

EUROPEAN SPACE AGENCY
EUROPEAN SPACE OPERATIONS CENTRE
GROUND SYSTEMS ENGINEERING DEPARTMENT
Space Debris Office

GEN-DB-LOG-00074-OPS-GR

**CLASSIFICATION OF
GEOSYNCHRONOUS OBJECTS**

ISSUE 13

by

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Produced with the DISCOS Database

February 2011

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Abstract

This is a status report on geosynchronous objects as of the end of 2010.

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 30 deg) is analysed. From 1202 objects for which orbital data are available, 397 are controlled inside their longitude slots, 622 are drifting above, below or through GEO, 172 are in a libration orbit and 11 whose status could not be determined. Furthermore, there are 72 uncontrolled objects without orbital data (of which 66 have not been catalogued). Thus the total number of known objects in the geostationary region is 1274.

During 2010 at least sixteen spacecraft reached end-of-life. Eleven of them were reorbited following the IADC recommendations, of which one spacecraft was reorbited with a perigee of 241 km - it is not yet clear if it will enter the 200-km protected zone around GEO or not -, four spacecraft were reorbited too low and at least one spacecraft did not or could not make any reorbiting manoeuvre at all and is now librating inside the geostationary ring.

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

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1 Introduction

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

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 30 degrees

The basic source of information are the NASA Two-Line Elements (TLE). 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 the status of which 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 three tables, there is a list of all objects in ascending order of their COSPAR identification 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: 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.
- 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
64047A	Syncom 3	1.	D	395.
65028A	Intelsat I F-1	1.	L2	24.
66053A	GGTS 1	1.	D	511.
66053B	IDCSP 1	1.	D	509.
66053C	IDCSP 2	1.	D	507.
66053D	IDCSP 3	1.	D	504.
66053E	IDCSP 4	1.	D	501.
66053F	IDCSP 5	1.	D	498.
66053G	IDCSP 6	1.	D	495.
66053H	IDCSP 7	1.	D	493.
66053J	Titan IIIC stage 3 (Transtage)	1.	D	491.
66110A	ATS 1	1.	D	398.
67001A	Intelsat II F-2	1.	D	396.
67003A	IDCSP 8	1.	D	515.
67003B	IDCSP 9	1.	D	514.
67003C	IDCSP 10	1.	D	513.
67003D	IDCSP 11	1.	D	512.
67003E	IDCSP 12	1.	D	510.
67003F	IDCSP 13	1.	D	503.
67003G	IDCSP 14	1.	D	500.
67003H	IDCSP 15	1.	D	496.
67026A	Intelsat II F-3	1.	L1	101.
67066A	IDCSP 16	1.	D	522.
67066B	IDCSP 17	1.	D	521.
67066C	IDCSP 18	1.	D	520.
67066D	IDCSP 19	1.	D	519.
67066E	LES 5	1.	D	518.
67066F	DODGE 1	1.	D	517.
67066G	Titan IIIC stage 3 (Transtage)	1.	D	516.
67094A	Intelsat II F-4	1.	L2	28.
67111A	ATS 3	1.	C2	64.
68050A	OPS 9341 (IDSCS 20)	1.	D	508.
68050B	OPS 9342 (IDSCS 21)	1.	D	506.
68050C	OPS 9343 (IDSCS 22)	1.	D	505.
68050D	OPS 9344 (IDSCS 23)	1.	D	502.
68050E	OPS 9345 (IDSCS 24)	1.	D	499.
68050F	OPS 9346 (IDSCS 25)	1.	D	497.
68050G	OPS 9347 (IDSCS 26)	1.	D	494.
68050H	OPS 9348 (IDSCS 27)	1.	D	492.
68050J	Titan IIIC stage 3 (Transtage)	1.	D	490.
68063A	OPS 2222 (CANYON 1)	2.	D1	69.
68063B	Atlas SLV-3A stage 2 (Agena D)	2.	D1	9.
68081A	OV2 5	1.	D	465.
68081D	LES 6	1.	L2	22.
68081E	Titan IIIC stage 3 (Transtage)	1.	D	463.
68081G	LES 6 operational debris	1.	D	439.
68081H	LES 6 operational debris	1.	D	468.
68081J	Transtage 5 debris	1.	D	431.
68081K	Transtage 5 debris	1.	D	472.
68081L	Transtage 5 debris	1.	D	469.
68081M	Transtage 5 debris	1.	D	424.
68081N	Transtage 5 debris	1.	D	433.
68081P	Transtage 5 debris	1.	D	459.
68116A	Intelsat III F-2	1.	D	6.
69011A	Intelsat III F-3	1.	D	4.

