14	742	10.9	69.6	80.5	48	342
	23734.131956	42166.14899	0.0003967	3.0559	58.9993	143.1625	70.2276
L1 . 11	**91010A**	**Cosmos 2133**					
	26-DEC-14	742	11.1	69.5	80.6	48	1162
	23735.006898	42163.95644	0.0005051	14.2695	20.1435	109.0684	69.7528
L1 . 12	**81018A**	**Comstar 4**					
	26-DEC-14	742	11.3	69.4	80.7	48	1168
	23735.011458	42162.52265	0.0001578	14.6875	350.9569	250.2100	79.9790

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	**98025A**	**Cosmos 2350**					
	25-DEC-14	743	12.2	69.0	81.1	48	830
	23734.124352	42168.44698	0.0005544	11.3327	38.8888	70.6383	76.0800
L1 . 14	**84031A**	**Cosmos 1546**					
	25-DEC-14	743	12.7	68.7	81.4	48	1014
	23734.511725	42160.37961	0.0022354	14.6449	351.0257	257.9455	75.8243
L1 . 15	**90051A**	**Insat-ID**					
	26-DEC-14	744	13.9	68.1	82.0	48	1135
	23735.019375	42165.33401	0.0014100	13.4969	32.2084	92.2201	68.7489
L1 . 16	**94069A**	**Elektro 1**					
	25-DEC-14	744	14.5	67.8	82.3	48	994
	23734.885266	42168.73635	0.0009057	14.1735	28.0792	150.7521	72.2854
L1 . 17	**82044A**	**Cosmos 1366**					
	30-DEC-14	744	14.6	67.7	82.4	49	1017
	23739.962442	42168.40380	0.0002519	15.4962	343.5414	12.6632	71.1389
L1 . 18	**93062A**	**Raduga 30**					
	31-DEC-14	745	16.7	66.7	83.4	48	1099
	23740.593426	42163.75293	0.0004956	14.1723	25.2119	187.0872	69.2063
L1 . 19	**83028A**	**Raduga 12**					
	23-DEC-14	747	20.0	65.0	85.0	48	1087
	23732.001296	42159.60610	0.0002207	14.7112	347.5557	187.3011	81.8090
L1 . 20	**81102A**	**Raduga 10**					
	23-DEC-14	748	20.8	64.6	85.4	48	995
	23732.818056	42170.57730	0.0006872	14.2910	339.3718	143.1614	79.7068
L1 . 21	**79035A**	**Raduga 5**					
	30-DEC-14	748	21.2	64.4	85.6	49	1075
	23739.962442	42170.50354	0.0004208	13.6776	331.7047	140.0475	69.7756
L1 . 22	**75123A**	**Raduga 1**					
	30-DEC-14	748	21.6	64.2	85.8	49	1029
	23739.956331	42157.51724	0.0009338	11.8411	322.3491	157.0874	74.7770
L1 . 23	**84016A**	**Raduga 14**					
	30-DEC-14	750	23.2	63.4	86.6	49	988
	23739.956273	42171.55099	0.0003457	14.6152	350.4163	132.2181	71.1504
L1 . 24	**76092A**	**Raduga 2**					
	29-DEC-14	750	23.3	63.4	86.7	49	1076
	23738.876829	42166.57487	0.0027235	12.4130	324.3358	266.3800	86.1786
L1 . 25	**77080A**	**SIRIO 1**					
	30-DEC-14	750	1.5	74.4	75.9	49	914
	23739.575775	42164.18294	0.0005203	14.4429	342.1777	75.9090	74.5012
L1 . 26	**06053D**	**Fengyun 2D debris**					
	23-DEC-14	750	23.8	63.1	86.9	43	265
	23732.686157	42161.29330	0.0080917	4.2807	65.5748	256.3969	85.2829
L1 . 27	**88014A**	**STTW-2**					
	25-DEC-14	753	27.3	61.3	88.6	48	1155
	23734.602315	42172.01458	0.0005750	14.7544	18.0528	86.4039	67.2794

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	**03053B**	**Yamal 200 N1 (Yamal 201)**					
	26-DEC-14	757	30.5	59.7	90.2	48	564
	23735.139398	42175.56583	0.0004516	0.4370	83.8898	185.2475	70.5202
L1 . 29	**79062A**	**Gorizont 2**					
	29-DEC-14	757	30.5	59.7	90.2	49	1112
	23738.963194	42157.15128	0.0006041	13.9234	333.8429	212.7986	85.1392
L1 . 30	**08033D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	758	31.4	59.2	90.7	48	340
	23733.812975	42171.27082	0.0031408	3.0234	58.9506	237.8159	86.7942
L1 . 31	**83118F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	761	33.8	58.1	91.8	49	1049
	23739.957627	42158.72782	0.0046024	14.5738	350.4418	227.4466	89.4219
L1 . 32	**97070A**	**Kupon 1**					
	22-DEC-14	765	37.4	56.2	93.6	48	834
	23731.989398	42155.77887	0.0005664	13.3355	32.6688	186.1230	64.3374
L1 . 33	**88063A**	**Insat-IC**					
	26-DEC-14	766	38.1	55.8	94.0	48	1018
	23735.008032	42155.37120	0.0003328	14.9238	5.8808	82.9795	87.7735
L1 . 34	**85102A**	**Cosmos 1700**					
	25-DEC-14	768	39.2	55.3	94.5	48	1099
	23734.117789	42170.23237	0.0007087	14.7190	357.1484	138.6772	57.5740
L1 . 35	**90112A**	**Raduga 26**					
	31-DEC-14	774	42.9	53.4	96.3	49	1156
	23740.002743	42174.11169	0.0002461	14.6929	15.7782	40.2467	90.7812
L1 . 36	**90054A**	**Gorizont 20**					
	26-DEC-14	775	44.0	52.8	96.8	48	1203
	23735.144583	42168.95647	0.0008783	14.8398	14.2417	127.9528	54.0496
L1 . 37	**84041A**	**Gorizont 9**					
	31-DEC-14	776	44.4	52.6	97.0	49	1006
	23740.137755	42156.22213	0.0008332	14.6157	351.5766	165.0189	57.2951
L1 . 38	**87096A**	**Cosmos 1897**					
	24-DEC-14	777	44.7	52.5	97.2	48	1072
	23733.130556	42161.88498	0.0001977	14.8008	4.6885	73.6183	52.5341
L1 . 39	**79087A**	**Ekran 4**					
	31-DEC-14	777	44.7	52.5	97.2	49	1020
	23740.068414	42152.55254	0.0003887	13.8460	333.1576	55.3545	63.1761
L1 . 40	**76092F**	**Proton-K/DM fourth stage (Blok-DM)**					
	29-DEC-14	777	45.0	52.3	97.3	49	1055
	23738.427292	42159.22300	0.0014306	12.3883	324.4746	82.6514	95.6333
L1 . 41	**76107A**	**Ekran 1**					
	29-DEC-14	778	45.3	52.2	97.5	49	1092
	23738.873403	42154.58503	0.0060944	12.4859	324.6714	60.2102	91.2199
L1 . 42	**90011A**	**DFH-2A**					
	22-DEC-14	780	46.4	51.6	98.0	47	1183
	23731.977627	42152.31583	0.0003912	14.3895	25.1341	84.3349	62.5855

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	**80104A**	**Ekran 6**					
	30-DEC-14	780	46.8	51.4	98.2	49	1101
	23739.956458	42178.73624	0.0004929	14.1259	336.6787	290.1237	80.2477
L1 . 44	**03060D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	31-DEC-14	783	48.2	50.7	98.9	49	549
	23740.139907	42179.65401	0.0017508	9.3657	46.9102	124.2392	70.8356
L1 . 45	**92074A**	**Ekran 20**					
	25-DEC-14	785	49.1	50.2	99.3	48	1109
	23734.598356	42175.18825	0.0005889	14.3648	22.3896	124.1586	57.5767
L1 . 46	**84016F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-14	785	49.2	50.2	99.4	49	1084
	23737.550185	42171.66009	0.0039670	14.6093	350.5167	116.7500	53.1834
L1 . 47	**77092A**	**Ekran 2**					
	31-DEC-14	785	49.3	50.1	99.4	49	1067
	23740.074213	42149.72818	0.0038256	12.9868	327.1868	250.5898	82.6315
L1 . 48	**79015A**	**Ekran 3**					
	30-DEC-14	786	50.1	49.7	99.8	49	1096
	23739.012662	42162.70709	0.0039587	13.5546	331.1292	245.4878	49.8514
L1 . 49	**81061A**	**Ekran 7**					
	28-DEC-14	788	50.9	49.3	100.2	48	1110
	23737.930787	42152.19705	0.0001450	14.2400	338.2488	204.6338	91.1100
L1 . 50	**90116A**	**Raduga 1-2**					
	24-DEC-14	790	51.8	48.8	100.6	48	1188
	23733.994433	42163.74031	0.0004305	14.7170	15.9757	52.7085	100.8775
L1 . 51	**94008A**	**Raduga 1-3**					
	24-DEC-14	790	51.9	48.8	100.7	48	1051
	23733.951690	42156.97671	0.0002613	14.1079	26.5349	141.7570	51.9286
L1 . 52	**83100A**	**Ekran 11**					
	26-DEC-14	795	54.3	47.6	101.8	48	1007
	23735.011458	42147.79513	0.0004915	14.5010	345.8016	198.3244	80.2137
L1 . 53	**86010A**	**STTW-1**					
	30-DEC-14	800	56.5	46.4	102.9	49	1052
	23739.938530	42168.32164	0.0005033	14.8873	1.7532	160.4490	102.4703
L1 . 54	**96058A**	**Ekspress 2**					
	30-DEC-14	801	57.0	46.2	103.2	49	924
	23739.646042	42146.99532	0.0006963	13.4017	32.4264	206.4554	72.3020
L1 . 55	**01045D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	803	57.7	45.8	103.5	48	657
	23734.756863	42180.62738	0.0024605	9.8691	46.6027	274.8745	87.6828
L1 . 56	**05010F**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	24-DEC-14	805	58.9	45.2	104.1	48	499
	23733.681123	42182.77664	0.0023059	8.2631	50.0166	163.3098	70.8821
L1 . 57	**00049A**	**Raduga 1-5**					
	31-DEC-14	806	59.2	45.0	104.2	49	740
	23740.657315	42176.06964	0.0001176	10.6200	42.8439	118.1696	99.0407

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	**82093A**	**Ekran 9**					
	25-DEC-14	808	60.2	44.5	104.7	47	1008
	23734.872708	42166.56505	0.0025869	14.2926	342.1835	248.2850	104.8430
L1 . 59	**89098A**	**Raduga 24**					
	25-DEC-14	809	60.6	44.3	104.9	48	1110
	23734.528866	42153.68011	0.0004295	15.0273	12.3802	161.0321	99.3809
L1 . 60	**94012A**	**Raduga 31**					
	25-DEC-14	810	60.9	44.1	105.1	48	984
	23734.885266	42183.31098	0.0002084	14.0772	26.4732	88.2586	71.6037
L1 . 61	**04042D**	**Fengyun 2C operational debris (cooler cover)**					
	29-DEC-14	816	63.4	42.9	106.3	24	24
	23738.732211	42155.37736	0.0063782	7.8277	49.6227	299.1898	47.2243
L1 . 62	**80016A**	**Raduga 6**					
	31-DEC-14	822	65.5	41.8	107.3	49	1021
	23740.138785	42181.99649	0.0005620	13.8661	334.1009	181.2140	59.2592
L1 . 63	**07018A**	**Nigcomsat 1**					
	25-DEC-14	825	66.8	41.1	107.9	48	398
	23734.884965	42181.94401	0.0005015	5.0794	60.4061	75.3229	92.4740
L1 . 64	**74060A**	**Molniya 1-S**					
	29-DEC-14	826	66.9	41.1	107.9	49	1096
	23738.762975	42153.22823	0.0011119	10.6192	317.4991	149.4842	101.9636
L1 . 65	**78039A**	**Yuri**					
	23-DEC-14	828	67.6	40.7	108.3	48	1042
	23732.908900	42179.16131	0.0019550	13.7772	332.7304	199.4456	51.9183
L1 . 66	**86044A**	**Gorizont 12**					
	24-DEC-14	834	69.8	39.5	109.4	48	1058
	23733.430613	42160.20473	0.0005608	14.7271	359.2019	187.6523	108.9683
L1 . 67	**79105A**	**Gorizont 3**					
	24-DEC-14	835	70.0	39.4	109.4	48	1041
	23733.040718	42180.58585	0.0015274	14.0019	335.0575	149.5962	53.0048
L1 . 68	**78073A**	**Raduga 4**					
	25-DEC-14	846	73.7	37.5	111.2	48	1082
	23734.839676	42186.69758	0.0010901	13.3660	329.5463	254.8996	75.0440
L1 . 69	**88111A**	**STTW-3**					
	26-DEC-14	846	73.8	37.5	111.2	48	1238
	23735.206157	42160.85831	0.0005692	14.4444	24.2527	85.1195	37.6728
L1 . 70	**75097A**	**Cosmos 775**					
	22-DEC-14	863	78.6	34.9	113.6	48	1101
	23731.059259	42154.80244	0.0008013	11.5074	320.5835	59.1646	39.3695
L1 . 71	**89081A**	**Gorizont 19**					
	30-DEC-14	864	78.9	34.8	113.7	49	1191
	23739.097153	42167.14234	0.0006207	14.7359	11.1677	180.3239	35.0307
L1 . 72	**99010A**	**Raduga 1-4**					
	31-DEC-14	864	79.0	34.7	113.7	48	812
	23740.951887	42179.11108	0.0004891	12.9931	41.7535	160.6895	45.0862

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	**77071A**	**Raduga 3**					
	24-DEC-14	866	79.5	34.5	114.0	48	1085
	23733.788137	42151.72532	0.0011836	12.9148	326.7146	171.9842	107.1402
L1 . 74	**81069A**	**Raduga 9**					
	24-DEC-14	866	79.6	34.4	114.0	48	1022
	23733.850799	42168.42988	0.0002323	14.2648	338.6684	159.6131	34.9959
L1 . 75	**96058D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	23-DEC-14	871	81.0	33.7	114.7	48	835
	23732.990845	42141.99956	0.0007479	13.7920	29.3580	22.3664	87.7602
L1 . 76	**94002A**	**Gals 1**					
	21-DEC-14	873	81.4	33.5	114.9	48	1061
	23730.544861	42158.96630	0.0009980	13.4402	32.0588	117.0332	113.9276
L1 . 77	**01037D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	26-DEC-14	886	84.7	31.7	116.4	48	663
	23735.112720	42147.35573	0.0019010	9.0122	46.5602	334.9175	44.5578
L1 . 78	**97071B**	**Cakrawatra 1**					
	31-DEC-14	887	84.9	31.6	116.5	49	856
	23740.888843	42158.66897	0.0002637	7.8838	50.9788	183.1815	115.8982
L1 . 79	**84078F**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	888	85.3	31.4	116.7	48	1019
	23739.128241	42188.61994	0.0024240	14.6510	352.8575	104.7575	66.6121
L1 . 80	**82031A**	**Insat-IA**					
	31-DEC-14	924	93.4	27.1	120.5	49	680
	23740.859780	42175.60285	0.0018855	14.4071	341.7615	296.9693	32.7953
L1 . 81	**74060F**	**Proton-K/DM fourth stage (Blok-DM)**					
	24-DEC-14	932	95.1	26.2	121.3	47	980
	23733.756238	42163.91551	0.0016986	10.6123	317.3549	100.6310	26.3440
L1 . 82	**90061D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	942	97.0	25.2	122.2	49	1075
	23740.138484	42146.16893	0.0034636	14.7570	14.3829	105.5269	41.0419
L1 . 83	**97021A**	**Zhongxing 6 (B)**					
	31-DEC-14	986	104.9	20.9	125.8	49	904
	23740.505521	42153.70477	0.0006210	9.3060	46.9009	24.9939	121.4218
L1 . 84	**86090D**	**Proton-K/DM fourth stage (Blok-DM)**					
	30-DEC-14	1007	108.3	19.1	127.4	49	1112
	23739.376146	42155.62168	0.0009378	14.7672	0.7750	84.3145	124.5109
L1 . 85	**84063A**	**Raduga 15**					
	30-DEC-14	1032	112.1	17.0	129.1	49	1016
	23739.126863	42193.93028	0.0005150	14.6424	351.4166	128.5271	65.9873
L1 . 86	**04010A**	**Raduga-1**					
	31-DEC-14	1034	112.4	16.8	129.2	49	552
	23740.859907	42178.87119	0.0003903	8.2659	55.4802	117.9358	26.9521
L1 . 87	**96040B**	**Turksat 1C**					
	25-DEC-14	1043	113.5	16.2	129.7	48	919
	23734.529097	42142.45477	0.0005590	5.6214	58.1753	100.2017	108.6051

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**					
	30-DEC-14	1048	114.2	15.8	130.0	49	766
	23739.777361	42135.42293	0.0007983	12.9122	326.9227	156.2766	61.5470
L1 . 89	**03015F**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	1074	117.6	13.9	131.5	49	584
	23740.070625	42193.56634	0.0009097	7.6791	50.4026	290.7770	92.4226
L1 . 90	**83089B**	**Insat-IB**					
	28-DEC-14	1077	117.9	13.7	131.6	49	1091
	23737.107002	42178.60213	0.0011658	14.8854	5.2059	143.6474	24.7702
L1 . 91	**09018A**	**Beidou DW 2 (Compass G2)**					
	25-DEC-14	1088	119.3	12.9	132.2	48	298
	23734.117384	42187.38447	0.0088556	3.6849	64.8962	182.1718	40.1305
L1 . 92	**01037A**	**Cosmos-2379**					
	31-DEC-14	1101	120.7	12.1	132.8	49	685
	23740.958796	42196.11325	0.0005615	9.0527	46.3604	132.8535	72.9185
L1 . 93	**95054D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	25-DEC-14	1107	121.5	11.7	133.1	45	826
	23734.781771	42162.49266	0.0017939	12.9144	37.8871	350.2117	11.5946
L1 . 94	**93013A**	**Raduga 29**					
	25-DEC-14	1114	122.2	11.2	133.5	47	1120
	23734.885266	42196.15594	0.0002750	14.3355	23.5132	71.6954	72.4882
L1 . 95	**77108A**	**Meteosat 1**					
	29-DEC-14	1126	123.4	10.5	134.0	49	1096
	23738.288449	42157.19808	0.0011035	13.5278	331.0121	330.2184	132.0041
L1 . 96	**88095A**	**Raduga 22**					
	24-DEC-14	1135	124.4	10.0	134.4	48	1223
	23733.852708	42140.65329	0.0005474	14.7781	8.0002	109.4339	39.5331
L1 . 97	**84035A**	**STW F-2**					
	25-DEC-14	1142	125.1	9.6	134.7	48	993
	23734.913391	42165.52605	0.0009545	14.6073	356.2111	99.9319	9.2174
L1 . 98	**95063D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	1172	128.0	7.8	135.9	48	835
	23733.933299	42185.87599	0.0043282	14.0859	26.6160	79.5768	115.4944
L1 . 99	**90102A**	**Gorizont 22**					
	26-DEC-14	1315	138.7	1.2	139.9	47	1173
	23735.604340	42152.61473	0.0003795	14.6866	15.3157	210.5482	133.0092
L1 . 100	**74094A**	**Skynet 2B**					
	30-DEC-14	1369	141.6	359.3	140.9	49	895
	23739.956343	42130.89530	0.0001244	12.2104	327.6120	156.0792	75.0511
L1 . 101	**78035A**	**Intelsat IVA F-6**					
	22-DEC-14	1426	144.2	357.4	141.6	47	1035
	23731.594225	42186.88397	0.0008764	14.6819	351.5874	193.8168	117.7190
L1 . 102	**70032A**	**Intelsat III F-7**					
	31-DEC-14	1433	144.5	357.2	141.7	48	171
	23740.646273	42169.76883	0.0003218	7.2276	306.2432	255.3491	140.5429

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	**93062D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	31-DEC-14	1588	149.2	353.6	142.9	49	866
	23740.888843	42188.14634	0.0007821	14.1435	25.0907	340.2716	115.9141
L1 . 104	**85035B**	**Telecom 1B**					
	24-DEC-14	1675	150.9	352.3	143.1	48	1099
	23733.197350	42175.23650	0.0002572	14.8066	359.4801	215.6586	7.3018
L1 . 105	**92088A**	**Cosmos 2224**					
	31-DEC-14	1684	151.0	352.1	143.2	49	1104
	23740.150208	42163.75769	0.0006171	13.7304	25.1607	165.9152	350.9966
L1 . 106	**67026A**	**Intelsat II F-3**					
	23-DEC-14	1743	151.8	351.4	143.3	48	581
	23732.886539	42185.69467	0.0023625	5.3204	308.1026	261.6545	26.2222

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 42 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 3 on page 35.