COSPAR	NAME	TABLE	STATUS	No
69013A	TACSAT 1	1.	D	403.
69013B	Titan IIIC stage 3 (Transtage)	1.	D	54.
69036A	OPS 3148 (CANYON 2)	2.	D	40.
69036B	Atlas SLV-3A stage 2 (Agena D)	2.	D	4.
69045A	Intelsat III F-4	1.	D	5.
69069A	ATS 5	1.	D	258.
69069C	JPL SR-28-3 (ATS 5 AKM)	1.	D	99.
69101A	Skynet 1A	1.	L2	4.
70003A	Intelsat III F-6	1.	D	197.
70021A	NATO I	1.	L2	7.
70032A	Intelsat III F-7	2.	L1	7.
70046A	OPS 5346 (Rhyolite 1)	2.	L1	3.
70055A	Intelsat III F-8	1.	D	475.
70069A	OPS 7329 (CANYON 3)	2.	L2	4.
70069B	Atlas SLV-3A stage 2 (Agena D)	2.	D	10.
70093A	OPS 5960 (DSP F1)	1.	D	524.
70093B	Titan IIIC stage 3 (Transtage)	1.	D	525.
71006A	Intelsat IV F-2	1.	D	155.
71009A	NATO IIB	1.	L2	3.
71039A	OPS 3811 (DSP F2)	2.	D	86.
71039B	Titan IIIC stage 3 (Transtage)	2.	D	41.
71095A	OPS 9431 (DSCS II F-1)	1.	L2	8.
71095B	OPS 9432 (DSCS II F-2)	1.	L3	2.
71095C	Titan IIIC stage 3 (Transtage)	1.	D	42.
71116A	Intelsat IV F-3	1.	D	277.
72003A	Intelsat IV F-4	1.	D	311.
72010A	OPS 1570 (DSP F3)	2.	D	50.
72010B	Titan IIIC stage 3 (Transtage)	2.	D	29.
72041A	Intelsat IV F-5	1.	D	369.
72090A	Anik A1	1.	D	154.
72101A	OPS 9390 (CANYON 5)	2.	L1	2.
72101B	Atlas SLV-3A stage 2 (Agena D)	2.	D	6.
73013A	OPS 6063 (Rhyolite 2)	2.	L1	4.
73023A	Anik A2	1.	D	305.
73040A	OPS 6157 (DSP F4)	2.	D	48.
73040B	Titan IIIC stage 3 (Transtage)	2.	D	58.
73058A	Intelsat IV F-7	1.	D	191.
73100A	OPS 9433 (DSCS II F-3)	1.	D	57.
73100B	OPS 9434 (DSCS II F-4)	1.	D	47.
73100D	Titan IIIC stage 3 (Transtage)	1.	D	12.
74017A	Cosmos 637	1.	D	425.
74017F	Proton-K fourth stage (Block DM)	1.	D	436.
74022A	Westar I	1.	D	327.
74033A	SMS 1	1.	D	128.
74033F	SMS 1 AKM	1.	D	523.
74039A	ATS 6	1.	D	471.
74039C	Titan IIIC stage 3 (Transtage)	1.	D	420.
74060A	Molniya 1-S	1.	L1	59.
74060F	Proton-K fourth stage (Block DM)	1.	L1	77.
74075A	Westar II	1.	D	318.
74093A	Intelsat IV F-8	1.	D	302.
74094A	Skynet 2B	1.	L1	96.
74101A	Symphonie A	1.	D	337.
75011A	SMS 2	1.	D	259.
75011F	Aerojet SVM-5 (SMS 2 AKM)	1.	D	125.

COSPAR	NAME	TABLE	STATUS	No
75038A	Anik A3	1.	D	359.
75042A	Intelsat IV F-1	1.	D	223.
75055A	OPS 4966 (CANYON 6)	2.	L1	8.
75055B	Atlas SLV-3A stage 2 (Agena D)	2.	D	8.
75077A	Symphonie B	1.	D	340.
75091A	Intelsat IVA F-1	1.	D	331.
75097A	Cosmos 775	1.	L1	65.
75097F	Proton-K fourth stage (Block DM)	1.	D	368.
75100A	GOES 1	1.	L2	14.
75100F	Aerojet SVM-5 (GOES 1 AKM)	1.	D	470.
75117A	RCA Satcom I	1.	D	275.
75118A	OPS 3165 (DSP F5)	2.	D	37.
75118C	Titan IIIC stage 3 (Transtage)	2.	D	35.
75118D	OPS 3165 debris (Telescope aperture suncover)	2.	U	1.
75123A	Raduga 1	1.	L1	19.
75123F	Proton-K fourth stage (Block DM)	1.	D	409.
76004A	Hermes	1.	L2	20.
76010A	Intelsat IVA F-2	1.	D	287.
76017A	Marisat 1	1.	D	208.
76023A	LES 8 (RTGPP)	1.	L2	9.
76023B	LES 9 (RTGPP)	1.	L2	11.
76023F	Titan IIIC stage 3 (Transtage)	1.	D	103.
76023J	LES 8, LES 9 operational debris	1.	D	102.
76023K	LES 8, LES 9 operational debris	1.	D	455.
76029A	RCA Satcom II	1.	D	130.
76035A	NATO IIIA	1.	D	315.
76042A	Comstar 1A	1.	D	309.
76053A	Marisat 2	1.	D	24.
76059A	OPS 2112 (DSP F6)	2.	D	62.
76059C	Titan IIIC stage 3 (Transtage)	2.	D	36.
76059D	OPS 2112 debris (Telescope aperture suncover)	2.	U	2.
76066A	Palapa 1	1.	D	365.
76073A	Comstar 2	1.	D	343.
76092A	Raduga 2	1.	L1	21.
76092F	Proton-K fourth stage (Block DM)	1.	L1	36.
76101A	Marisat 3	1.	D	50.
76107A	Ekran 1	1.	L1	37.
76107F	Proton-K fourth stage (Block DM)	1.	D	461.
77005A	NATO IIIB	1.	D	17.
77007A	OPS 3151 (DSP F7)	2.	D	88.
77007C	Titan IIIC stage 3 (Transtage)	2.	L2	1.
77007D	OPS 3151 debris (Telescope aperture suncover)	2.	D	34.
77014A	Kiku-2	1.	D	349.
77018A	Palapa 2	1.	D	355.
77034A	OPS 9437 (DSCS II F-7)	1.	D	34.
77034B	OPS 9438 (DSCS II F-8)	1.	D	19.
77034C	Titan IIIC stage 3 (Transtage)	1.	D	21.
77038A	OPS 9751 (CANYON 7)	2.	L1	6.
77038C	Atlas SLV-3A stage 2 (Agena D)	2.	D	5.
77041A	Intelsat IVA F-4	1.	D	252.
77048A	GOES 2	1.	D	242.
77048G	Aerojet SVM-5 (GOES 2 AKM)	1.	D	414.
77065A	Himawari	1.	D	220.
77071A	Raduga 3	1.	L1	68.
77071F	Proton-K fourth stage (Block DM)	1.	D	66.

COSPAR	NAME	TABLE	STATUS	No
77080A	SIRIO 1	1.	L1	22.
77092A	Ekran 2	1.	L1	43.
77092G	Proton-K fourth stage (Block DM)	1.	D	451.
77092H	Ekran 2 fragmentation debris	1.	L1	84.
77092J	Ekran 2 fragmentation debris	1.	D	353.
77092K	Ekran 2 fragmentation debris	1.	D	377.
77108A	Meteosat 1	1.	L1	91.
77108D	Mage 1 (Meteosat 1 AKM)	1.	D	72.
77114A	OPS 4258 (AQUACADE 3)	2.	L2	3.
77118A	Sakura	1.	D	163.
78002A	Intelsat IVA F-3	1.	D	329.
78016A	OPS 6391 (FLTSATCOM F1)	2.	D	73.
78035A	Intelsat IVA F-6	1.	L1	97.
78038A	OPS 8790 (AQUACADE 4)	2.	D	39.
78039A	Yuri	1.	L1	60.
78044A	OTS 2	1.	D	189.
78058A	OPS 9454 (VORTEX 1) (CHALET 1)	2.	D	45.
78058B	Titan IIIC stage 3 (Transtage)	2.	D	54.
78062A	GOES 3	1.	L2	5.
78062D	Aerojet SVM-5 (GOES 3 AKM)	1.	D	257.
78068A	Comstar 3	1.	D	206.
78071A	ESA GEOS 2	1.	D	238.
78073A	Raduga 4	1.	L1	64.
78073F	Proton-K fourth stage (Block DM)	1.	D	48.
78106A	NATO IIIC	1.	D	117.
78113A	OPS 9441 (DSCS II F-11)	1.	D	9.
78113B	OPS 9442 (DSCS II F-12)	1.	D	113.
78113D	Titan IIIC stage 3 (Transtage)	1.	D	8.
78116A	Anik B1	1.	D	307.
79007A	Scatha	1.	D	464.
79007C	Scatha AKM	1.	D	466.
79015A	Ekran 3	1.	L1	44.
79015D	Proton-K fourth stage (Block DM)	1.	D	452.
79035A	Raduga 5	1.	L1	18.
79035E	Proton-K fourth stage (Block DM)	1.	D	386.
79038A	OPS 6392 (FLTSATCOM F2)	1.	D	121.
79053A	OPS 7484 (DSP F8)	2.	D	79.
79053C	Titan IIIC stage 3 (Transtage)	2.	D	64.
79053D	OPS 7484 debris (Telescope aperture suncover)	2.	U	3.
79062A	Gorizont 2	1.	L1	25.
79062D	Proton-K fourth stage (Block DM)	1.	D	60.
79072A	Westar III	1.	D	336.
79086A	OPS 1948 (VORTEX 2) (CHALET 2)	2.	D	43.
79086C	Titan IIIC stage 3 (Transtage)	2.	D	53.
79087A	Ekran 4	1.	L1	34.
79087C	Proton-K fourth stage (Block DM)	1.	D	407.
79098A	OPS 9443 (DSCS II F-13)	1.	D	22.
79098B	OPS 9444 (DSCS II F-14)	1.	D	109.
79098C	Titan IIIC stage 3 (Transtage)	1.	D	18.
79105A	Gorizont 3	1.	L1	62.
79105E	Proton-K fourth stage (Block DM)	1.	D	136.
80004A	OPS 6393 (FLTSATCOM F3)	1.	L2	36.
80016A	Raduga 6	1.	L1	57.
80016D	Proton-K fourth stage (Block DM)	1.	D	55.
80049A	Gorizont 4	1.	D	132.