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	**85035A**	**Gstar 1**					
	31-DEC-14	800	0.3	254.5	254.8	48	1268
	23740.548715	42164.54037	0.0003839	14.1446	27.2924	309.8855	254.7910
L2 . 2	**88081A**	**Gstar 3**					
	25-DEC-14	850	0.3	254.5	254.8	48	1159
	23734.204491	42164.37805	0.0005305	15.8813	0.0117	96.4516	254.7938
L2 . 3	**93058B**	**ACTS**					
	26-DEC-14	890	1.2	254.1	255.3	48	1079
	23735.595301	42164.33628	0.0016831	13.1902	33.5810	350.3301	255.1759
L2 . 4	**71009A**	**NATO IIB**					
	26-DEC-14	900	0.9	254.2	255.1	48	1070
	23735.512836	42164.77388	0.0003378	10.4090	316.8349	141.9484	254.5398
L2 . 5	**69101A**	**Skynet 1A**					
	29-DEC-14	910	4.1	252.6	256.7	49	988
	23738.410984	42164.66203	0.0025539	8.8667	314.8859	204.4808	252.6584
L2 . 6	**78062A**	**GOES 3**					
	30-DEC-14	911	8.0	250.7	258.8	49	1265
	23739.371285	42165.93676	0.0003910	14.2694	340.9860	158.6783	251.9176
L2 . 7	**93073A**	**Solidaridad 1**					
	25-DEC-14	911	8.1	250.7	258.8	48	1064
	23734.190938	42166.62870	0.0007222	11.8823	39.0146	148.8637	255.0040
L2 . 8	**70021A**	**NATO I**					
	29-DEC-14	912	10.5	249.5	260.0	49	996
	23738.420544	42166.95505	0.0004375	9.4334	318.5808	190.1270	257.1919
L2 . 9	**71095A**	**OPS 9431 (DSCS II F-1)**					
	31-DEC-14	913	13.1	248.2	261.3	49	1195
	23740.424016	42164.81678	0.0005708	10.8062	318.2277	210.3090	248.2805
L2 . 10	**76023A**	**LES 8 (RTGPP)**					
	30-DEC-14	913	13.7	247.9	261.6	48	1246
	23739.539942	42163.21528	0.0013335	14.0463	99.2125	17.2442	254.0928
L2 . 11	**93077A**	**Telstar 4A**					
	28-DEC-14	914	16.5	246.5	263.1	49	1085
	23737.525220	42168.06144	0.0006663	13.8877	29.3550	50.4705	259.5305
L2 . 12	**76023B**	**LES 9 (RTGPP)**					
	24-DEC-14	920	5.0	252.5	257.5	48	1257
	23733.397535	42164.74922	0.0021960	13.9943	99.3293	51.8607	252.4093

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	**95049A**	**Telstar 402R**					
	30-DEC-14	925	32.3	238.8	271.1	49	976
	23739.259884	42166.72514	0.0003818	9.5535	46.0380	203.6118	239.4248
L2 . 14	**85076C**	**ASC 1**					
	24-DEC-14	940	45.7	232.3	278.0	48	1201
	23733.422211	42173.39196	0.0003931	14.5969	22.0629	275.6115	239.4907
L2 . 15	**75100A**	**GOES 1**					
	26-DEC-14	943	48.4	231.0	279.4	48	1223
	23735.324039	42167.91031	0.0004829	13.2410	328.8668	224.6142	278.4665
L2 . 16	**76004F**	**CTS JBSA**					
	26-DEC-14	945	49.3	230.6	279.8	17	18
	23735.961157	42154.09419	0.0162335	12.2798	323.4112	298.9732	240.6262
L2 . 17	**76004E**	**CTS JBSA**					
	25-DEC-14	945	49.4	230.5	279.9	31	31
	23734.944988	42176.61864	0.0010609	12.2539	323.1492	176.7662	248.8163
L2 . 18	**82105A**	**Aurora I**					
	31-DEC-14	950	0.8	254.3	255.1	49	1257
	23740.547882	42164.63288	0.0003554	14.8915	10.5835	263.6577	254.9006
L2 . 19	**67111A**	**ATS 3**					
	26-DEC-14	950	0.3	254.6	254.9	48	1220
	23735.553588	42164.68894	0.0014780	6.3778	305.7865	108.1026	254.9037
L2 . 20	**83041A**	**GOES 6**					
	30-DEC-14	962	59.9	225.4	285.4	49	1258
	23739.376748	42170.26770	0.0004238	14.8249	359.5855	151.7167	282.7381
L2 . 21	**95069A**	**Galaxy IIIR**					
	26-DEC-14	965	61.5	224.7	286.2	48	970
	23735.425718	42174.00006	0.0001864	8.7373	48.5223	169.9119	230.5673
L2 . 22	**81049A**	**GOES 5**					
	25-DEC-14	995	75.3	218.1	293.4	48	1195
	23734.146215	42175.71085	0.0005249	14.7676	354.8159	190.2899	285.1126
L2 . 23	**76004A**	**Hermes**					
	26-DEC-14	1006	79.5	216.1	295.7	48	1190
	23735.323970	42181.20767	0.0016656	12.7749	325.9768	161.2845	275.8102
L2 . 24	**96055A**	**EchoStar 2**					
	25-DEC-14	1032	88.3	212.0	300.3	48	914
	23734.106157	42144.32029	0.0002094	5.3395	59.4414	19.3464	270.5666
L2 . 25	**68081D**	**LES 6**					
	24-DEC-14	1042	91.2	210.6	301.9	48	1123
	23733.669063	42153.90536	0.0009039	7.8665	319.4299	292.5454	216.6721
L2 . 26	**87100A**	**Raduga 21**					
	24-DEC-14	1098	105.8	203.9	309.7	48	1261
	23733.314861	42166.02592	0.0003648	15.2125	4.5446	142.6540	309.6901
L2 . 27	**65028A**	**Intelsat I F-1**					
	30-DEC-14	1125	111.4	201.3	312.7	48	550
	23739.272998	42153.92021	0.0005686	2.2936	296.3754	195.6241	207.2166

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	**97086A**	**HGS-1**					
	26-DEC-14	1284	135.3	190.8	326.2	48	827
	23735.548553	42134.87835	0.0043121	6.1340	68.4136	293.2230	255.6707
L2 . 29	**84078A**	**Gorizont 10**					
	30-DEC-14	1306	137.8	189.8	327.6	49	1137
	23739.186817	42194.38971	0.0003901	14.6123	352.5974	194.8396	253.3341
L2 . 30	**90016A**	**Raduga 25**					
	25-DEC-14	1323	139.6	189.1	328.6	48	1212
	23734.204942	42177.66787	0.0003896	14.7396	12.7136	156.5278	316.0831
L2 . 31	**67094A**	**Intelsat II F-4**					
	29-DEC-14	1325	139.7	189.0	328.7	49	882
	23738.465220	42148.18862	0.0017563	5.4677	303.6896	212.2942	203.5592
L2 . 32	**82103A**	**Gorizont 6**					
	29-DEC-14	1339	141.1	188.5	329.6	49	1091
	23738.562697	42171.16229	0.0004940	14.3318	343.8149	163.9766	190.3822
L2 . 33	**85070A**	**Raduga 16**					
	29-DEC-14	1350	142.1	188.1	330.2	49	1088
	23738.507766	42166.30600	0.0003987	14.6873	355.5589	174.6495	187.3007
L2 . 34	**80081A**	**Raduga 7**					
	30-DEC-14	1451	149.9	185.1	335.1	49	1078
	23739.253808	42166.54234	0.0012345	13.9359	335.6908	202.5593	334.2723
L2 . 35	**94038A**	**Cosmos 2282**					
	30-DEC-14	1488	152.3	184.3	336.6	49	1040
	23739.660185	42133.27327	0.0006560	13.1287	29.4404	16.4940	250.0149
L2 . 36	**92059A**	**Cosmos 2209**					
	24-DEC-14	1497	152.8	184.1	336.9	48	1098
	23733.681470	42173.38916	0.0006594	14.5274	21.1900	172.5764	188.1458
L2 . 37	**85016A**	**Cosmos 1629**					
	25-DEC-14	1499	152.9	184.1	337.0	48	1093
	23734.142766	42145.00658	0.0007269	14.6986	353.7786	149.2516	308.2187
L2 . 38	**87091A**	**Cosmos 1894**					
	30-DEC-14	1521	154.0	183.7	337.8	49	1207
	23739.363032	42158.70596	0.0004336	14.7420	3.4254	198.8681	183.9450
L2 . 39	**80004A**	**OPS 6393 (FLTSATCOM F3)**					
	29-DEC-14	1545	155.3	183.4	338.6	49	1173
	23738.606447	42154.72652	0.0028139	13.0511	342.6531	140.9597	188.9130
L2 . 40	**89101A**	**Cosmos 2054**					
	22-DEC-14	1657	159.6	182.2	341.8	48	1188
	23731.876991	42162.73848	0.0002014	14.7390	12.2681	160.3897	340.7380
L2 . 41	**94082A**	**Luch 1**					
	30-DEC-14	1870	164.1	181.3	345.4	49	1014
	23739.348542	42195.43471	0.0005236	13.4770	33.3551	105.4122	270.7424
L2 . 42	**94060A**	**Cosmos 2291**					
	30-DEC-14	2550	167.3	181.0	348.3	49	1015
	23739.240810	42139.28194	0.0006430	13.8477	27.7715	117.2945	295.2947

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 35.

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	**97083A**	**Intelsat 804**					
	31-DEC-14	2936	334.8	174.7	149.5	49	861
	23740.796748	42154.84167	0.0005055	8.4100	49.4607	211.4315	340.9317
L3 . 2	**82044F**	**Proton-K/DM fourth stage (Blok-DM)**					
	28-DEC-14	2936	334.9	174.6	149.5	49	1020
	23737.839144	42186.21254	0.0015765	15.4349	343.2151	89.9188	120.1055
L3 . 3	**71095B**	**OPS 9432 (DSCS II F-2)**					
	29-DEC-14	2937	335.4	174.3	149.8	49	1079
	23738.352025	42133.18792	0.0002606	10.7615	318.5365	292.9740	276.1594
L3 . 4	**91054D**	**IUS second stage**					
	24-DEC-14	2937	334.1	175.0	149.1	48	955
	23733.397558	42188.34763	0.0036303	16.1211	14.7298	231.9141	303.1368
L3 . 5	**91064A**	**Cosmos 2155**					
	30-DEC-14	2942	332.8	175.7	148.5	49	1154
	23739.873299	42174.76721	0.0002974	14.6921	17.6045	177.0545	141.4571
L3 . 6	**86027A**	**Cosmos 1738**					
	23-DEC-14	2945	337.4	173.4	150.7	48	1146
	23732.664560	42187.17254	0.0009738	15.2554	358.0693	18.4796	118.0165
L3 . 7	**97041A**	**Cosmos 2345**					
	31-DEC-14	2996	329.0	146.6	177.6	49	865
	23740.881829	42166.84038	0.0166513	12.6712	35.1093	190.4723	158.4684
L3 . 8	**12012D**	**Proton-K/DM-2 fourth stage (Blok DM-2)**					
	24-DEC-14	3014	328.3	178.0	146.3	48	144
	23733.481470	42186.66081	0.0012551	0.5116	331.5615	304.9621	305.3292
L3 . 9	**90094A**	**Gorizont 21**					
	31-DEC-14	3074	326.8	178.8	145.6	48	1209
	23740.795012	42157.97344	0.0007573	14.7647	15.0193	165.2487	342.3951
L3 . 10	**00029A**	**Gorizont 33**					
	23-DEC-14	3113	326.1	179.2	145.2	48	743
	23732.823438	42157.38750	0.0002121	10.7427	41.6527	123.0263	357.8799
L3 . 11	**12012A**	**Cosmos-2479**					
	25-DEC-14	3398	353.0	165.4	158.4	48	147
	23734.201806	42146.48481	0.0001449	0.4978	330.3663	278.7022	193.7084

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	**94067D**	**Proton-K/DM-2M fourth stage (Blok DM-2M)**					
	24-DEC-14	3564	323.1	180.7	143.8	48	917
	23733.908067	42188.29204	0.0005965	14.3898	23.4960	50.2475	32.2412
L3 . 13	**85007A**	**Gorizont 11**					
	29-DEC-14	3572	323.0	180.7	143.8	49	1113
	23738.833113	42198.46448	0.0003231	14.6104	354.3152	145.3091	80.0781
L3 . 14	**87084A**	**Cosmos 1888**					
	29-DEC-14	3681	322.8	180.8	143.6	49	1229
	23738.516701	42150.35671	0.0004565	14.7107	3.8541	157.6671	192.7479
L3 . 15	**95045A**	**Cosmos 2319**					
	24-DEC-14	3683	322.8	180.8	143.6	48	975
	23733.392269	42159.79331	0.0008076	13.4802	30.8553	143.7633	181.7100
L3 . 16	**91079A**	**Cosmos 2172**					
	31-DEC-14	3717	322.8	180.9	143.6	49	1113
	23740.211771	42179.65625	0.0003981	14.6228	18.6845	241.5913	15.0075
L3 . 17	**94030A**	**Gorizont 30**					
	31-DEC-14	3869	322.6	181.0	143.5	49	1055
	23740.150208	42166.41646	0.0004791	14.0164	26.4086	164.9487	350.0825