COSPAR	NAME	TABLE	STATUS	No
80049F	Proton-K fourth stage (Block DM)	1.	D	80.
80060A	Ekran 5	2.	L3	1.
80060F	Proton-K fourth stage (Block DM)	1.	D	467.
80060G	EKRAN 5 debris	2.	D	42.
80074A	GOES 4	1.	D	215.
80074C	Star 27 (GOES 4 AKM)	1.	D	1.
80081A	Raduga 7	1.	L2	31.
80081F	Proton-K fourth stage (Block DM)	1.	D	339.
80087A	OPS 6394 (FLTSATCOM F4)	2.	D	75.
80091A	SBS I	1.	D	308.
80098A	Intelsat V F-2	1.	D	158.
80104A	Ekran 6	1.	L1	39.
80104E	Proton-K fourth stage (Block DM)	1.	D	453.
81018A	Comstar 4	1.	L1	8.
81025A	OPS 7350 (DSP F9)	2.	D	78.
81025C	Titan IIIC stage 3 (Transtage)	2.	D	12.
81027A	Raduga 8	1.	D	400.
81027F	Proton-K fourth stage (Block DM)	1.	D	59.
81049A	GOES 5	1.	L2	19.
81049D	Star 27 S/N 0041	1.	D	2.
81050A	Intelsat V F-1	1.	D	156.
81057A	Meteosat 2	1.	D	140.
81057B	APPLE	1.	D	352.
81057F	Mage 1 (Meteosat 2 AKM)	1.	D	237.
81061A	Ekran 7	1.	L1	45.
81061F	Proton-K fourth stage (Block DM)	1.	D	438.
81069A	Raduga 9	1.	L1	69.
81069F	Proton-K fourth stage (Block DM)	1.	D	64.
81073A	FLTSATCOM F5	1.	D	126.
81076A	Himawari-2	1.	D	267.
81096A	SBS II	1.	D	381.
81102A	Raduga 10	1.	L1	17.
81102F	Proton-K fourth stage (Block DM)	1.	D	394.
81107A	OPS 4029 (VORTEX 3)	2.	L2	2.
81107C	Titan IIIC stage 3 (Transtage)	2.	D	55.
81114A	RCA Satcom IIIR	1.	D	370.
81119A	Intelsat V F-3	1.	D	256.
81122A	Marecs A	1.	D	14.
82004A	RCA Satcom IV	1.	D	273.
82009A	Ekran 8	1.	D	334.
82009F	Proton-K fourth stage (Block DM)	1.	D	435.
82014A	Westar IV	1.	D	299.
82017A	Intelsat V F-4	1.	D	213.
82019A	OPS 8701 (DSP F10)	2.	D	84.
82019B	Titan IIIC stage 3 (Transtage)	2.	D	15.
82020A	Gorizont 5	1.	D	119.
82020F	Proton-K fourth stage (Block DM)	1.	D	134.
82031A	Insat-IA	1.	L1	76.
82044A	Cosmos 1366	1.	L1	13.
82044F	Proton-K fourth stage (Block DM)	1.	L3	1.
82058A	Westar V	1.	D	210.
82082A	Anik D1	1.	D	372.
82093A	Ekran 9	1.	L1	53.
82093F	Proton-K fourth stage (Block DM)	1.	D	449.
82097A	Intelsat V F-5	1.	D	111.