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

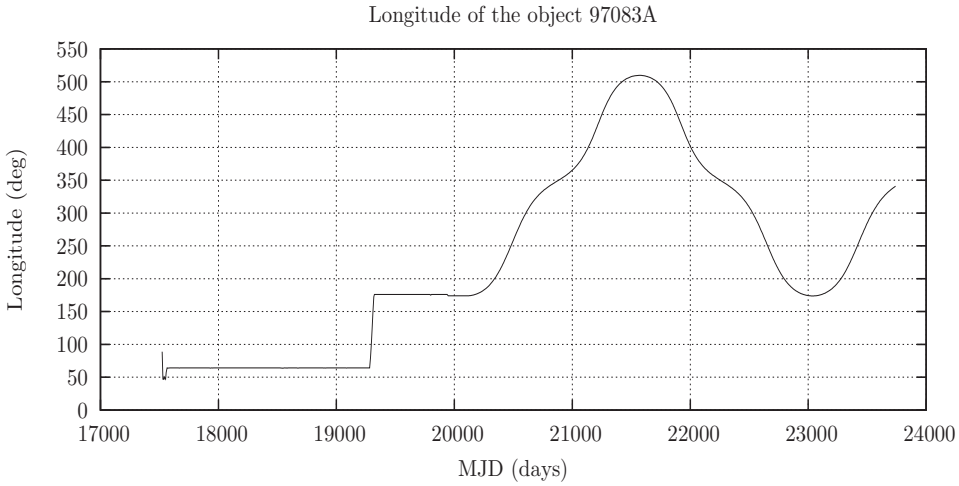

Figure 3.1: Longitude history of 97083A

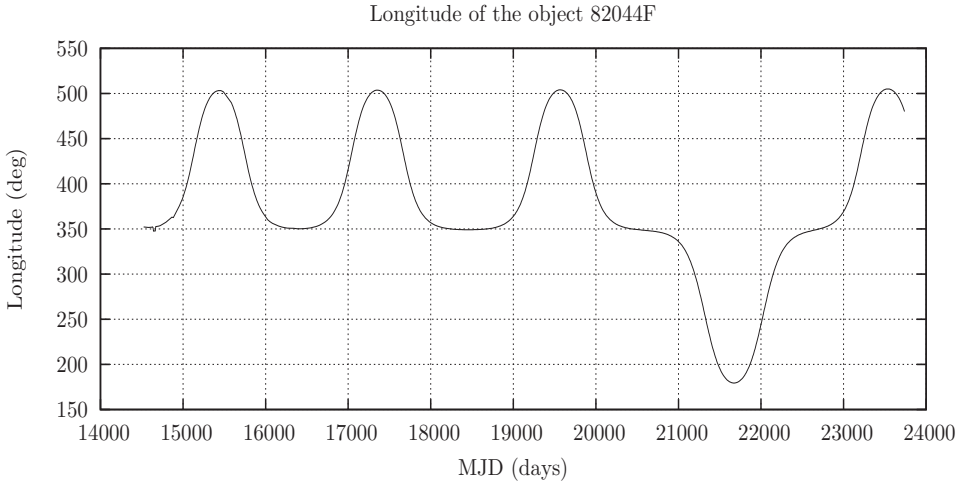

Figure 3.2: Longitude history of 82044F

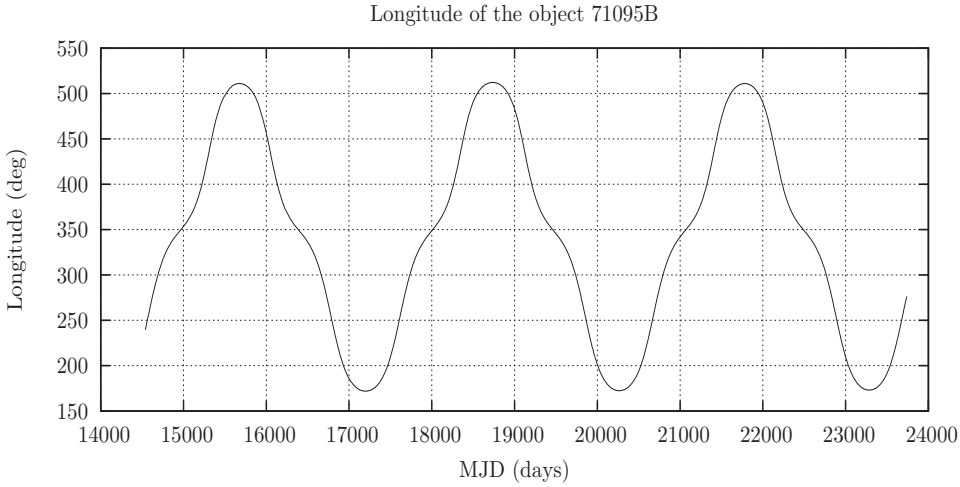

Figure 3.3: Longitude history of 71095B

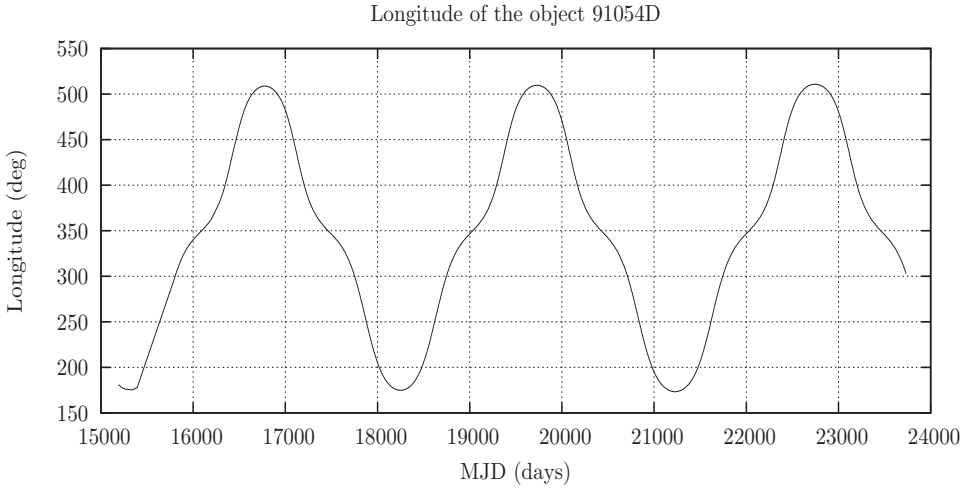

Figure 3.4: Longitude history of 91054D

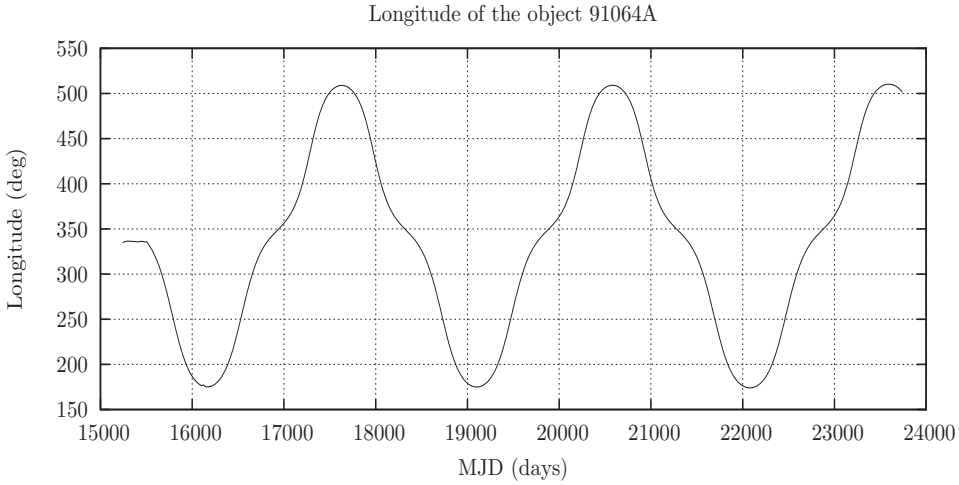

Figure 3.5: Longitude history of 91064A

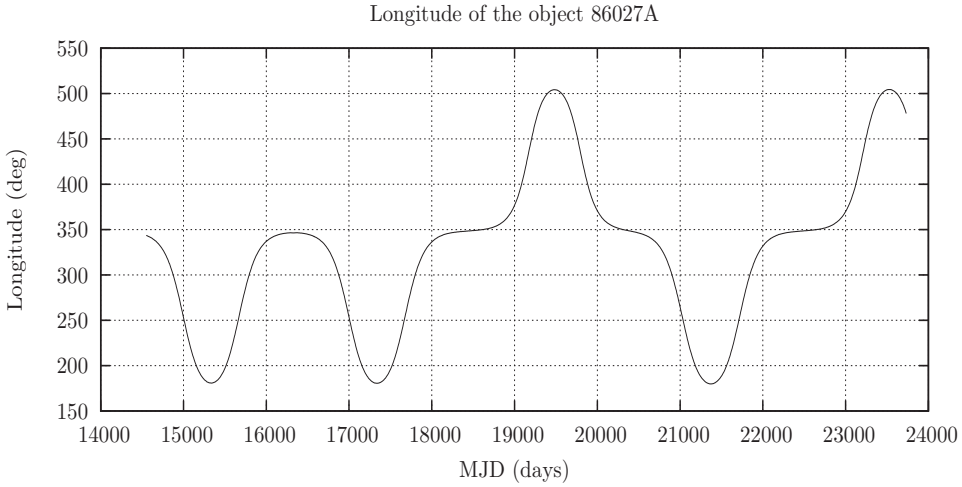

Figure 3.6: Longitude history of 86027A

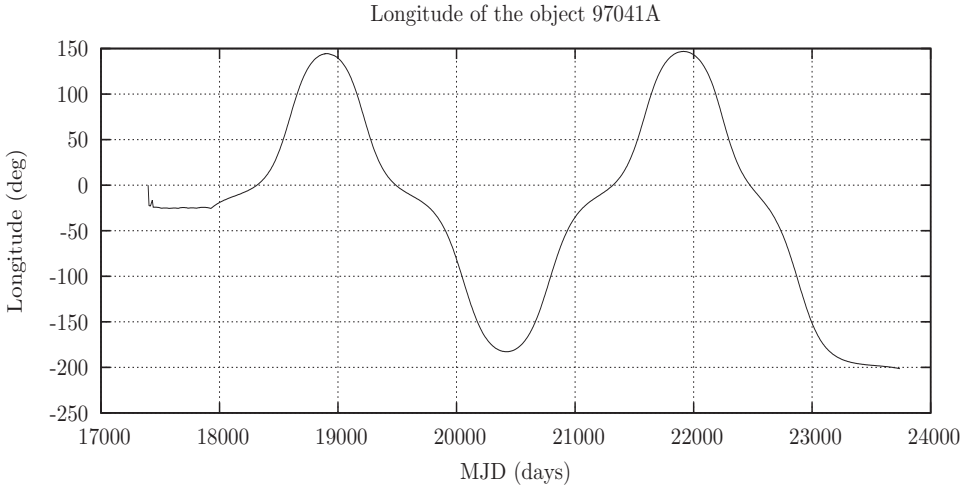

Figure 3.7: Longitude history of 97041A

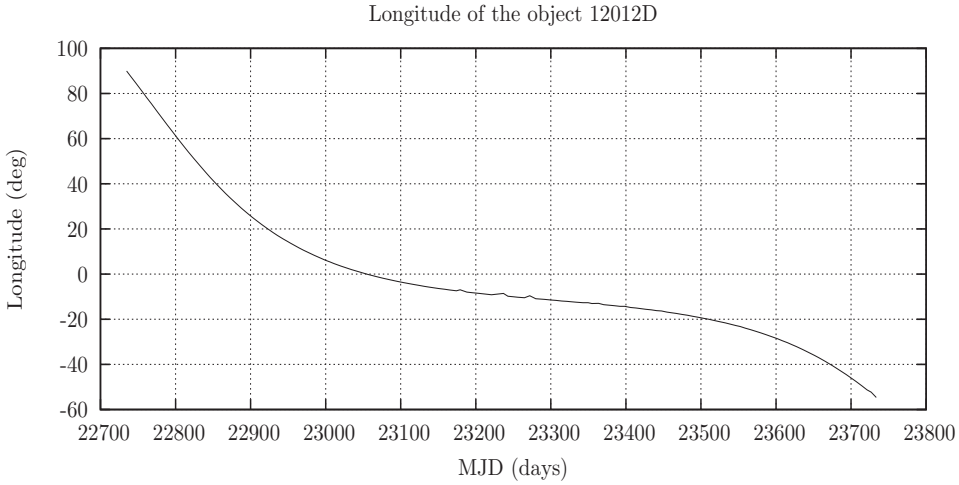

Figure 3.8: Longitude history of 12012D

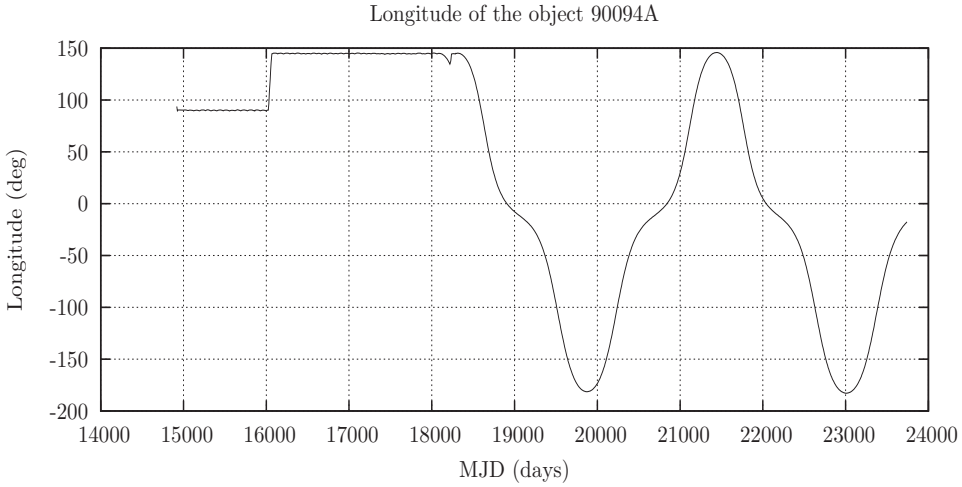

Figure 3.9: Longitude history of 90094A

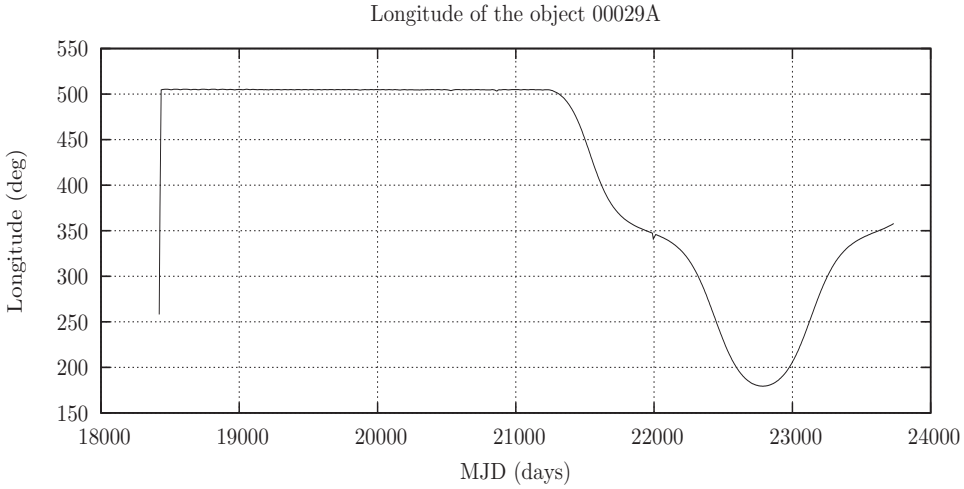

Figure 3.10: Longitude history of 00029A

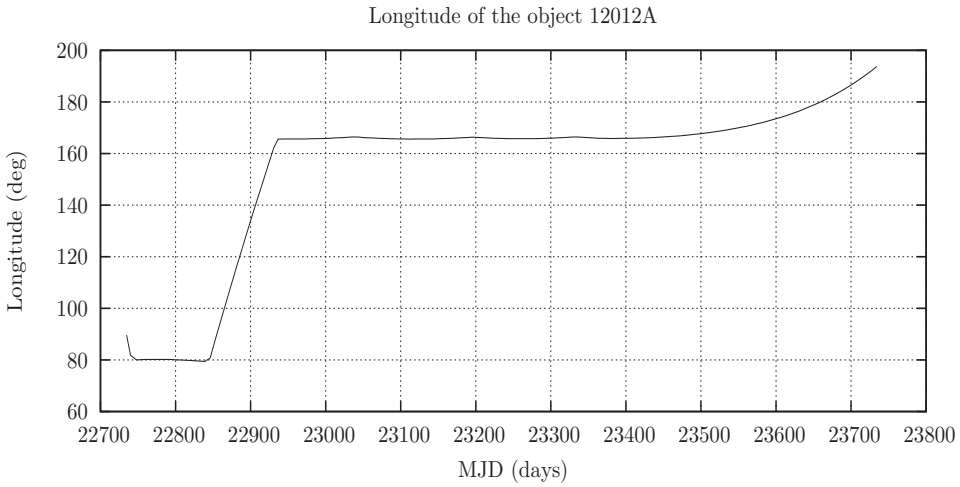

Figure 3.11: Longitude history of 12012A

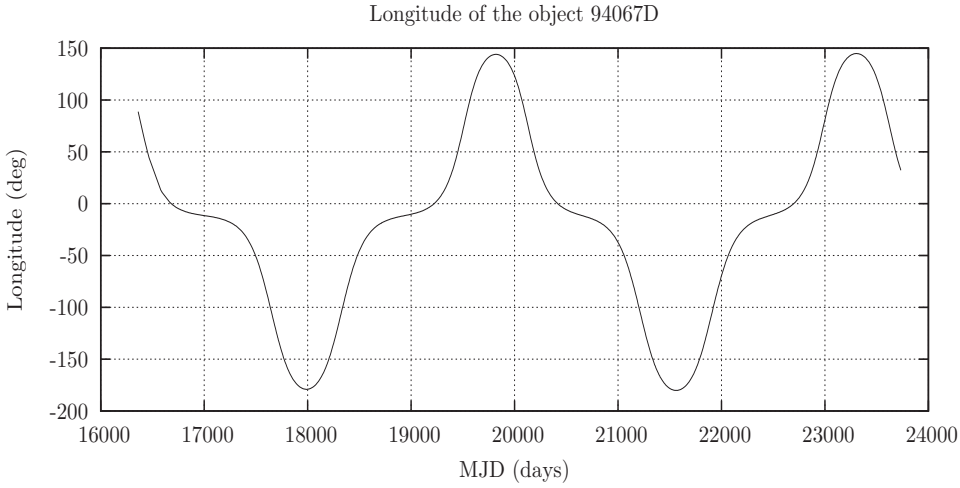

Figure 3.12: Longitude history of 94067D

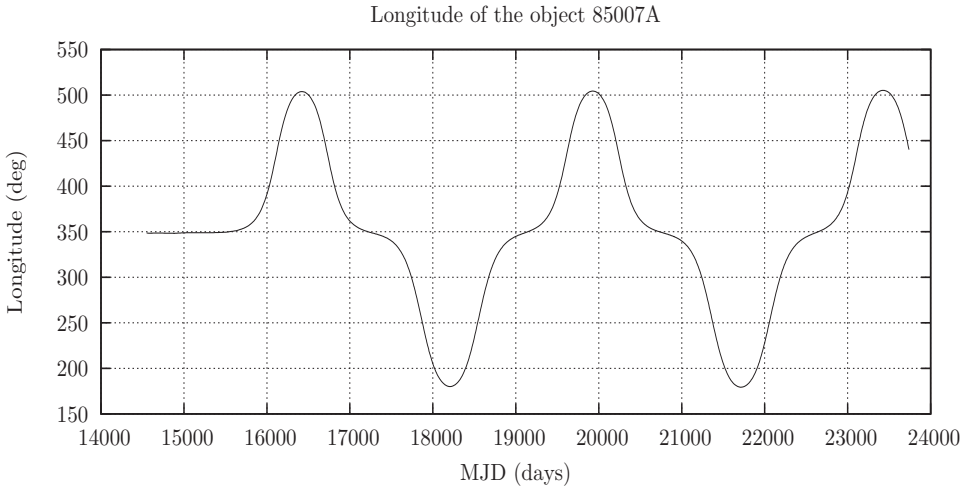

Figure 3.13: Longitude history of 85007A

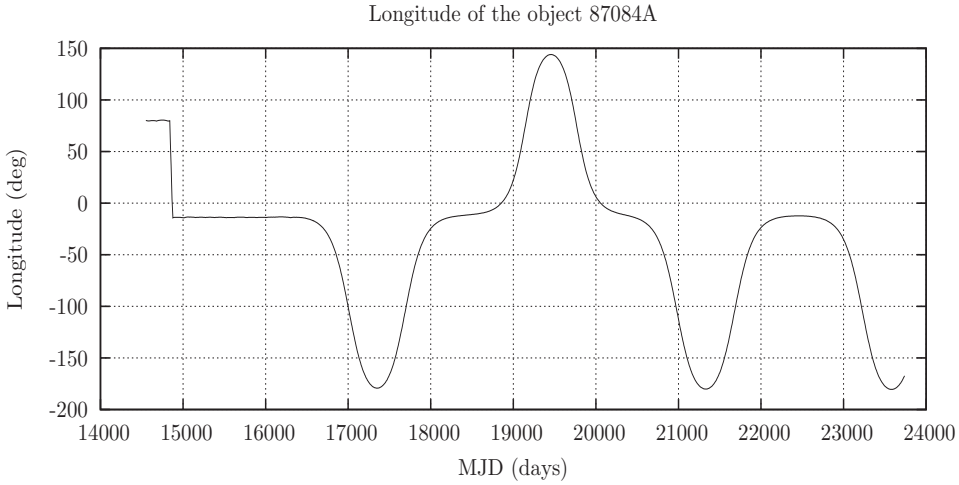

Figure 3.14: Longitude history of 87084A

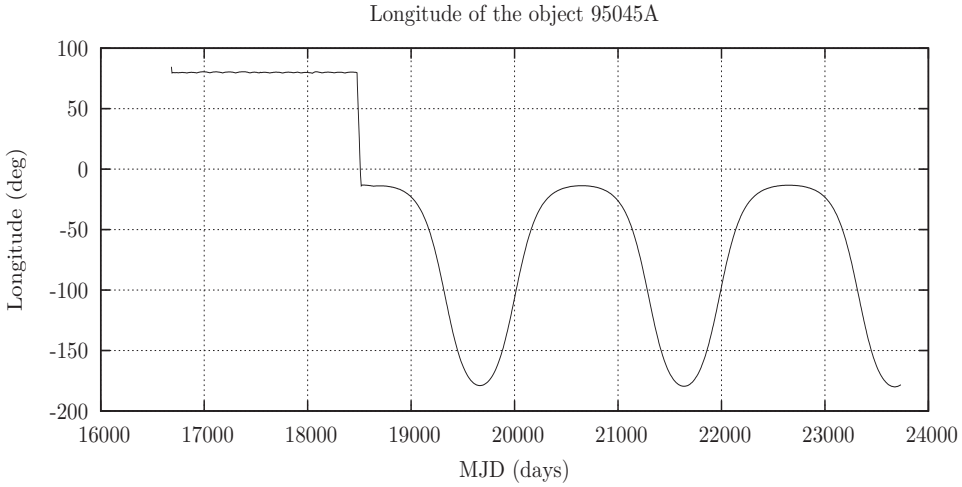

Figure 3.15: Longitude history of 95045A

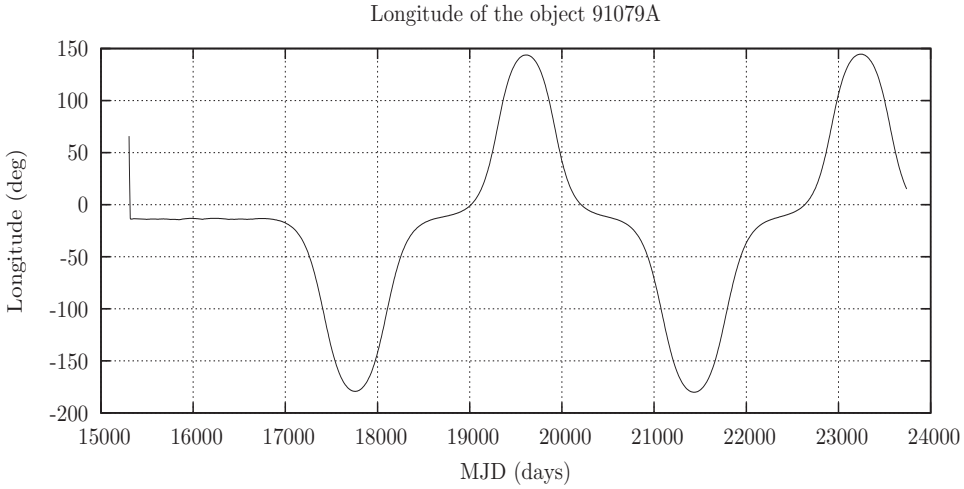

Figure 3.16: Longitude history of 91079A

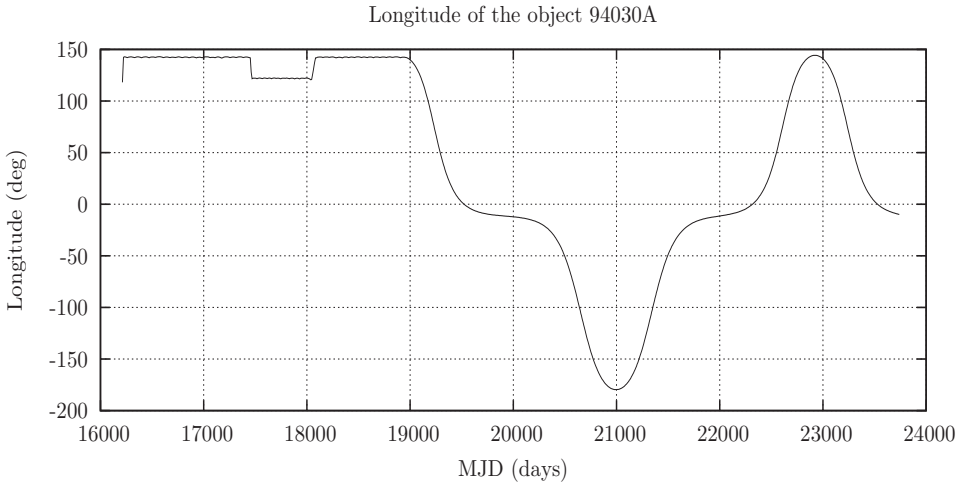

Figure 3.17: Longitude history of 94030A

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 4.7 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 4.7 their origin is not yet determined with the required reliability.

Orbits were established by processing of optical measurements and propagation to Jan 1, 2015 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 2014. 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, Primorsky Krai, Russia),
- Zvenigorod observatory of the Astronomy Institute of the RAS (INASAN) (Moscow oblast, Russia),
- Crimean Astrophysical Observatory (Nauchny),
- Ulugbek Astronomical Observatory (Kitab facilitiy, Qashqadaryo Province, Uzbekistan),
- Observation facilities operated by the "Astronomical Scientific Center", JSC:
  - Artem (Primorsky Krai, Russia),
  - Blagoveshchensk (Amur region, Russia),
  - Kislovodsk observatory (Karachaevo-Cherkesskaya Republic, Russia),
  - Lesosibirsk (Krasnoyarsky Krai, Russia),
  - Milkovo (Kamchatka Krai, Russia),
- Byurakan Astrophysical Observatory of the Armenian Academy of Sciences (Byurakan, Armenia),
- Andrushivka Observatory (Zhytomyrs'ka oblast, Ukraine),
- National observatory of Bolivia (Tarija, Bolivia),
- Sayan Solar Observatory of the Institute of Solar-Terrestrial Physics of the Siberian branch of the RAS (Mondy, Republic of Buryatia, Russia),
- Observation facility of the PGU (Tiraspol),
- Odessa State University Astronomical Observatory (Mayaki, Odes'ka oblast, Ukraine),
- Chuguyev observation facility of the Astronomy scientific and research institute of Kharkov national university (Kharkiv'ska oblast, 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,
- 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 9 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 129.

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	**09020A**	**SICRAL 1B**				
UI179	20150101	00:00:00.0	1436.2302	35780.8	35797.6	011.862
	00.1886	084.3965	149.8685	42167.341	0.0001983	027.5903
C1 . 2	**09047A**	**USA 207 (PAN)**				
UI158	20150101	00:00:00.0	1436.1427	35747.3	35827.7	047.733
	00.1445	047.8081	293.6524	42165.629	0.0009537	099.9812
C1 . 3	**09017A**	**USA 204 (WGS SV-2)**				
UI156	20150101	00:00:00.0	1436.0661	35781.8	35790.2	060.213
	00.0963	074.6689	207.8600	42164.128	0.0000989	085.6649
C1 . 4	**12003A**	**USA 233 (WGS SV-4)**				
UI169	20150101	00:00:00.0	1436.1602	35782.5	35793.1	088.376
	00.0934	074.7271	175.7009	42165.970	0.0001259	113.7657
C1 . 5	**14055A**	**USA 257 (CLIO)**				
UI188	20150101	00:00:00.0	1436.1821	35748.8	35827.7	108.154
	00.1112	037.0404	295.0952	42166.400	0.0009350	171.0502
C1 . 6	**07046A**	**USA 195 (WGS SV-1)**				
UI152	20150101	00:00:00.0	1436.1653	35783.3	35792.6	175.019
	00.0918	075.4424	230.6841	42166.070	0.0001107	199.6821
C1 . 7	**13041A**	**USA 244 (WGS SV-6)**				
UI180	20150101	00:00:00.0	1436.0384	35781.7	35789.2	224.841
	00.1022	075.3594	159.7057	42163.587	0.0000894	249.6360
C1 . 8	**13024A**	**USA 243 (WGS SV-5)**				
UI176	20150101	00:00:00.0	1436.2797	35788.5	35791.9	307.481
	00.0998	074.3359	266.5795	42168.311	0.0000400	333.2315
C1 . 9	**09068A**	**USA 211 (WGS SV-3)**				
UI159	20150101	00:00:00.0	1436.1999	35788.5	35788.8	347.999
	00.1052	076.1062	271.9580	42166.748	0.0000036	012.0270

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

In the case where the satellite is only under longitude control, there are 55 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 129.

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	20150101	00:00:00.0	1436.0832	35779.1	35795.3	007.739
	11.8262	039.7557	280.5567	42164.464	0.0001919	068.1086
C2 . 2	**13011A**	**USA 241 (SBIRS GEO-2)**				
UI175	20150101	00:00:00.0	1436.1256	35776.0	35798.5	020.619
	04.8200	321.1946	313.0151	42165.293	0.0002672	159.5178
C2 . 3	**01005A**	**Sicral**				
UI178	20150101	00:00:00.0	1436.1194	35763.3	35811.1	021.885
	05.9012	057.7429	233.9256	42165.172	0.0005661	064.2114
C2 . 4	**93056A**	**USA 95 (UFO F2)**				
UI069	20150101	00:00:00.0	1436.1538	35779.4	35797.0	028.741
	10.0014	030.9826	299.2732	42165.845	0.0002093	097.8757
C2 . 5	**02001A**	**USA 164 (Milstar-2 F3)**				
UI063	20150101	00:00:00.0	1436.1282	35774.6	35800.2	029.967
	06.5202	042.4081	231.8782	42165.345	0.0003038	087.6427
C2 . 6	**09001A**	**USA 202 (NROL-26)**				
UI155	20150101	00:00:00.0	1436.1218	35755.2	35819.0	044.059
	04.0853	025.4078	347.5153	42165.220	0.0007558	118.8287
C2 . 7	**96026A**	**USA 118 (MERCURY 2)**				
UI073	20150101	00:00:00.0	1435.9538	34079.9	37488.2	046.855
	09.4643	006.6597	220.6143	42161.930	0.0404197	132.6335
C2 . 8	**94054A**	**USA 105 (MERCURY 1)**				
UI008	20150101	00:00:00.0	1436.1240	35649.7	35925.6	047.143
	09.8744	043.2212	115.3947	42165.262	0.0032716	104.3206
C2 . 9	**12034A**	**USA 237 (NROL-15)**				
UI173	20150101	00:00:00.0	1436.0752	35596.6	35975.7	052.513
	01.9390	309.7634	356.3298	42164.307	0.0044958	202.6222
C2 . 10	**00065A**	**USA 153 (DSCS III B-11)(DSCS III F12)**				
UI105	20150101	00:00:00.0	1436.0493	35774.4	35797.1	056.646
	04.6106	062.6842	225.1973	42163.799	0.0002699	094.0531
C2 . 11	**04004A**	**USA 176 (DSP F22)**				
UI108	20150101	00:00:00.0	1436.1054	35776.3	35797.3	065.979
	06.4042	052.8317	201.1034	42164.898	0.0002498	113.2415
C2 . 12	**03041A**	**USA 171 (Advanced ORION 3)**				
UI118	20150101	00:00:00.0	1436.1023	35557.1	36016.3	067.909
	07.6522	079.0077	193.8118	42164.838	0.0054449	088.2839
C2 . 13	**99063A**	**USA 146 (UFO F10)**				
UI065	20150101	00:00:00.0	1436.0275	35765.4	35805.2	072.210
	05.5704	042.6235	214.2634	42163.374	0.0004716	129.6416

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	**03057A**	**USA 174 (UFO F11)**				
UI117	20150101	00:00:00.0	1436.1092	35769.1	35804.7	075.704
	04.0981	033.6075	226.4245	42164.973	0.0004232	142.1445
C2 . 15	**11011A**	**USA 227 (NROL-27)**				
UI165	20150101	00:00:00.0	1436.1347	35768.3	35806.6	092.159
	04.7661	355.4112	244.3675	42165.472	0.0004542	196.7892
C2 . 16	**11019A**	**USA 230 (SBIRS-GEO 1)**				
UI166	20150101	00:00:00.0	1436.1464	35774.0	35801.3	094.039
	04.8069	320.8926	302.7237	42165.702	0.0003243	233.2036
C2 . 17	**10063A**	**USA 223 (NROL-32)**				
UI160	20150101	00:00:00.0	1436.1396	35577.3	35997.7	095.618
	03.7958	231.3986	034.8465	42165.567	0.0049853	324.1263
C2 . 18	**86096A**	**USA 20 (FLTSATCOM F7)**				
UI134	20150101	00:00:00.0	1436.1393	35708.6	35867.3	099.597
	14.4654	016.1595	143.1862	42165.562	0.0018819	183.8336
C2 . 19	**89035A**	**USA 37 (VORTEX 6)**				
UI018	20150101	00:00:00.0	1436.1107	31625.0	39949.5	101.676
	07.7608	012.0255	257.7564	42165.003	0.0987125	167.2681
C2 . 20	**00080A**	**USA 155 (SDS 3 F2)**				
UI007	20150101	00:00:00.0	1436.2154	35751.0	35826.9	110.122
	06.8938	041.9521	205.5354	42167.051	0.0009004	168.1813
C2 . 21	**95022A**	**USA 110 (Advanced ORION 1)**				
UI128	20150101	00:00:00.0	1436.1953	35496.8	36081.8	126.924
	12.6038	050.3960	060.8723	42166.657	0.0069376	178.0496
C2 . 22	**01033A**	**USA 159 (DSP F21)**				
UI001	20150101	00:00:00.0	1436.2180	35779.7	35798.9	131.005
	08.4720	046.6929	233.2723	42167.103	0.0002277	184.3877
C2 . 23	**00001A**	**USA 148 (DSCS III B-08)(DSCS III F11)**				
UI104	20150101	00:00:00.0	1436.2292	35769.1	35809.3	149.707
	05.2636	060.3607	212.1447	42167.321	0.0004770	189.4105
C2 . 24	**01009A**	**USA 157 (Milstar-2 F2)**				
UI112	20150101	00:00:00.0	1436.1969	35770.5	35806.9	152.157
	07.1585	042.5104	221.5044	42166.689	0.0004322	209.7204
C2 . 25	**98016A**	**USA 138 (UFO F8)**				
UI111	20150101	00:00:00.0	1436.0993	35767.6	35806.0	171.687
	06.3818	043.0049	230.2026	42164.778	0.0004555	228.7714
C2 . 26	**95038A**	**USA 113 (DSCS III B-07)(DSCS III F9)**				
UI115	20150101	00:00:00.0	1436.1603	35771.4	35804.8	179.696
	09.1126	047.7176	221.1129	42165.973	0.0003964	232.0779
C2 . 27	**12009A**	**MUOS 1**				
UI170	20150101	00:00:00.0	1436.1497	35565.8	36009.4	183.014
	04.0833	331.1234	183.1403	42165.764	0.0052597	312.4435
C2 . 28	**00024A**	**USA 149 (DSP F20)**				
UI004	20150101	00:00:00.0	1436.1421	35776.5	35799.6	194.160
	09.4356	043.8132	254.4771	42165.616	0.0002737	250.4374

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	**14020A**	**USA 250 (NROL-67)**				
UI182	20150101	00:00:00.0	1436.0717	35770.4	35802.0	197.212
	04.0547	315.4264	281.7357	42164.238	0.0003750	341.9159
C2 . 30	**13050A**	**USA 246 (AEHF SV-3)**				
UI181	20150101	00:00:00.0	1436.1191	35772.9	35801.4	205.040
	04.1180	304.2946	285.7466	42165.167	0.0003381	000.8813
C2 . 31	**95060A**	**USA 115 (Milstar DFS-2)**				
UI124	20150101	00:00:00.0	1436.0984	35774.8	35800.0	210.021
	11.4842	039.3480	254.4135	42164.761	0.0002996	270.7793
C2 . 32	**14027A**	**USA 252 (NROL-33)**				
UI183	20150101	00:00:00.0	1436.0813	35766.4	35806.2	215.921
	04.3921	257.5662	197.7505	42164.427	0.0004713	058.4384
C4 . 33	**14043C**	**USA 255 (ANGELS)**				
UI186	20150101	00:00:00.0	1455.8115	36125.4	36217.8	229.459
	00.3131	359.6418	295.7369	42549.743	0.0010865	325.4281
C2 . 34	**03008A**	**USA 167 (DSCS III A-3)(DSCS III F13)**				
UI106	20150101	00:00:00.0	1436.1276	35779.4	35795.0	229.961
	03.0121	070.1524	191.8718	42165.334	0.0001850	259.9485
C2 . 35	**01046A**	**USA 162 (SDS 3 F3)**				
UI151	20150101	00:00:00.0	1436.0758	35744.7	35827.7	232.978
	07.6845	064.9771	196.5673	42164.318	0.0009837	268.2098
C4 . 36	**06024A**	**USA 187 (MITEx OSC satellite)**				
UI149	20150101	00:00:00.0	1456.1651	36171.2	36185.8	233.598
	01.5738	075.3012	245.7054	42556.633	0.0001713	254.8507
C4 . 37	**14043A**	**USA 253 (GSSAP 1, AFSPC-4 F1)**				
UI184	20150101	00:00:00.0	1433.6101	35728.2	35747.7	235.188
	00.0894	085.8905	213.8089	42116.042	0.0002315	249.8620
C4 . 38	**14043B**	**USA 254 (GSSAP 2, AFSPC-4 F2)**				
UI185	20150101	00:00:00.0	1433.6377	35731.6	35745.3	240.822
	00.0731	085.6665	218.0428	42116.582	0.0001621	255.7243
C2 . 39	**97065A**	**USA 134 (DSCS III B-13)(DSCS III F10)**				
UI110	20150101	00:00:00.0	1436.1096	35760.4	35813.4	247.998
	07.5751	052.1306	202.3037	42164.981	0.0006294	296.0386
C2 . 40	**93074A**	**USA 97 (DSCS III B-10)(DSCS III F8)**				
UI066	20150101	00:00:00.0	1436.0791	35771.1	35802.0	248.234
	09.4382	047.0345	222.7444	42164.384	0.0003661	301.3454
C2 . 41	**95057A**	**USA 114 (UFO F6)**				
UI119	20150101	00:00:00.0	1436.0980	35762.7	35810.6	254.832
	08.1202	036.1088	159.5040	42164.754	0.0005683	318.8980
C2 . 42	**95003A**	**USA 108 (UFO F4)**				
UI121	20150101	00:00:00.0	1436.0489	35765.8	35806.1	260.011
	08.7494	034.6111	232.9324	42163.793	0.0004781	325.5512
C2 . 43	**13036A**	**MUOS 2**				
UI177	20150101	00:00:00.0	1436.0989	35542.8	36030.5	260.034
	04.5773	329.9132	356.0787	42164.770	0.0057836	030.5844

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	**91080B**	**USA 75 (DSP F16)**				
UI133	20150101	00:00:00.0	1436.1175	35779.4	35796.2	263.555
	14.5909	023.0546	230.2220	42165.134	0.0002003	340.6276
C2 . 45	**03012A**	**USA 169 (Milstar-2 F4)**				
UI109	20150101	00:00:00.0	1436.1281	35776.6	35797.9	270.079
	05.9496	060.4099	212.4754	42165.342	0.0002530	309.8045
C2 . 46	**10039A**	**USA 214 (AEHF SV-1)**				
UI167	20150101	00:00:00.0	1436.1647	35779.1	35796.8	292.003
	01.8077	263.3348	032.8842	42166.060	0.0002094	128.8324
C2 . 47	**94084A**	**USA 107 (DSP F17)**				
UI131	20150101	00:00:00.0	1436.1454	35786.7	35790.6	310.922
	13.3709	032.5962	097.0792	42165.681	0.0000469	018.4606
C2 . 48	**03040A**	**USA 170 (DSCS III B-6)(DSCS III F14)**				
UI107	20150101	00:00:00.0	1436.2571	35781.1	35798.4	317.732
	02.0745	074.7202	222.0766	42167.868	0.0002056	343.1065
C2 . 49	**94009A**	**USA 99 (Milstar DFS-1)**				
UI142	20150101	00:00:00.0	1436.2226	35779.9	35798.6	321.058
	10.5840	078.2064	209.5251	42167.193	0.0002222	342.9568
C2 . 50	**98029A**	**USA 139 (Advanced ORION 2)**				
UI074	20150101	00:00:00.0	1436.2548	35608.8	35971.2	334.263
	09.1398	003.0162	230.8504	42167.823	0.0042980	070.8214
C2 . 51	**96042A**	**USA 127 (UFO F7)**				
UI116	20150101	00:00:00.0	1436.0940	35771.9	35801.6	337.097
	07.3356	037.7184	235.7390	42164.676	0.0003527	039.4913
C2 . 52	**12019A**	**USA 235 (AEHF 2)**				
UI171	20150101	00:00:00.0	1436.1844	35773.0	35803.7	343.544
	02.6086	319.8016	310.0061	42166.444	0.0003638	123.8407
C2 . 53	**89077A**	**USA 46 (FLTSATCOM F8)**				
UI130	20150101	00:00:00.0	1436.2074	35780.0	35798.1	344.363
	12.3920	024.0603	214.0952	42166.895	0.0002141	060.4078
C4 . 54	**06024C**	**USA 189 (NRL Upper Stage/Satellite)**				
UI140	20150101	00:00:00.0	1384.2767	34741.2	34791.5	346.205
	06.6930	052.3132	108.0193	41144.216	0.0006116	035.3003
C2 . 55	**12033A**	**USA 236 (SDS 3 F7, NROL-38)**				
UI172	20150101	00:00:00.0	1436.1739	35774.6	35801.6	349.943
	02.9235	258.5945	343.2426	42166.239	0.0003192	191.4418

4.3 Objects in a drift orbit

In the case where the object is in a drift orbit, there are 97 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 129.