COSPAR	NAME	TABLE	STATUS	No
82103A	Gorizont 6	1.	L2	29.
82103E	Proton-K fourth stage (Block DM)	1.	D	399.
82105A	Aurora I	1.	L2	15.
82106A	DSCS II F-16	1.	D	15.
82106B	DSCS III A-01	2.	D	87.
82106D	IUS stage 2	1.	D	239.
82110B	SBS III	1.	D	332.
82110C	Anik C3	1.	D	328.
82113A	Raduga 11	1.	D	65.
82113F	Proton-K fourth stage (Block DM)	1.	D	49.
83006A	Sakura 2A	1.	D	247.
83016A	Ekran 10	1.	D	13.
83016F	Proton-K fourth stage (Block DM)	1.	D	443.
83026B	TDRS-1	1.	D	142.
83028A	Raduga 12	1.	L1	16.
83028F	Proton-K fourth stage (Block DM)	1.	D	357.
83030A	RCA Satcom IR	1.	D	319.
83041A	GOES 6	1.	L2	17.
83041C	Star 27 (GOES 6 AKM)	1.	D	3.
83047A	Intelsat V F-6	1.	D	198.
83058A	Eutelsat I F-1 (ECS 1)	1.	D	157.
83059B	Anik C2	1.	D	186.
83059C	Palapa Pacific System	1.	D	388.
83065A	Galaxy I	1.	D	376.
83066A	Gorizont 7	1.	D	108.
83066F	Proton-K fourth stage (Block DM)	1.	D	53.
83077A	Arabsat 1D-R	1.	D	260.
83081A	Sakura 2B	1.	D	152.
83088A	Raduga 13	1.	D	98.
83088F	Proton-K fourth stage (Block DM)	1.	D	52.
83089B	Insat-IB	1.	L1	87.
83094A	RCA Satcom IIR	1.	D	248.
83098A	Galaxy II	1.	D	392.
83100A	Ekran 11	1.	L1	48.
83100F	Proton-K fourth stage (Block DM)	1.	D	440.
83105A	Intelsat V F-7	1.	D	288.
83118A	Gorizont 8	1.	D	104.
83118F	Proton-K fourth stage (Block DM)	1.	L1	27.
84005A	Yuri 2A	1.	D	176.
84009A	OPS 0441 (VORTEX 4)	2.	C2	1.
84009C	Titan 34D stage 3 (Transtage)	2.	D	63.
84016A	Raduga 14	1.	L1	20.
84016F	Proton-K fourth stage (Block DM)	1.	L1	42.
84022A	Cosmos 1540	1.	L1	7.
84022F	Proton-K fourth stage (Block DM)	1.	D	321.
84023A	Intelsat V F-8	1.	D	43.
84028A	Ekran 12	1.	D	29.
84028F	Proton-K fourth stage (Block DM)	1.	D	460.
84031A	Cosmos 1546	1.	L1	11.
84031F	Proton-K fourth stage (Block DM)	1.	D	249.
84035A	STW F-2	1.	L1	93.
84037A	OPS 7641 (DSP F11)	2.	D	80.
84037B	Titan 34D stage 3 (Transtage)	2.	D	23.
84041A	Gorizont 9	1.	L1	32.
84041D	Proton-K fourth stage (Block DM)	1.	D	131.