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 (Integrated Apogee Boost System)**				
UI132	20150101	00:00:00.0	1299.8657	30566.2	35586.3	358.067
	11.3284	005.0038	327.8961	39454.133	0.0636187	104.4339
D1 . 2	**10063B**	**Delta 4 second stage (Delta 351, DCSS-5 F05)**				
UI161	20150101	00:00:00.0	1384.1642	33803.3	35724.4	283.558
	03.9658	229.4491	205.1329	41141.986	0.0233468	156.9012
D1 . 3	**69036B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI012	20150101	00:00:00.0	1386.5872	30615.8	39008.4	092.973
	07.6097	074.8985	123.5873	41189.985	0.1018761	134.6513
D1 . 4	**12034B**	**Delta 4 second stage (Delta 360, DCSS-5 F09)**				
UI174	20150101	00:00:00.0	1396.0084	34248.1	35748.4	227.182
	02.0205	306.8462	208.9075	41376.352	0.0181304	020.3557
D1 . 5	**77038C**	**Atlas SLV-3A stage 2 (Agena D)**				
UI082	20150101	00:00:00.0	1407.2077	28973.2	41466.8	085.539
	11.2087	354.6701	076.9675	41597.349	0.1501734	222.0436
D1 . 6	**72101B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI059	20150101	00:00:00.0	1407.4418	29939.7	40508.5	103.875
	17.2758	310.1637	021.9868	41601.963	0.1270224	252.1339
D1 . 7	**93046C**	**IABS (Integrated Apogee Boost System)**				
UI028	20150101	00:00:00.0	1410.0139	34933.9	35615.5	186.450
	14.3332	016.8824	024.0015	41652.631	0.0081821	274.1823
D1 . 8	**75055B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI103	20150101	00:00:00.0	1410.5085	29740.8	40827.8	246.065
	18.5486	315.8283	348.8084	41662.370	0.1330580	039.2616
D1 . 9	**68063B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI055	20150101	00:00:00.0	1415.0260	30755.3	39992.3	323.098
	13.3615	327.4305	129.7732	41751.279	0.1106190	102.0047
D1 . 10	**70069B**	**Atlas SLV-3A stage 2 (Agena D)**				
UI145	20150101	00:00:00.0	1415.9732	29688.0	41095.6	148.324
	12.9083	255.7313	009.5176	41769.910	0.1365532	357.0021
D1 . 11	**92037C**	**IABS (Integrated Apogee Boost System)**				
UI085	20150101	00:00:00.0	1416.6378	35325.6	35485.0	221.588
	14.4806	013.3618	325.6723	41782.978	0.0019073	312.4181
D1 . 12	**81025C**	**Titan IIIC stage 3 (Transtage 40)**				
UI040	20150101	00:00:00.0	1421.1403	35260.1	35727.0	170.548
	13.8282	342.0539	203.6899	41871.464	0.0055755	292.0420
D1 . 13	**89046D**	**IUS second stage**				
UI080	20150101	00:00:00.0	1421.6266	35316.2	35691.9	163.277
	14.0100	015.9918	255.7817	41881.016	0.0044858	249.3781

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	**91080D**	**IUS second stage**				
UI078	20150101	00:00:00.0	1421.8945	35417.1	35600.9	184.704
	14.3687	022.2776	232.8484	41886.277	0.0021935	265.1123
D1 . 15	**95038C**	**IABS (Integrated Apogee Boost System)**				
UI022	20150101	00:00:00.0	1422.1255	35426.1	35599.4	163.057
	14.1530	024.7698	196.5310	41890.813	0.0020685	240.8585
D1 . 16	**82019B**	**Titan IIIC stage 3 (Transtage 38)**				
UI039	20150101	00:00:00.0	1422.2343	35477.1	35553.5	175.779
	14.3551	345.1141	038.4171	41892.951	0.0009115	293.5934
D1 . 17	**89069D**	**Titan 34D stage 3 (Transtage D-2)**				
UI088	20150101	00:00:00.0	1422.3053	35222.9	35811.2	026.783
	14.6074	006.5270	232.5484	41894.345	0.0070219	120.1698
D1 . 18	**87097B**	**Titan 34D stage 3 (Transtage D-14)**				
UI029	20150101	00:00:00.0	1422.5258	35478.2	35563.3	151.136
	13.6329	009.3772	157.8726	41898.675	0.0010156	244.3572
D1 . 19	**00001C**	**IABS (Integrated Apogee Boost System)**				
UI015	20150101	00:00:00.0	1423.2150	35449.8	35619.5	106.148
	12.1373	037.2479	232.9837	41912.206	0.0020239	170.1706
D1 . 20	**00065C**	**IABS (Integrated Apogee Boost System)**				
UI011	20150101	00:00:00.0	1423.2279	35285.2	35783.5	287.912
	11.6828	038.6079	168.9361	41912.460	0.0059440	352.6790
D1 . 21	**94084D**	**IUS second stage**				
UI019	20150101	00:00:00.0	1423.2524	35525.6	35546.2	115.715
	13.2203	032.0177	080.8446	41912.940	0.0002449	185.5428
D1 . 22	**84129B**	**Titan 34D stage 3 (Transtage D-13)**				
UI032	20150101	00:00:00.0	1423.5735	35507.9	35575.7	015.932
	15.3861	358.1015	137.0001	41919.245	0.0008079	119.0365
D1 . 23	**84037B**	**Titan 34D stage 3 (Transtage D-11)**				
UI095	20150101	00:00:00.0	1423.5840	35402.5	35680.6	340.795
	14.6280	352.2535	204.5097	41919.451	0.0033161	088.9532
D1 . 24	**03008C**	**IABS (Integrated Apogee Boost System)**				
UI006	20150101	00:00:00.0	1423.9799	35479.3	35619.2	076.405
	09.8765	044.9441	148.7025	41927.221	0.0016683	132.7601
D1 . 25	**85092E**	**IUS second stage**				
UI033	20150101	00:00:00.0	1424.5342	35321.2	35801.4	274.946
	15.3104	356.8765	070.6177	41938.101	0.0057251	018.4542
D1 . 26	**03041B**	**Titan IVB stage 3 (Centaur)**				
UI072	20150101	00:00:00.0	1427.7635	35469.5	35777.2	089.648
	07.6103	090.2549	348.0600	42001.458	0.0036622	100.4099
D1 . 27	**85010D**	**IUS second stage**				
UI047	20150101	00:00:00.0	1428.4442	35511.7	35761.7	303.624
	17.9150	000.0562	177.7379	42014.807	0.0029756	043.7044
D1 . 28	**03040C**	**IABS (Integrated Apogee Boost System)**				
UI002	20150101	00:00:00.0	1429.2758	35589.0	35717.0	066.029
	09.4902	046.0484	192.7889	42031.111	0.0015226	120.4822

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	**89090B**	**USA 48 (MAGNUM 2)**				
UI136	20150101	00:00:00.0	1429.4344	34488.5	36823.7	274.441
	17.5320	026.8194	354.9649	42034.221	0.0277762	348.7603
D1 . 30	**72010B**	**Titan IIIC stage 3 (Transtage 22)**				
UI038	20150101	00:00:00.0	1430.6337	35439.0	35920.5	343.958
	08.4161	312.9085	037.9239	42057.729	0.0057242	132.7393
D1 . 31	**95060B**	**Titan IVA stage 3 (Centaur)**				
UI016	20150101	00:00:00.0	1431.3452	35545.7	35843.1	065.706
	12.5263	036.5581	110.7269	42071.673	0.0035339	130.2237
D1 . 32	**94009B**	**Titan IVA stage 3 (Centaur)**				
UI014	20150101	00:00:00.0	1431.3620	35634.7	35754.0	084.668
	10.5698	069.8784	123.5732	42072.002	0.0014170	115.4152
D1 . 33	**77007D**	**DSP F7 operational debris (IR-telescope aperture suncover)**				
UI100	20150101	00:00:00.0	1431.3867	34795.3	36593.4	218.761
	12.0581	321.5112	359.5616	42072.486	0.0213683	358.4909
D1 . 34	**03012B**	**Titan IVB stage 3 (Centaur)**				
UI064	20150101	00:00:00.0	1431.5274	35596.2	35798.0	268.537
	06.3085	044.1353	181.2958	42075.242	0.0023984	325.7209
D1 . 35	**76059C**	**Titan IIIC stage 3 (Transtage 28)**				
UI054	20150101	00:00:00.0	1431.9419	35648.3	35762.9	224.458
	11.7694	321.5856	141.2604	42083.364	0.0013612	003.0103
D1 . 36	**95022B**	**Titan IVA stage 3 (Centaur)**				
UI021	20150101	00:00:00.0	1432.0497	35666.0	35750.1	103.388
	14.4716	052.8903	226.3877	42085.476	0.0009988	150.8619
D1 . 37	**75118C**	**Titan IIIC stage 3 (Transtage 29)**				
UI050	20150101	00:00:00.0	1432.0931	35661.9	35756.1	050.548
	11.3611	320.2909	096.8596	42086.325	0.0011198	191.1767
D1 . 38	**75118A**	**OPS 3165 (DSP F5)**				
UI052	20150101	00:00:00.0	1432.9756	35596.6	35855.8	261.942
	11.3936	320.2102	249.7525	42103.614	0.0030778	041.7919
D1 . 39	**01009B**	**Titan IVB stage 3 (Centaur)**				
UI003	20150101	00:00:00.0	1433.3168	35669.4	35795.4	196.713
	09.0122	042.1332	041.9393	42110.297	0.0014957	255.2244
D1 . 40	**78038A**	**OPS 8790 (AQUACADE 4)**				
UI091	20150101	00:00:00.0	1433.4277	35650.7	35818.2	168.162
	10.2378	337.2928	205.7993	42112.469	0.0019894	291.6691
D1 . 41	**71039B**	**Titan IIIC stage 3 (Transtage 20)**				
UI093	20150101	00:00:00.0	1433.7330	35610.1	35870.5	099.874
	07.7017	310.7369	357.0759	42118.449	0.0030909	249.3229
D1 . 42	**80060G**	**Ekran 5 debris**				
UI137	20150101	00:00:00.0	1434.6500	35680.8	35836.6	294.960
	13.6313	332.7067	215.4394	42136.406	0.0018490	062.2316
D1 . 43	**69036A**	**OPS 3148 (CANYON 2)**				
UI070	20150101	00:00:00.0	1434.7809	31973.7	39548.3	346.263
	05.3555	085.5873	068.6387	42138.969	0.0898757	000.8777

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	20150101	00:00:00.0	1436.9449	35572.0	36034.5	353.349
	04.7929	040.4218	048.0072	42181.328	0.0054825	053.5570
D1 . 45	**79086A**	**OPS 1948 (VORTEX 2) (CHALET 2)**				
UI023	20150101	00:00:00.0	1437.7681	30686.7	40952.0	047.142
	06.8924	354.9632	015.1236	42197.438	0.1216342	163.4070
D1 . 46	**78058A**	**OPS 9454 (VORTEX 1) (CHALET 1)**				
UI009	20150101	00:00:00.0	1438.3970	29875.8	41787.5	039.007
	06.7171	033.2240	330.5914	42209.741	0.1411016	109.9232
D1 . 47	**90095D**	**IUS second stage**				
UI081	20150101	00:00:00.0	1440.8198	35601.4	36156.9	000.583
	14.8726	020.8131	342.6072	42257.126	0.0065728	080.1652
D1 . 48	**01033D**	**IUS second stage**				
UI061	20150101	00:00:00.0	1441.5597	35873.7	35914.0	123.014
	08.5202	046.8005	249.6607	42271.592	0.0004769	175.5740
D1 . 49	**73040A**	**OPS 6157 (DSP F4)**				
UI048	20150101	00:00:00.0	1442.6350	35884.9	35945.2	322.801
	10.1230	314.3578	252.9135	42292.611	0.0007125	107.9597
D1 . 50	**04004D**	**IUS second stage**				
UI062	20150101	00:00:00.0	1442.6607	35899.6	35930.7	309.527
	06.4513	053.0682	308.9212	42293.112	0.0003681	354.9627
D1 . 51	**85010B**	**USA 8 (MAGNUM 1)**				
UI097	20150101	00:00:00.0	1442.8052	35361.0	36478.0	286.761
	17.8249	359.5850	292.5473	42295.937	0.0132053	027.3014
D1 . 52	**72010A**	**OPS 1570 (DSP F3)**				
UI144	20150101	00:00:00.0	1443.3899	35887.0	35972.4	088.063
	08.9591	314.2732	256.1365	42307.362	0.0010099	232.5807
D1 . 53	**00024D**	**IUS second stage**				
UI067	20150101	00:00:00.0	1444.2231	35911.4	35980.7	203.956
	09.5064	044.1172	075.8003	42323.643	0.0008190	258.5924
D1 . 54	**00024E**	**DSP F20 operational debris (IR-telescope aperture suncover)**				
UI005	20150101	00:00:00.0	1444.2285	34939.3	36952.7	270.301
	09.8649	043.8016	234.5700	42323.749	0.0237859	325.2711
D1 . 55	**79086C**	**Titan IIIC stage 3 (Transtage 34)**				
UI024	20150101	00:00:00.0	1444.7072	30281.7	41628.8	300.932
	07.1275	353.3564	069.4166	42333.100	0.1340212	058.6716
D1 . 56	**78058B**	**Titan IIIC stage 3 (Transtage 33)**				
UI010	20150101	00:00:00.0	1445.4143	29559.1	42378.7	228.131
	06.5027	031.1854	041.9204	42346.912	0.1513629	289.1495
D1 . 57	**81107C**	**Titan IIIC stage 3 (Transtage 39)**				
UI076	20150101	00:00:00.0	1445.7500	31782.6	40168.6	331.384
	07.6382	349.4355	058.7037	42353.469	0.0990003	097.5795
D1 . 58	**94054B**	**Titan IVA stage 3 (Centaur)**				
UI017	20150101	00:00:00.0	1446.0001	35471.6	36490.3	010.485
	11.8112	024.8034	246.6600	42358.352	0.0120250	083.5539

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	**96026B**	**Titan IVA stage 3 (Centaur)**				
UI075	20150101	00:00:00.0	1446.4011	34050.4	37926.5	298.881
	09.4930	358.6352	308.2058	42366.184	0.0457453	041.3024
D1 . 60	**73040B**	**Titan IIIC stage 3 (Transtage 24)**				
UI049	20150101	00:00:00.0	1446.4697	35858.0	36121.9	096.322
	10.3191	314.8665	296.7694	42367.523	0.0031142	239.2351
D1 . 61	**97008E**	**DSP F18 operational debris (IR-telescope aperture suncover)**				
UI164	20150101	00:00:00.0	1446.8242	35731.7	36261.2	042.493
	12.0701	040.0091	157.8048	42374.445	0.0062486	101.5343
D1 . 62	**89090D**	**IUS second stage**				
UI090	20150101	00:00:00.0	1446.9909	34621.1	37378.3	139.137
	17.6753	027.4543	345.4669	42377.699	0.0325314	206.7984
D1 . 63	**97008D**	**IUS second stage**				
UI071	20150101	00:00:00.0	1447.2677	35900.1	36111.6	149.715
	11.9440	040.2164	084.9108	42383.104	0.0024954	208.5354
D1 . 64	**76059A**	**OPS 2112 (DSP F6)**				
UI056	20150101	00:00:00.0	1447.6729	35991.5	36034.9	132.128
	12.3646	323.5919	144.2964	42391.015	0.0005117	266.6015
D1 . 65	**84009C**	**Titan 34D stage 3 (Transtage D-10)**				
UI025	20150101	00:00:00.0	1448.0452	31837.0	40203.5	053.232
	08.2011	354.9686	033.9959	42398.282	0.0986653	171.1589
D1 . 66	**79053C**	**Titan IIIC stage 3 (Transtage 31)**				
UI051	20150101	00:00:00.0	1448.0925	35757.8	36284.3	062.692
	14.5271	339.0339	182.6559	42399.204	0.0062090	182.2295
D1 . 67	**89035C**	**Titan 34D stage 3 (Transtage D-16)**				
UI020	20150101	00:00:00.0	1448.3012	31809.4	40241.1	130.623
	08.0120	010.7652	329.1508	42403.279	0.0994229	203.0353
D1 . 68	**85092C**	**USA 12 (DSCS III B-05)**				
UI077	20150101	00:00:00.0	1449.7907	36042.5	36067.7	357.288
	14.5452	025.3683	124.1883	42432.347	0.0002966	071.3748
D1 . 69	**93074B**	**IABS (Integrated Apogee Boost System)**				
UI084	20150101	00:00:00.0	1450.8272	36056.9	36094.8	049.340
	14.9902	020.1251	266.0082	42452.568	0.0004466	127.9491
D1 . 70	**68063A**	**OPS 2222 (CANYON 1)**				
UI102	20150101	00:00:00.0	1450.9658	32098.1	40058.5	158.303
	14.5481	333.0637	110.9520	42455.272	0.0937496	292.4251
D1 . 71	**89069B**	**USA 44 (DSCS III A-02)**				
UI126	20150101	00:00:00.0	1452.8370	36089.4	36139.6	076.341
	12.0252	039.9870	257.3234	42491.765	0.0005912	134.7908
D1 . 72	**93046A**	**USA 93 (DSCS III B-09)(DSCS III F7)**				
UI120	20150101	00:00:00.0	1453.8049	36127.8	36138.4	226.513
	09.6990	046.9745	094.8890	42510.636	0.0001241	276.2760
D1 . 73	**92006A**	**USA 78 (DSCS III B-14)**				
UI127	20150101	00:00:00.0	1453.9779	36109.7	36162.6	251.545
	12.3509	038.9132	212.1647	42514.008	0.0006213	308.9478

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	20150101	00:00:00.0	1454.5381	36110.8	36182.8	150.574
	14.9841	337.8111	182.0648	42524.928	0.0008468	269.5263
D1 . 75	**85092B**	**USA 11 (DSCS III B-04)**				
UI079	20150101	00:00:00.0	1454.6849	36144.5	36155.6	031.903
	14.7073	023.8719	327.4044	42527.789	0.0001307	106.7844
D1 . 76	**80087A**	**OPS 6394 (FLTSATCOM F4)**				
UI096	20150101	00:00:00.0	1455.3115	36152.5	36171.5	339.791
	14.8465	345.1844	199.0436	42540.000	0.0002227	093.4563
D1 . 77	**14043D**	**Delta 4 second stage (DCSS 4)**				
UI187	20150101	00:00:00.0	1455.8121	36121.5	36221.8	229.477
	00.3161	358.8434	297.9435	42549.754	0.0011786	326.2283
D1 . 78	**06024B**	**USA 188 (MITEx Lockheed satellite)**				
UI148	20150101	00:00:00.0	1456.5830	36154.7	36218.7	170.627
	04.3678	064.0447	068.4222	42564.775	0.0007518	203.9470
D1 . 79	**84129A**	**USA 7 (DSP F12)**				
UI034	20150101	00:00:00.0	1456.7327	36171.9	36207.3	105.022
	16.1113	000.8974	175.3377	42567.691	0.0004158	201.3872
D1 . 80	**01020A**	**USA 158 (GeoLITE)**				
UI114	20150101	00:00:00.0	1456.9002	36116.7	36269.0	015.967
	04.9837	051.0220	025.7914	42570.953	0.0017885	064.3673
D1 . 81	**81025A**	**OPS 7350 (DSP F9)**				
UI045	20150101	00:00:00.0	1457.0701	36106.9	36285.4	020.049
	14.9119	345.5438	173.3491	42574.264	0.0020956	132.5718
D1 . 82	**89046A**	**USA 39 (DSP F14)**				
UI150	20150101	00:00:00.0	1457.2876	36186.2	36215.2	325.066
	14.3962	016.9462	150.3287	42578.500	0.0003404	047.5339
D1 . 83	**92037A**	**USA 82 (DSCS III B-12)(DSCS III F6)**				
UI123	20150101	00:00:00.0	1457.3415	36170.2	36234.1	009.482
	10.7170	043.2127	272.3453	42579.549	0.0007508	065.3886
D1 . 84	**95027A**	**USA 111 (UFO F5)**				
UI122	20150101	00:00:00.0	1458.2421	36206.7	36231.2	253.882
	09.1370	034.4582	187.7013	42597.091	0.0002875	314.7218
D1 . 85	**79053A**	**OPS 7484 (DSP F8)**				
UI053	20150101	00:00:00.0	1458.3524	36172.8	36269.4	104.076
	14.7742	340.0722	183.4079	42599.239	0.0011336	220.7852
D1 . 86	**84037A**	**OPS 7641 (DSP F11)**				
UI037	20150101	00:00:00.0	1459.2684	36192.0	36286.1	251.077
	15.6431	355.2338	166.0383	42617.075	0.0011046	350.3401
D1 . 87	**90097B**	**USA 67 (SDS 2 F2)(QUASAR 2)**				
UI092	20150101	00:00:00.0	1459.4288	36133.1	36351.0	011.189
	16.3516	013.7693	183.3751	42620.198	0.0025563	095.6836
D1 . 88	**89069A**	**USA 43 (DSCS II F-15)**				
UI087	20150101	00:00:00.0	1460.2911	36178.2	36339.9	047.125
	15.1914	013.2721	157.3064	42636.983	0.0018956	131.7559

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	**90095A**	**USA 65 (DSP F15)**				
UI083	20150101	00:00:00.0	1463.5270	36312.7	36332.4	121.526
	14.9180	020.7568	312.7546	42699.947	0.0002307	197.0921
D1 . 90	**87097A**	**USA 28 (DSP F13)**				
UI030	20150101	00:00:00.0	1463.6775	36209.4	36440.2	125.395
	14.3021	012.0841	170.8324	42702.875	0.0027027	209.6636
D1 . 91	**82019A**	**OPS 8701 (DSP F10)**				
UI046	20150101	00:00:00.0	1466.6162	36355.0	36408.8	101.594
	15.6288	349.4374	189.8714	42760.013	0.0006289	207.8806
D1 . 92	**98058A**	**USA 140 (UFO F9)**				
UI113	20150101	00:00:00.0	1466.7830	36336.2	36434.5	172.973
	06.9254	038.5103	293.6437	42763.256	0.0011493	229.4464
D1 . 93	**71039A**	**OPS 3811 (DSP F2)**				
UI042	20150101	00:00:00.0	1467.0347	36296.7	36484.4	202.539
	09.1239	315.6173	260.9073	42768.147	0.0021949	339.7301
D1 . 94	**82106B**	**DSCS III A-01**				
UI135	20150101	00:00:00.0	1471.9694	36410.7	36564.0	205.522
	15.2945	009.4850	094.2513	42864.000	0.0017885	289.1006
D1 . 95	**77007A**	**OPS 3151 (DSP F7)**				
UI057	20150101	00:00:00.0	1476.5577	36233.6	36918.3	335.901
	13.4239	329.1954	284.9764	42953.029	0.0079698	103.0615
D1 . 96	**09001B**	**Delta 4 second stage (Delta 337, DCSS-5 F03)**				
UI154	20150101	00:00:00.0	1499.0815	35922.9	38098.3	265.643
	04.1694	027.8859	002.7826	43388.736	0.0250695	321.9758
D1 . 97	**07054B**	**Delta 4 second stage (Delta 329, DCSS-5 F02)**				
UI147	20150101	00:00:00.0	1502.1158	35955.3	38183.0	355.064
	02.2825	086.0417	029.0221	43447.266	0.0256370	352.6107

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 7 objects.

For explanation symbols, see definition at the beginning of Chapter 4 on page 129.

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	**07054A**	**USA 197 (DSP F23)**				
UI141	20150101	00:00:00.0	1436.2442	35778.8	35800.2	008.137
	02.3262	081.2238	118.2136	42167.615	0.0002545	027.0423
L1 . 2	**72101A**	**OPS 9390 (CANYON 5)**				
UI138	20150101	00:00:00.0	1436.1603	30120.0	41456.9	012.786
	18.4522	315.3379	326.7049	42165.973	0.1344315	149.0788
L1 . 3	**98029B**	**Titan IVB stage 3 (Centaur)**				
UI027	20150101	00:00:00.0	1435.4393	35567.6	35981.3	015.537
	10.6645	000.7331	084.9997	42151.859	0.0049066	115.8369
L1 . 4	**70046A**	**OPS 5346 (Rhyolite 1)**				
UI035	20150101	00:00:00.0	1436.3944	35769.3	35815.7	069.760
	07.2207	308.2970	145.0662	42170.555	0.0005505	221.6463
L1 . 5	**73013A**	**OPS 6063 (Rhyolite 2)**				
UI043	20150101	00:00:00.0	1436.1502	35687.0	35888.4	074.093
	09.5825	316.0090	160.5910	42165.775	0.0023881	218.5301
L1 . 6	**77038A**	**OPS 9751 (CANYON 7)**				
UI086	20150101	00:00:00.0	1435.5633	30566.8	40986.0	074.403
	11.7543	356.2972	029.3648	42154.287	0.1235839	189.8887
L1 . 7	**75055A**	**OPS 4966 (CANYON 6)**				
UI060	20150101	00:00:00.0	1437.4892	30312.1	41319.8	115.861
	19.6091	320.3972	289.3829	42191.980	0.1304480	229.4175

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 129.

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	20150101	00:00:00.0	1436.5015	35781.6	35807.4	000.007
	09.9688	034.8974	169.8145	42172.651	0.0003056	065.1975
L2 . 2	**77007C**	**Titan IIIC stage 3 (Transtage 23)**				
UI162	20150101	00:00:00.0	1436.0394	35715.8	35857.1	217.053
	12.3258	324.0009	268.5211	42163.606	0.0016761	353.1937
L2 . 3	**77114A**	**OPS 4258 (AQUACADE 3)**				
UI146	20150101	00:00:00.0	1435.0836	35676.1	35861.0	304.267
	18.4562	334.5916	246.7355	42144.896	0.0021943	069.6146
L2 . 4	**81107A**	**OPS 4029 (VORTEX 3)**				
UI129	20150101	00:00:00.0	1436.9166	31967.6	39638.2	312.729
	07.8331	356.9337	308.1022	42180.774	0.0909254	058.0530
L2 . 5	**70069A**	**OPS 7329 (CANYON 3)**				
UI157	20150101	00:00:00.0	1436.0545	32269.4	39304.4	349.677
	14.6943	268.6212	295.0803	42163.901	0.0834246	165.1378

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 are 2 objects identified.

For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 129.

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	**84009A**	**OPS 0441 (VORTEX 4)**				
UI026	20150101	00:00:00.0	1435.8092	31433.7	40128.5	187.964
	07.8866	353.4898	328.2503	42159.100	0.1031189	280.5358
L3 . 2	**80060A**	**Ekran 5**				
UI098	20150101	00:00:00.0	1436.2993	35748.5	35834.7	352.620
	13.7165	332.8941	111.3343	42168.693	0.0010221	119.9689

4.7 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 129.

UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
TYPE	i	Ω	ω	a	e	u
UI031	20150101	00:00:00.0	1413.2027	34386.7	36288.2	296.555
D1	05.3442	313.9210	256.1719	41715.407	0.0227907	081.3239
UI041	20150101	00:00:00.0	1436.0944	35567.9	36007.7	038.850
L1	14.0618	342.5713	264.3989	42164.683	0.0052143	155.2516
UI044	20150101	00:00:00.0	1436.9509	35632.5	35974.3	082.080
L1	14.3295	342.1461	344.5224	42181.446	0.0040522	199.5559
UI058	20150101	00:00:00.0	1526.5868	37406.3	37675.0	086.689
D1	17.1159	343.6148	316.1956	43917.861	0.0030593	190.6329
UI139	20150101	00:00:00.0	1435.3149	35570.7	35971.9	242.208
L2	14.8921	015.7997	174.4435	42149.424	0.0047599	327.0202
UI168	20150101	00:00:00.0	1437.5227	34953.1	36677.4	130.441
D1	14.3930	007.7183	047.8103	42192.635	0.0204342	224.4878

4.8 Uncontrolled uncatalogued objects

In this list there are 6 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	DSP F5 operational debris (IR-telescope aperture suncover)	Debris
U . 2	76059D	DSP F6 operational debris (IR-telescope aperture suncover)	Debris
U . 3	79053D	DSP F8 operational debris (IR-telescope aperture suncover)	Debris
U . 4	89046E	DSP F14 operational debris (IR-telescope aperture suncover)	Debris
U . 5	01033E	DSP F21 operational debris (IR-telescope aperture suncover)	Debris
U . 6	02040E	MSG-1 operational debris (SEVIRI Cooler Cover)	Debris

For the following objects old TLEs are available. For an explanation of the symbols, see the definitions at the beginning of Chapter 3 on page 35.

D.	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.	**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
D.	**68081S**	**Transtage 5 debris**					
	27-DEC-13	-3.99	313.769	-1040.605	1668.142	22	37
	23371.004259	42477.41860	0.0323548	8.4817	326.3689	274.4403	225.5543
D.	**68081V**	**Transtage 5 debris**					
	26-DEC-12	-3.42	269.022	-1637.87	2175.912	0	24
	23005.971019	42433.26980	0.0445202	8.4913	327.1699	255.0743	236.8556
D.	**02040E**	**MSG-1 operational debris (SEVIRI Cooler Cover)**					
	18-MAR-14					0	1
	23452.690938	41915.96497	0.0021357	7.8269	47.6289	127.5587	232.3066

LX.	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
L3.	**77092L**	**Ekran 2 fragmentation debris**					
	27-DEC-12	2945	337.5	173.3	150.8	20	68
	23006.018472	42133.87767	0.0120587	13.5968	334.4370	291.3082	230.6170

For the following object without TLEs old data is available. For explanation of symbols, see the definitions at the beginning of Chapter 4 on page 129.

D.	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
	i	Ω	ω	a	e	u
D.	**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

4.9 Uncontrolled uncatalogued objects

In this list there are 69 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	(deleted)	NOTE: mapped to 76004E	(deleted)
UU. 7	(deleted)	NOTE: mapped to 76004F	(deleted)
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	(deleted)	NOTE: mapped to 02040E	(deleted)
UU. 66	(deleted)	NOTE: mapped to 02040F	(deleted)
UU. 67	04004	USA 176 debris (Telescope aperture suncover)	Debris
UU. 68	(deleted)	NOTE: mapped to 04042D	(deleted)
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
UU. 74	14090	Fengyun 2G debris (VISSR cover?)	Debris

For the following objects classified as 'uncontrolled uncatalogued' the following orbital data have been provided by KIAM.

UUnnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
TYPE	i	Ω	ω	a	e	u
UU.010	20150101	00:00:00.000	1424.2088	34344.7	36762.6	167.953
D1	12.8537	327.7719	347.6399	41931.716	0.0288311	299.7077
UU.020	20150101	00:00:00.000	1450.0470	35716.2	36402.3	070.168
D1	14.7235	343.2517	359.4957	42437.348	0.0080836	185.1483
UU.041	20150101	00:00:00.000	1446.7336	35759.8	36231.7	083.685
D1	15.2208	008.1428	065.4473	42372.676	0.0055680	175.5621
UU.052	20140915	00:00:00.000	1421.9552	35243.9	35776.5	098.066
D1	14.0973	022.7635	305.7156	41887.470	0.0063575	069.6934

UUnnn	YYYYMMDD	HH:MM:SS.SS	t_{osc}	H_p	H_a	λ
TYPE	i	Ω	ω	a	e	u
UU.062	20140701	00:00:00.000	1436.8146	34727.8	36873.6	342.770
D1	11.9791	038.6453	014.2414	42178.780	0.0254368	222.1105
UU.072	20150101	00:00:00.000	1418.4475	35291.7	35589.1	056.684
D1	00.6024	140.8015	140.8556	41818.555	0.0035556	016.1393
UU.073	20150101	00:00:00.000	1401.5279	34739.2	35475.2	087.631
D1	00.5797	142.0441	074.9697	41485.341	0.0088696	047.3608
UU.061	20150101	00:00:00.000	1435.5305	35699.8	35851.6	099.402
L1	13.2483	035.5341	336.9156	42153.644	0.0018000	163.9590
UU.070	20150101	00:00:00.000	1437.4995	35414.5	36213.6	064.020
L1	02.3871	058.8251	230.9614	42192.181	0.0094699	103.5140
UU.071	20150101	00:00:00.000	1437.1890	35392.8	36223.1	096.798
L1	00.1909	350.6649	272.1117	42186.105	0.0098416	203.9375

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 11 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 35.

I .nn	COSPAR	NAME					
	Date					N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
I . 1	**63031A**	**Syncom 2**					
	30-DEC-14					49	338
	23739.013252	42169.61516	0.0007407	35.7413	358.3132	125.5420	71.4745
I . 2	**78012A**	**IUE**					
	23-DEC-14					48	1118
	23732.944109	42220.94083	0.1494353	43.8985	348.5382	193.8734	23.0168
I . 3	**10005A**	**Solar Dynamics Observatory**					
	26-DEC-14					48	258
	23735.221250	42164.63876	0.0001892	28.0265	156.9191	176.3486	258.1505
I . 4	**10036A**	**Beidou DW 5**					
	26-DEC-14					48	233
	23735.529896	42160.36336	0.0036117	54.3505	202.4779	200.1712	119.7799
I . 5	**10045A**	**Michibiki**					
	22-DEC-14					48	225
	23731.826435	42161.16297	0.0746651	40.5985	172.5564	270.0177	136.9567
I . 6	**10068A**	**Beidou DW 7**					
	26-DEC-14					48	213
	23735.577998	42158.25787	0.0032772	54.1747	321.7287	206.1187	118.4263
I . 7	**11013A**	**Beidou DW 8**					
	26-DEC-14					48	197
	23735.500613	42170.05177	0.0025867	56.7408	82.4398	190.1671	116.9496
I . 8	**11038A**	**Beidou DW 9**					
	26-DEC-14					48	181
	23735.866713	42164.27293	0.0031188	54.6681	204.6924	195.7789	96.0783
I . 9	**11073A**	**Beidou DW 10**					
	25-DEC-14					48	163
	23734.881227	42158.93211	0.0031432	54.2788	321.1796	205.6410	93.2237
I . 10	**13034A**	**IRNSS-R1A**					
	20-DEC-14					48	78
	23729.957766	42163.25649	0.0020961	27.5486	131.2538	179.0991	55.1197
I . 11	**14017A**	**IRNSS-R1B**					
	25-DEC-14					39	39
	23734.008252	42163.67864	0.0020277	30.6181	308.7556	190.1533	55.0471

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 12 objects are ordered according to their COSPAR designation.

Note that the numbering continues from Section **??**.

For an explanation of the symbols, see the definitions at the beginning of Chapter 3 on page 35.

Ind.nn	**COSPAR**	**NAME**					
	Date					N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
Ind. 1	**97036A**	**Superbird C**					
	26-DEC-14					48	878
	23735.525382	42120.19705	0.0003819	5.0914	60.4547	158.2465	115.2342
Ind. 2	**98068A**	**Bonum 1**					
	30-DEC-14					49	831
	23739.315833	42514.18825	0.0002625	2.4573	72.0054	238.0567	301.7540
Ind. 3	**07021A**	**Xinnuo 3**					
	26-DEC-14					45	388
	23735.150498	42715.67912	0.0002042	1.6972	37.0273	111.9464	344.6981
Ind. 4	**14062B**	**ARSAT-1**					
	24-DEC-14					11	11
	23733.405139	42165.28383	0.0001097	0.0191	327.0323	274.6315	288.1902
Ind. 5	**14064A**	**Ekspress-AM6**					
	24-DEC-14					10	10
	23733.690949	42232.52334	0.0598985	0.5759	268.2582	1.3779	117.3943
Ind. 6	**14078A**	**GSAT 16**					
	26-DEC-14					3	3
	23735.140301	42164.54261	0.0002469	0.1629	260.2775	200.4205	55.0259
Ind. 7	**14078B**	**DirectTV-14**					
	26-DEC-14					3	3
	23735.154722	42164.95106	0.0000804	0.0440	248.6034	178.5234	284.0107
Ind. 8	**14082A**	**Yamal 401**					
	23-DEC-14					2	2
	23732.476829	24346.90255	0.7214855	47.6436	94.1728	2.0123	192.3500
Ind. 9	**14085A**	**GVM/Briz-M**					
	25-DEC-14					1	1
	23734.164873	24499.36659	0.7219447	60.6044	145.4537	359.9728	352.2942
Ind. 10	**14089A**	**Astra 2G**					
	09-JAN-15					2	2
	23749.894317	42164.87453	0.0000557	0.0896	264.6962	179.9861	21.1372
Ind. 11	**14090A**	**Fengyun 2G**					
	09-JAN-15					2	2
	23749.894606	42163.48747	0.0003365	2.2694	278.4167	234.5338	99.7648

Ind.nn	COSPAR	NAME					
	Date					N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ
Ind. 12	**14090C**	**Fengyun 2G AKM**					
	09-JAN-15					1	1
	23749.235718	42359.60859	0.0044094	2.3292	278.8513	244.9323	85.5961

The longitude histories of objects in this category are plotted in Figures 6.1 to 6.12.