COSPAR	NAME	TABLE	STATUS	No
84049A	Chinasat 5 (Spacenet 1)	1.	D	344.
84063A	Raduga 15	1.	L1	83.
84063F	Proton-K fourth stage (Block DM)	1.	D	481.
84078A	Gorizont 10	1.	L2	26.
84078F	Proton-K fourth stage (Block DM)	1.	L1	72.
84080A	Himawari-3	1.	D	312.
84080E	Star 27 (Himawari-3 AKM)	1.	D	295.
84081A	Eutelsat I F-2 (ECS 2)	1.	D	149.
84081B	Telecom 1A	1.	D	110.
84090A	Ekran 13	1.	D	27.
84090F	Proton-K fourth stage (Block DM)	1.	D	450.
84093B	SBS IV	1.	D	144.
84093C	Leasat 2	1.	D	45.
84093D	Telstar 3C	1.	D	300.
84101A	Galaxy III	1.	D	314.
84113B	Arabsat 1D	1.	D	161.
84113C	Leasat 1	1.	D	122.
84114A	Spacenet 2	1.	D	296.
84114B	Marecs B2	1.	D	25.
84115A	NATO IIID	1.	D	11.
84129A	USA 7 (DSP F12)	2.	D	77.
84129B	Titan 34D stage 3 (Transtage)	2.	D	22.
85007A	Gorizont 11	1.	L3	10.
85007D	Proton-K fourth stage (Block DM)	1.	D	478.
85010B	USA 8 (MAGNUM 1)	2.	C2	13.
85010D	IUS stage 2	2.	D	27.
85015A	Arabsat 1A	1.	D	402.
85015B	Brazilsat 1	1.	D	266.
85016A	Cosmos 1629	1.	L2	33.
85016F	Proton-K fourth stage (Block DM)	1.	D	244.
85024A	Ekran 14	1.	D	10.
85024D	Proton-K fourth stage (Block DM)	1.	D	447.
85025A	Intelsat VA F-10	1.	D	106.
85028B	Anik C1	1.	D	284.
85028C	Leasat 3	1.	D	37.
85035A	Gstar 1	1.	C2	65.
85035B	Telecom 1B	1.	L1	99.
85048B	Morelos 1	1.	D	254.
85048C	Arabsat 1B	1.	D	401.
85048D	Telstar 3D	1.	D	323.
85055A	Intelsat VA F-11	1.	D	366.
85070A	Raduga 16	1.	L2	30.
85070F	Proton-K fourth stage (Block DM)	1.	D	71.
85076B	Optus A1	1.	D	298.
85076C	ASC 1	1.	L2	13.
85076D	Leasat 4	1.	D	69.
85087A	Intelsat VA F-12	1.	D	183.
85092B	USA 11 (DSCS III B-04)	2.	D	74.
85092C	USA 12 (DSCS III B-05)	2.	D	66.
85092E	IUS stage 2	2.	D	25.
85102A	Cosmos 1700	1.	L1	30.
85102D	Proton-K fourth stage (Block DM-2)	1.	D	417.
85107A	Raduga 17	1.	D	384.
85107F	Proton-K fourth stage (Block DM)	1.	D	46.
85109B	Morelos 2	1.	D	270.

COSPAR	NAME	TABLE	STATUS	No
85109C	Optus A2	1.	D	335.
85109D	Satcom Ku-2	1.	D	276.
86003B	Satcom Ku-1	1.	D	268.
86007A	Raduga 18	1.	D	153.
86007F	Proton-K fourth stage (Block DM)	1.	D	70.
86010A	STTW-1	1.	L1	49.
86016A	Yuri 2B	1.	D	229.
86026A	Gstar 2	1.	D	304.
86026B	Brazilsat 2	1.	D	279.
86027A	Cosmos 1738	1.	L3	15.
86027F	Proton-K fourth stage (Block DM)	1.	D	63.
86038A	Ekran 15	1.	D	32.
86038D	Proton-K fourth stage (Block DM)	1.	D	457.
86044A	Gorizont 12	1.	L1	61.
86044F	Proton-K fourth stage (Block DM)	1.	D	61.
86082A	Raduga 19	1.	D	116.
86082F	Proton-K fourth stage (Block DM)	1.	D	51.
86090A	Gorizont 13	1.	D	35.
86090D	Proton-K fourth stage (Block DM)	1.	L1	81.
86096A	USA 20 (FLTSATCOM F7)	2.	C2	17.
87022A	GOES 7	1.	C2	56.
87022F	Star 27 (GOES 7 AKM)	1.	D	147.
87028A	Raduga 20	1.	D	26.
87028D	Proton-K fourth stage (Block DM)	1.	D	322.
87029A	Agila 1	1.	D	330.
87040A	Gorizont 14	1.	D	58.
87040D	Proton-K fourth stage (Block DM)	1.	D	477.
87070A	Kiku-5	1.	D	234.
87073A	Ekran 16	1.	D	31.
87073D	Proton-K fourth stage (Block DM)	1.	D	458.
87078A	Optus A3	1.	D	160.
87078B	Eutelsat I F-4 (ECS 4)	1.	D	138.
87084A	Cosmos 1888	1.	L3	13.
87084D	Proton-K fourth stage (Block DM)	1.	D	356.
87091A	Cosmos 1894	1.	L2	35.
87091D	Proton-K fourth stage (Block DM)	1.	D	391.
87095A	TV-Sat 1	1.	D	164.
87096A	Cosmos 1897	1.	L1	33.
87096D	Proton-K fourth stage (Block DM)	1.	D	413.
87097A	USA 28 (DSP F13)	2.	D	83.
87097B	Titan 34D stage 3 (Transtage)	2.	D	18.
87100A	Raduga 21	1.	L2	23.
87100D	Proton-K fourth stage (Block DM)	1.	D	482.
87109A	Ekran 17	1.	D	23.
87109D	Proton-K fourth stage (Block DM)	1.	D	429.
88012A	Sakura 3A	1.	D	96.
88014A	STTW-2	1.	L1	24.
88018A	Spacenet 3R	1.	D	283.
88018B	Telecom 1C	1.	D	85.
88028A	Gorizont 15	1.	D	73.
88028D	Proton-K fourth stage (Block DM)	1.	D	68.
88034A	Cosmos 1940	1.	D	421.
88034D	Proton-K fourth stage (Block DM)	1.	D	367.
88036A	Ekran 18	1.	D	16.
88036E	Proton-K fourth stage (Block DM)	1.	D	444.