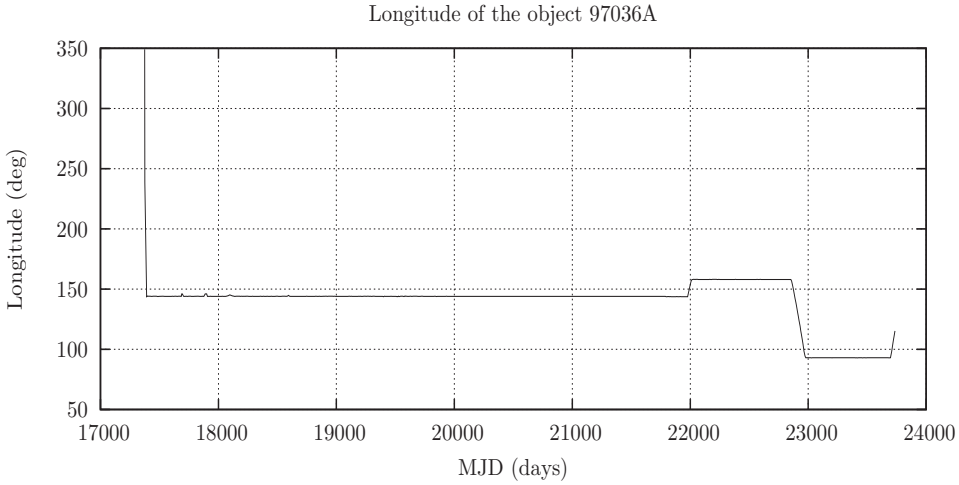

Figure 6.1: Longitude history of 97036A

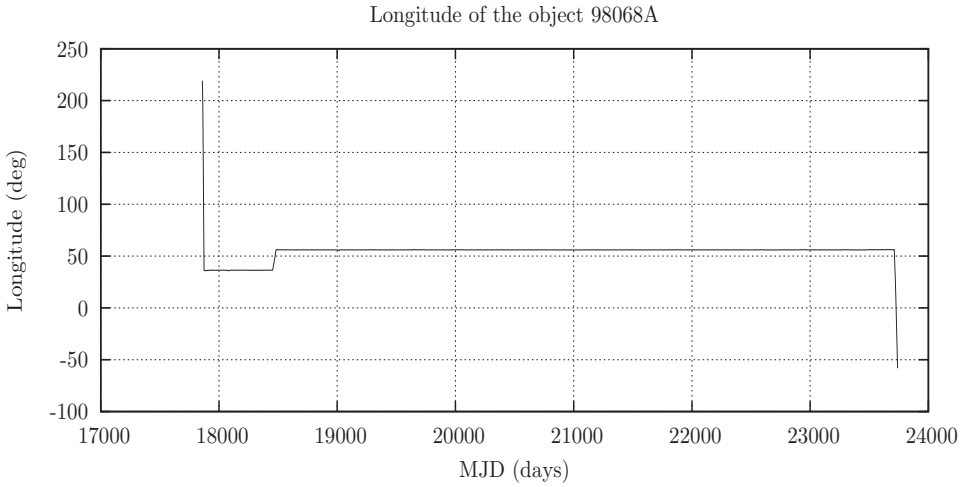

Figure 6.2: Longitude history of 98068A

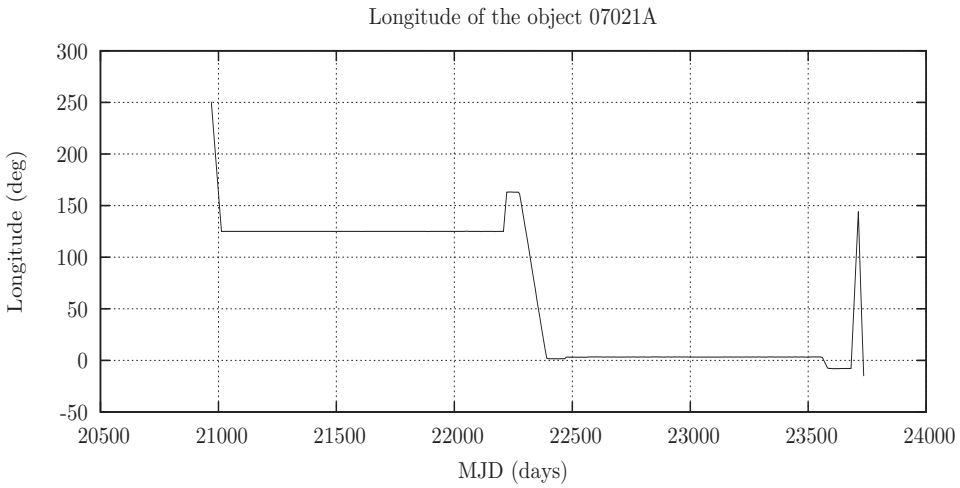

Figure 6.3: Longitude history of 07021A

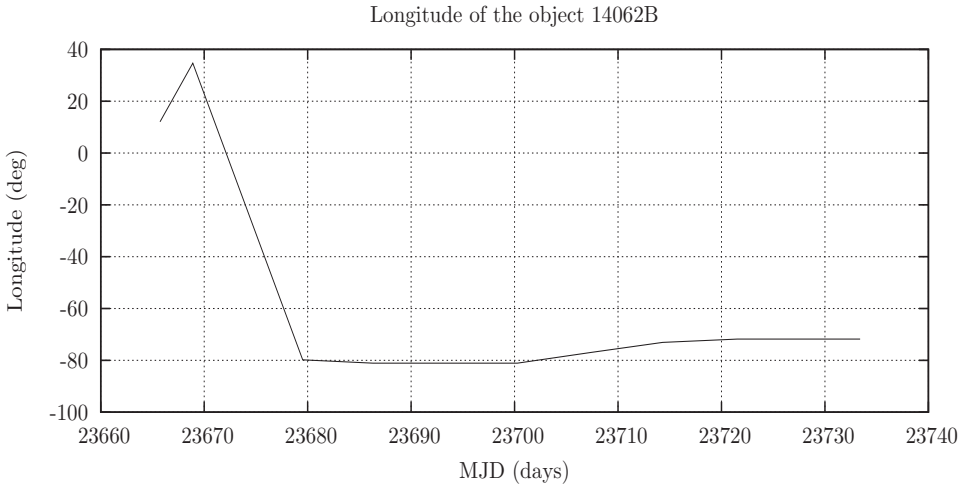

Figure 6.4: Longitude history of 14062B

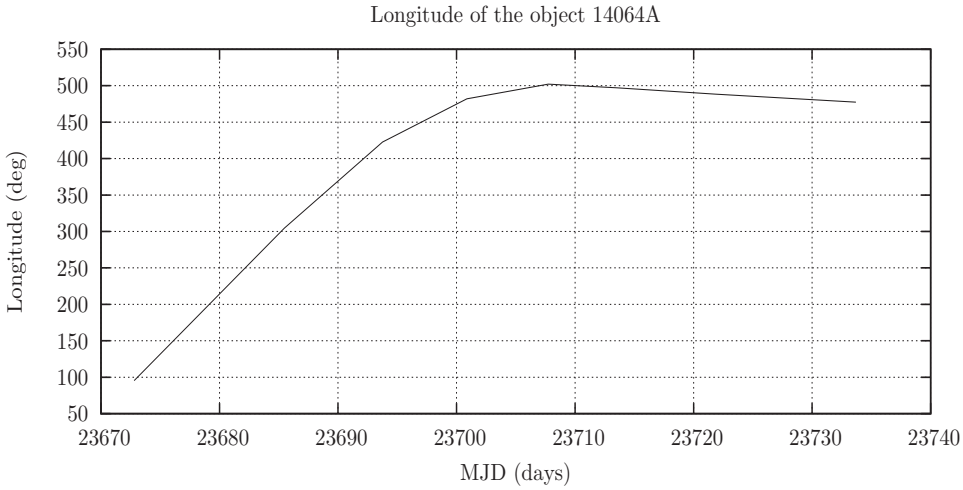

Figure 6.5: Longitude history of 14064A

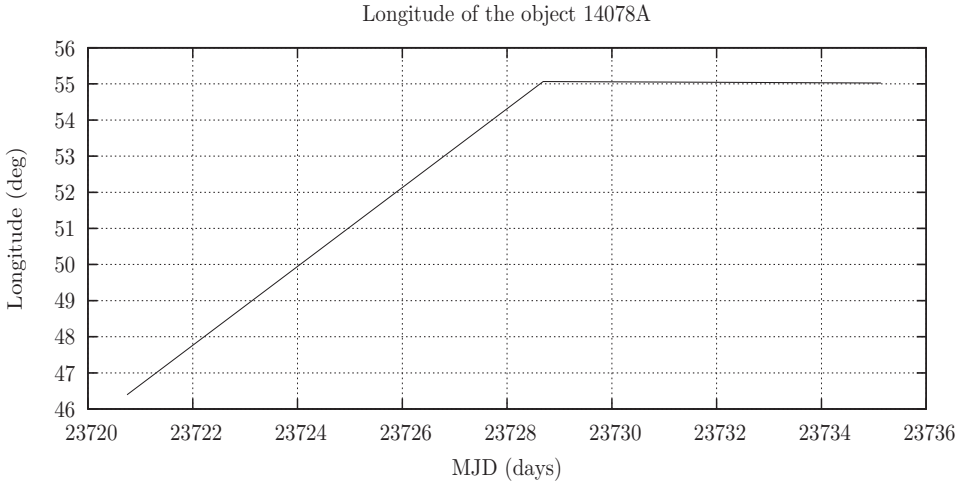

Figure 6.6: Longitude history of 14078A

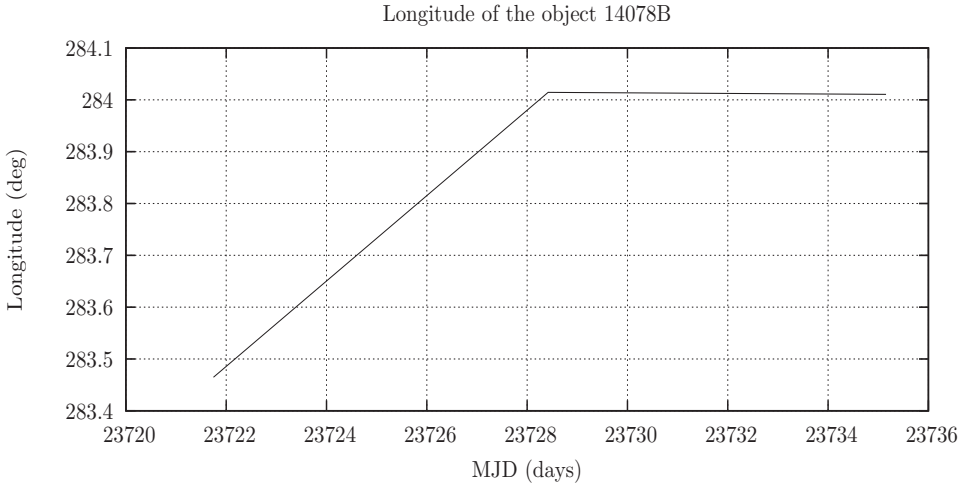

Figure 6.7: Longitude history of 14078B

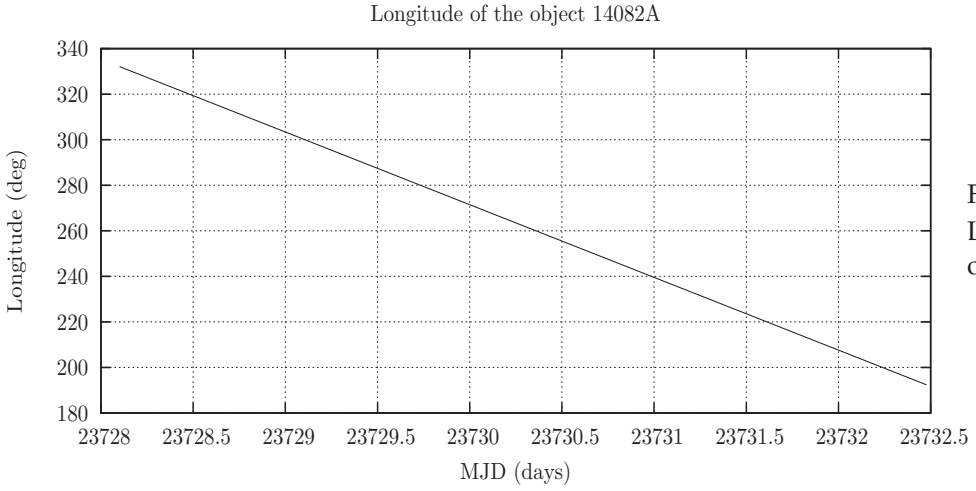

Figure 6.8: Longitude history of 14082A

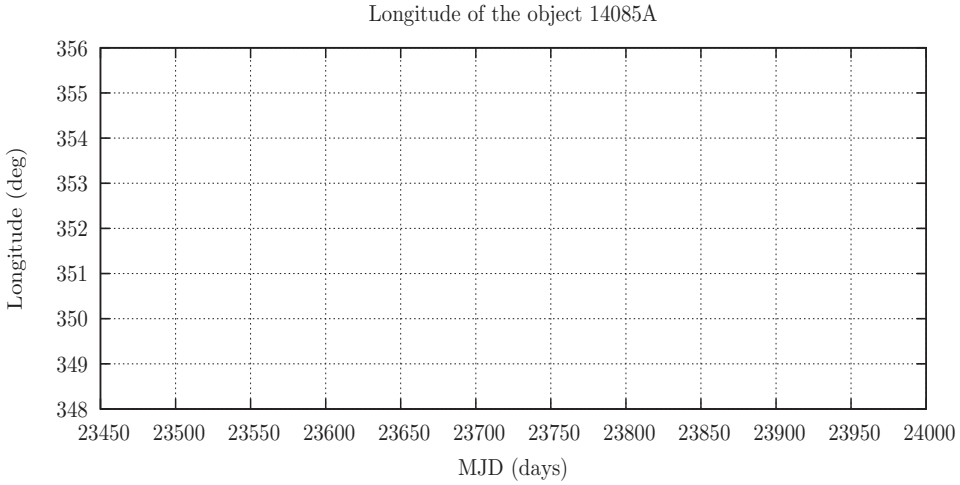

Figure 6.9: Longitude history of 14085A

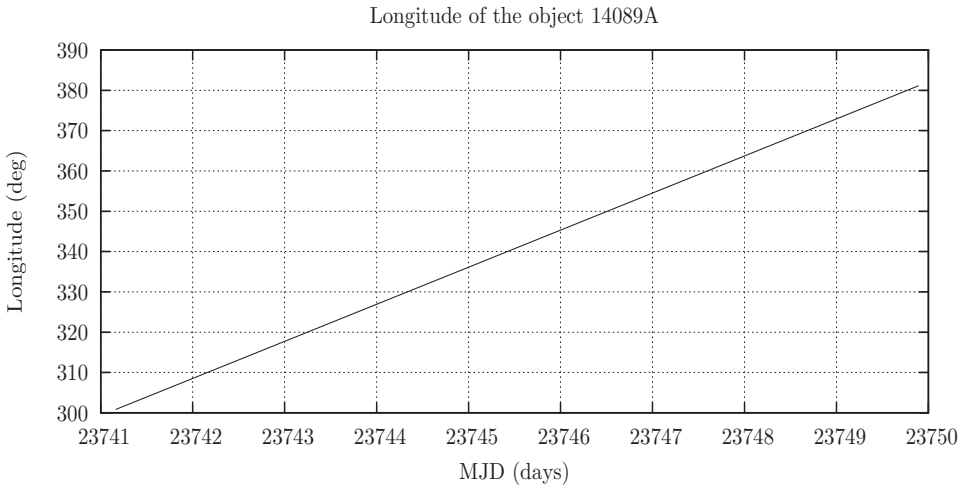

Figure 6.10: Longitude history of 14089A

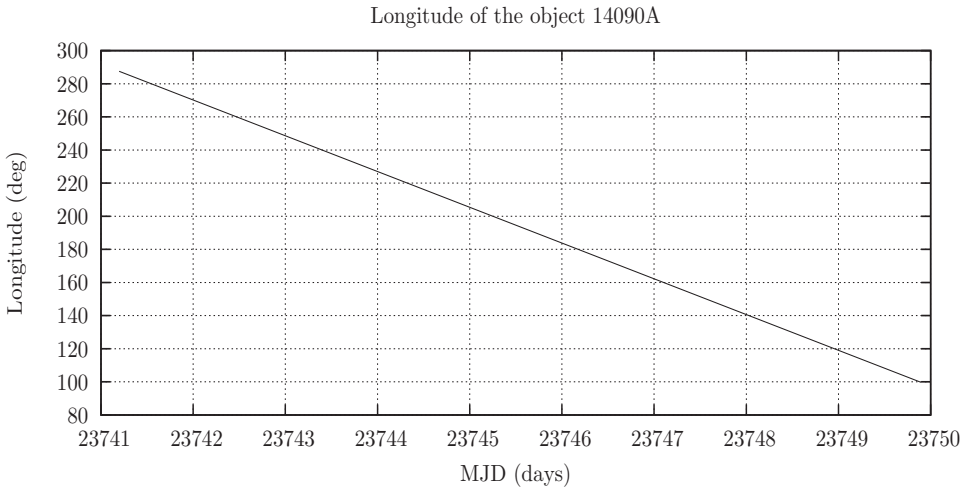

Figure 6.11: Longitude history of 14090A

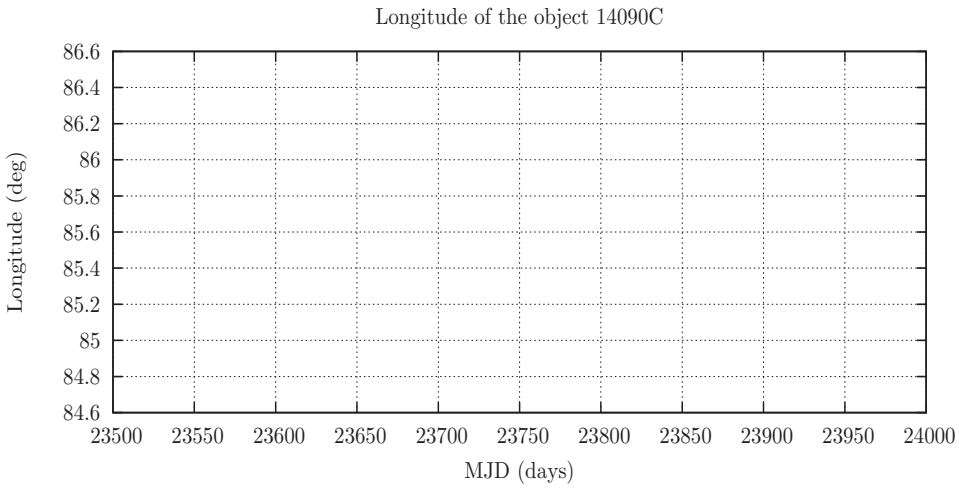

Figure 6.12: Longitude history of 14090C

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

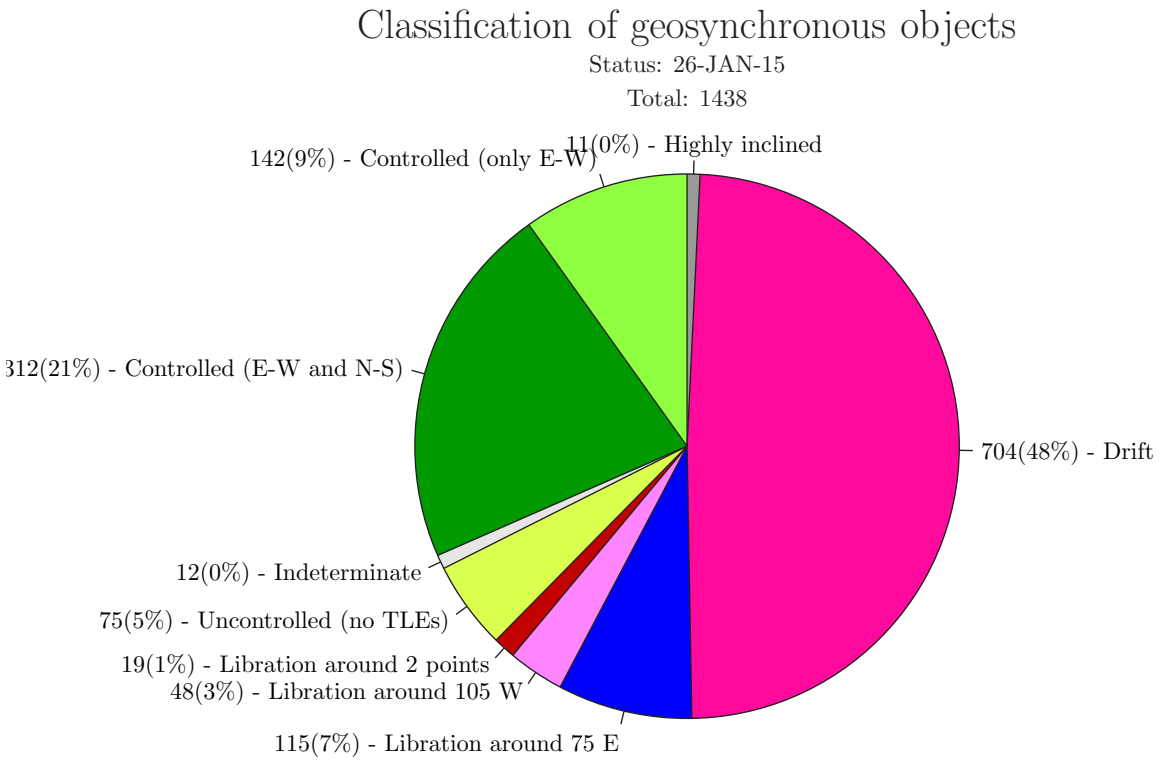

Figure 7.1:
Number of objects in each category

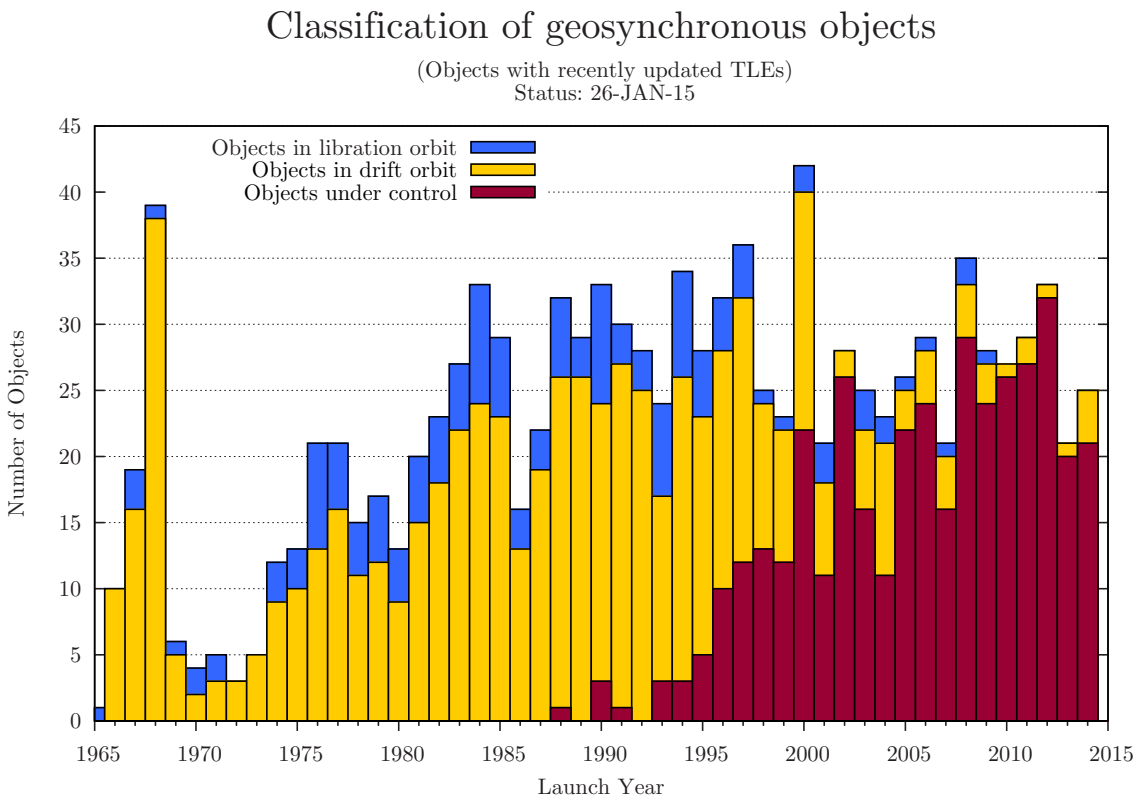

Figure 7.2:
Number of objects in each category according to the launch year.

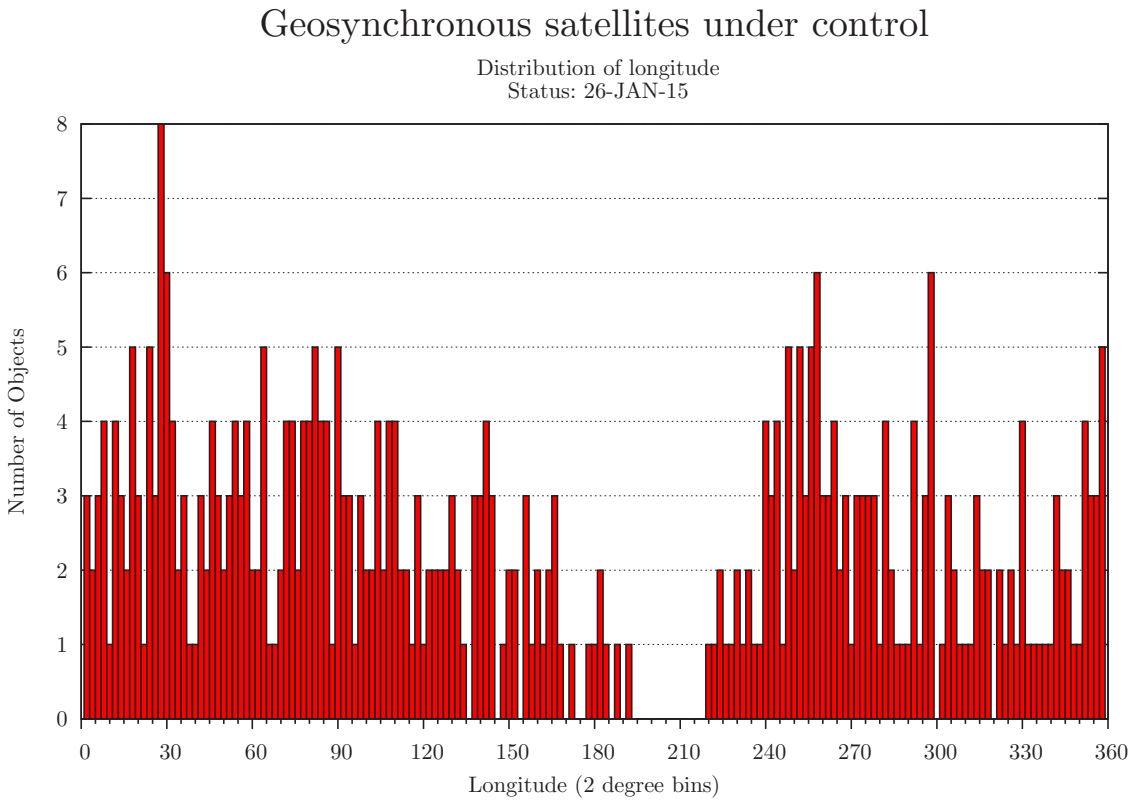

Figure 7.3:
Distribution of the longitude of the 390 satellites under control (with updated TLEs).

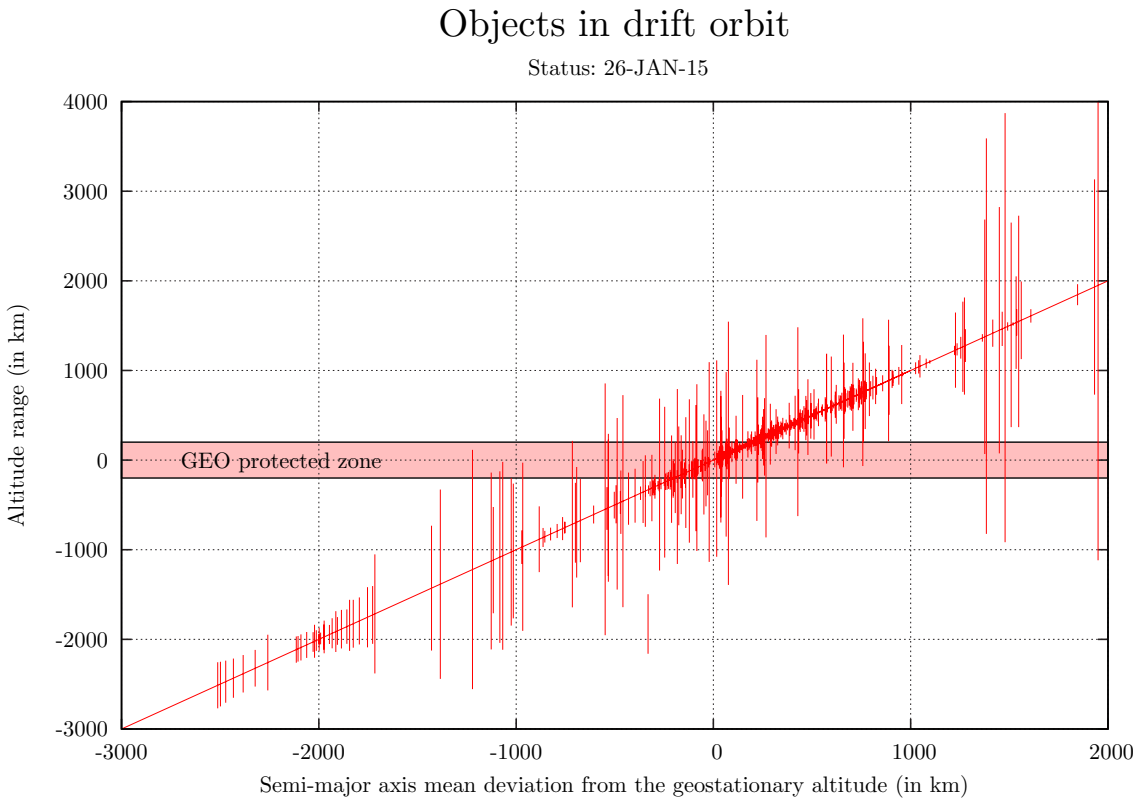

Figure 7.4:
Distribution and altitude range of the objects in drift orbit.

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.

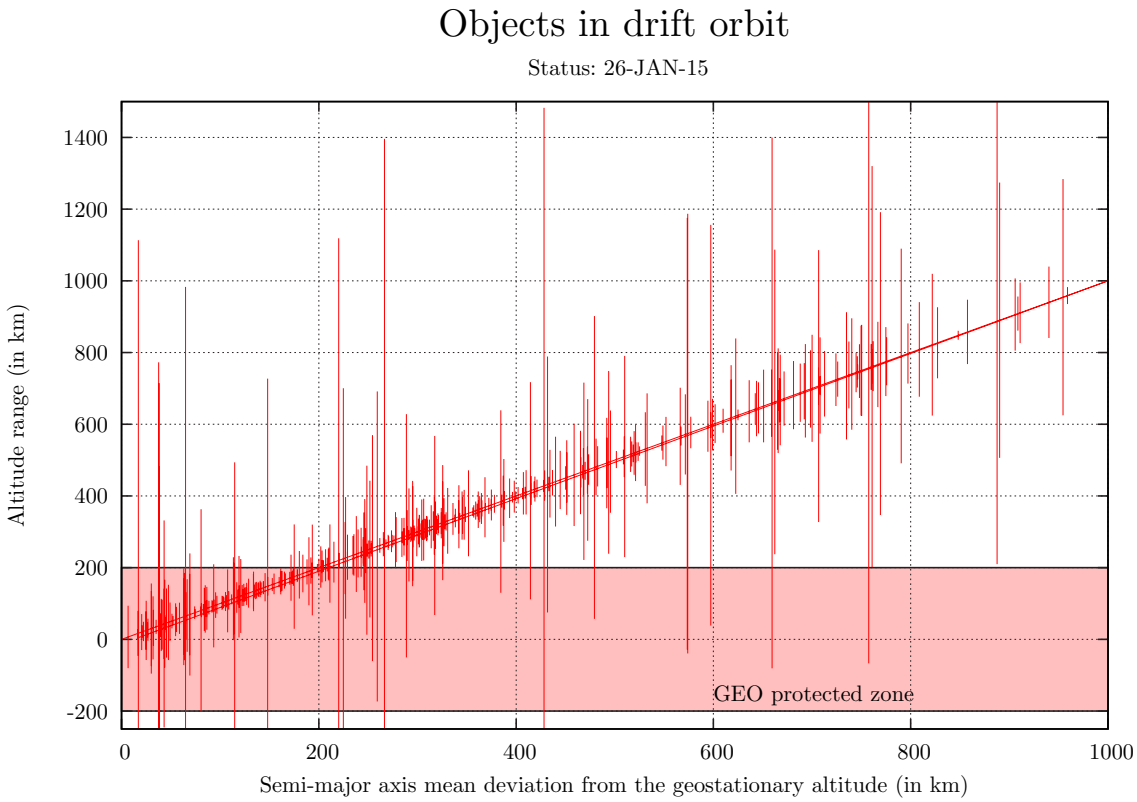

Figure 7.5:
Zoom in the distribution and altitude range of the objects in drift orbit.

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.

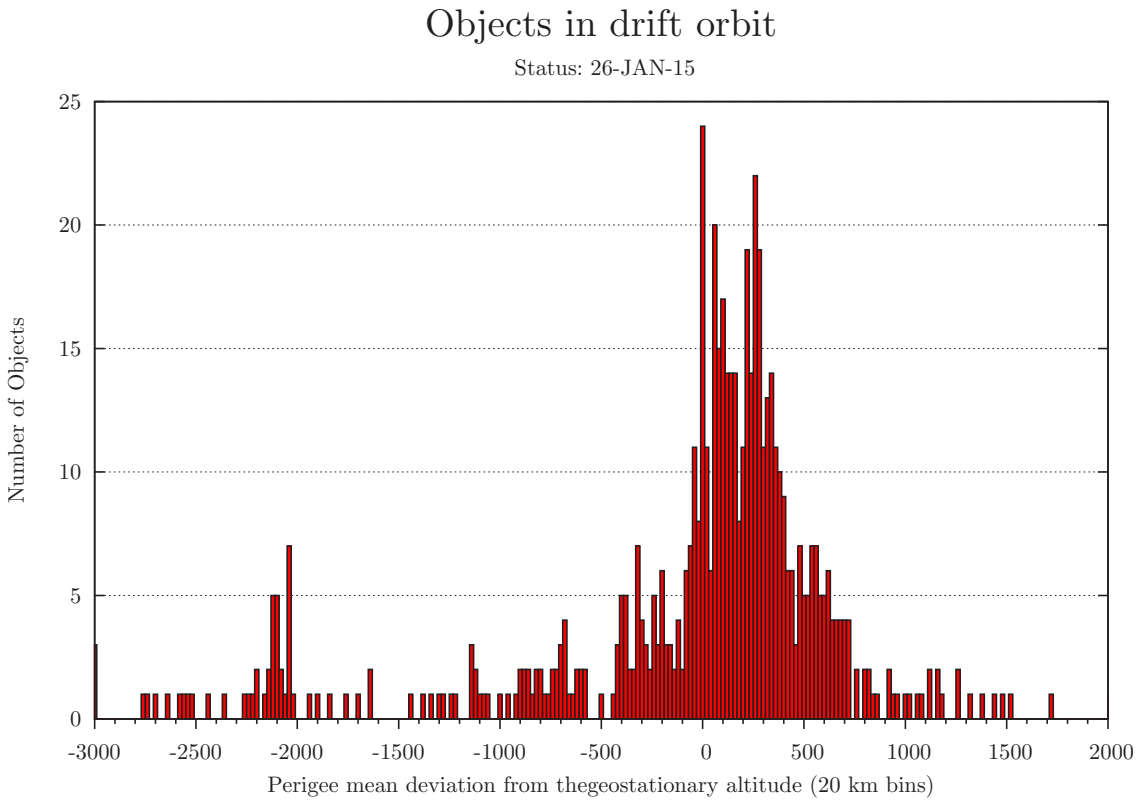

Figure 7.6:
Distribution of the perigee mean deviation from the geostationary altitude.

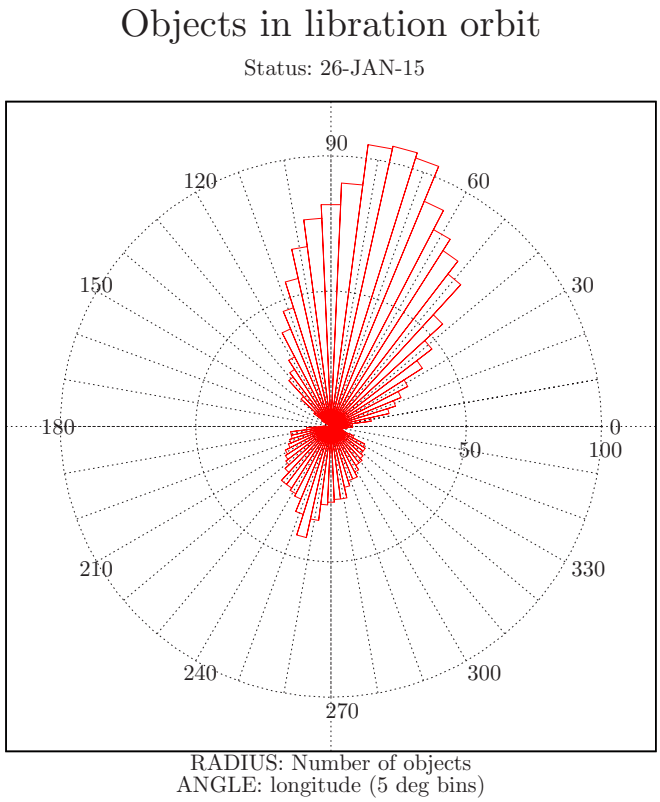

Figure 7.7:
Distribution of the objects in libration orbit in 5-deg bins of geographic longitude.

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.

1182 objects met these criteria as of 31 December 2014. 256 more objects are also known to be in this orbital region. For 181 of them KIAM provided orbital elements; 175 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 1438 .

They can be classified as follows:

- 454 are controlled (312 under longitude and inclination control),
- 704 are in a drift orbit,
- 182 are in a libration orbit,
- 6 are uncontrolled with no recent orbital elements available,
- 69 are uncatalogued objects which can, however, be associated with a launch,
- 11 are in highly-inclined orbits,
- 12 could not be classified.

Compared with the past issue of February 2014 the following changes can be observed: There were 42 new objects (31 payloads, and 5 rocket bodies) launched into or near GEO in 2014.

One object (68081AK) was newly catalogued, while 68081S appear lost from the last issue. Thus the total number of listed objects increased by 42. For one object (02040E) only one TLE was available after it appears lost again.

At least 18 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 13 were reorbited more than 250 km above GEO and complied with the IADC reorbiting guidelines:

- Inmarsat 2-F2 (91018A, INMARSAT, 427 km $\times$ 522 km),
- Astra 1C (93031A, LUXEMBURG, 391 km $\times$ 422 km),
- Intelsat VII F-3 (NSS-703) 94064A, INTELSAT, 256 km $\times$ 291 km),
- Intelsat 706 (95023A, INTELSAT, 335 km $\times$ 360 km),
- GE 5 (AMC-5) (98063B, USA , 251 km $\times$ 281 km),

- Telstar 6 (99005A, USA , 335 km × 388 km),
- Eutelsat W3 (99018A, EUTELSAT, 512 km × 538 km),
- DirecTV-1R (99056A, USA , 350 km × 394 km),
- XM Radio 2 (Rock) (01012A, USA , 328 km × 348 km),
- Fengyun 2C (04042A, CHINA , 611 km × 641 km),
- Xinnuo 3 (07021A, CHINA , 538 km × 546 km).

Intelsat VII F-3 (NSS-703) (94064A), and GE 5 (AMC-5) (98063A) were reorbited so that they might marginally touch the protected zone around GEO in a long-term forecast.

Two spacecraft listed in Table 2 were reorbited in 2014 into an orbit that complies with the IADC reorbiting guidelines:

- USA 67 (SDS 2 F2) (90097B, USA , 347 km × 565 km),
- USA 82 (DSCS III B-12) (92037A, USA , 384 km × 448 km).

Three spacecraft were reorbited too low:

- Apstar 1 (94043A, CHINA , 239 km × 267 km),
- Apstar 1A (96039A, CHINA , 220 km × 392 km),
- Insat 3E (03043E, INDIA , -214 km × -80 km).

Two spacecraft seems to be abandoned and have started librating around the libration point L1:

- Yamal 200 N1 (03053B, RUSSIA),
- Cosmos-2479 (12012A, RUSSIA).

Four rocket bodies (Proton-M/Briz-M fourth stages (14010C, 14023C, 14058B, 14064B, RUSSIA), were left in a drift orbit close or crossing the GEO, possibly also one AKM (14090C, CHINA).

This analysis has shown that in 2014, seventeen years after the IADC guidelines were established, there is a wide compliance with the guidelines. Only a few satellites were not or could not be properly reorbited.

9 References

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