COSPAR	NAME	TABLE	STATUS	No
88040A	Intelsat VA F-13 (NSS 513)	1.	D	123.
88051A	Meteosat 3	1.	D	36.
88051C	PAS 1	1.	D	241.
88063A	Insat-IC	1.	L1	28.
88063B	Eutelsat I F-5 (ECS 5)	1.	D	97.
88066A	Cosmos 1961	1.	L1	6.
88066D	Proton-K fourth stage (Block DM-2)	1.	D	135.
88071A	Gorizont 16	1.	D	342.
88071D	Proton-K fourth stage (Block DM)	1.	D	412.
88081A	Gstar 3	1.	L2	2.
88081B	SBS V	1.	D	303.
88086A	Sakura 3B	1.	D	212.
88091B	TDRS-West	1.	C2	78.
88091D	IUS stage 2	1.	D	406.
88095A	Raduga 22	1.	L1	92.
88095F	Proton-K fourth stage (Block DM)	1.	D	81.
88098A	TDF 1	1.	D	205.
88108A	Ekran 19	1.	D	33.
88108D	Proton-K fourth stage (Block DM)	1.	D	462.
88109A	Skynet 4B	1.	D	286.
88109B	Astra 1A	1.	D	107.
88111A	STTW-3	1.	L1	63.
89004A	Gorizont 17	1.	D	178.
89004F	Proton-K fourth stage (Block DM)	1.	D	88.
89006A	Intelsat VA F-15	1.	D	182.
89020A	JC-Sat 1	1.	D	263.
89020B	Meteosat 4	1.	D	39.
89020E	Mage 1 (Meteosat 4 AKM)	1.	D	404.
89021B	TDRS 4	1.	C2	79.
89021D	IUS stage 2	1.	D	416.
89027A	Tele-X	1.	D	202.
89030A	Raduga 23	1.	L1	75.
89030D	Proton-K fourth stage (Block DM)	1.	D	79.
89035A	USA 37 (VORTEX 6)	2.	C2	6.
89035C	Titan 34D stage 3 (Transtage)	2.	D	65.
89041A	Superbird A	1.	D	294.
89041B	DFS-Kopernikus 1	1.	D	419.
89046A	USA 39 (DSP F14)	2.	C2	29.
89046D	IUS stage 2	2.	D	13.
89046E	USA 39 debris (Telescope aperture suncover)	2.	U	4.
89048A	Raduga 1-1	1.	D	139.
89048D	Proton-K fourth stage (Block DM)	1.	D	78.
89052A	Gorizont 18	1.	D	243.
89052D	Proton-K fourth stage (Block DM)	1.	D	479.
89053A	Olympus 1	1.	D	456.
89062A	TV-Sat 2	1.	D	316.
89067A	Sirius 1	1.	D	204.
89069A	USA 43 (DSCS II F-15)	2.	D	81.
89069B	USA 44 (DSCS III A-02)	2.	D	70.
89069D	Titan 34D stage 3 (Transtage)	2.	D	17.
89070A	Himawari-4	1.	D	44.
89070C	Star 27 (Himawari-4 AKM)	1.	D	146.
89077A	USA 46 (FLTSATCOM F8)	2.	C2	40.
89081A	Gorizont 19	1.	L1	66.
89081D	Proton-K fourth stage (Block DM)	1.	D	415.

COSPAR	NAME	TABLE	STATUS	No
89087A	Intelsat VI F-2	1.	C2	55.
89090B	USA 48 (MAGNUM 2)	2.	C2	15.
89090D	IUS stage 2	2.	D	60.
89098A	Raduga 24	1.	L1	54.
89098D	Proton-K fourth stage (Block DM)	1.	D	76.
89101A	Cosmos 2054	1.	L2	37.
89101D	Proton-K fourth stage (Block DM)	1.	D	101.
89101G	Cosmos 2054 debris	1.	D	75.
90001A	Skynet 4A	1.	D	170.
90001B	JC-Sat 2	1.	D	120.
90002B	Leasat 5	1.	C2	28.
90011A	DFH-2A	1.	L1	38.
90016A	Raduga 25	1.	L2	27.
90016D	Proton-K fourth stage (Block DM)	1.	D	350.
90021A	Intelsat VI F-3	1.	C2	7.
90030A	AsiaSat 1	1.	D	219.
90034A	Palapa B-2R	1.	D	261.
90051A	Insat-ID	1.	L1	12.
90054A	Gorizont 20	1.	L1	31.
90054D	Proton-K fourth stage (Block DM)	1.	D	411.
90056A	Intelsat VI F-4	1.	D	112.
90061A	Cosmos 2085	1.	L1	4.
90061D	Proton-K fourth stage (Block DM-2)	1.	L1	78.
90063A	TDF 2	1.	D	127.
90063B	DFS-Kopernikus 2	1.	D	265.
90074A	Thor I	1.	D	209.
90077A	Yuri 3A	1.	D	151.
90079A	Skynet 4C	1.	C2	86.
90079B	Eutelsat II F-1	1.	D	235.
90091A	SBS VI	1.	D	169.
90091B	Galaxy VI	1.	D	297.
90093A	Inmarsat 2-F1	1.	C2	60.
90094A	Gorizont 21	1.	L3	6.
90094D	Proton-K fourth stage (Block DM-2)	1.	D	430.
90095A	USA 65 (DSP F15)	2.	D	82.
90095D	IUS stage 2	2.	D	46.
90095E	USA 65 debris (Telescope aperture suncover)	2.	D	67.
90097B	USA 67 (SDS 2 F2)(QUASAR 2)	2.	C2	14.
90097D	AKM ?	2.	U	5.
90100A	Satcom C-1	1.	D	203.
90100B	Gstar 4	1.	D	190.
90102A	Gorizont 22	1.	L1	95.
90102D	Proton-K fourth stage (Block DM-2)	1.	D	77.
90112A	Raduga 26	1.	L1	35.
90112D	Proton-K fourth stage (Block DM-2)	1.	D	351.
90116A	Raduga 1-2	1.	L1	47.
90116D	Proton-K fourth stage (Block DM-2)	1.	D	83.
91001A	NATO IVA	1.	D	105.
91003A	Italsat 1	1.	D	338.
91003B	Eutelsat II F-2	1.	D	165.
91010A	Cosmos 2133	1.	L1	9.
91010F	Proton-K fourth stage (Block DM-2)	1.	D	375.
91014A	Raduga 27	1.	L1	82.
91014D	Proton-K fourth stage (Block DM-2)	1.	D	483.
91015A	Astra 1B	1.	D	118.

COSPAR	NAME	TABLE	STATUS	No
91015B	Meteosat 5	1.	D	115.
91015E	Mage 1 (Meteosat 5 AKM)	1.	D	379.
91018A	Inmarsat 2-F2	1.	C2	59.
91026A	Anik E2	1.	D	187.
91028A	Spacenet 4	1.	D	271.
91037A	Aurora II	1.	D	172.
91046A	Gorizont 23	1.	D	162.
91046D	Proton-K fourth stage (Block DM-2)	1.	D	432.
91054B	TDRS 5	1.	C2	58.
91054D	IUS stage 2	1.	L3	4.
91055A	Intelsat VI F-5	1.	D	233.
91060A	Yuri 3B	1.	D	148.
91064A	Cosmos 2155	1.	L3	5.
91064B	Proton-K fourth stage (Block DM-2)	1.	D	326.
91067A	Anik E1	1.	D	199.
91074A	Gorizont 24	1.	D	114.
91074D	Proton-K fourth stage (Block DM-2)	1.	D	291.
91075A	Intelsat VI F-1	1.	C2	21.
91079A	Cosmos 2172	1.	L3	11.
91079D	Proton-K fourth stage (Block DM-2)	1.	D	129.
91080B	USA 75 (DSP F16)	2.	C2	36.
91080D	IUS stage 2	2.	D	14.
91083A	Eutelsat II F-3	1.	D	230.
91084A	Telecom 2A	1.	D	166.
91084B	Inmarsat 2-F3	1.	D	30.
91087A	Raduga 28	1.	L1	74.
91087D	Proton-K fourth stage (Block DM-2)	1.	D	90.
92006A	USA 78 (DSCS III B-14)	2.	D	71.
92006C	IABS	2.	D	1.
92010A	Superbird B1	1.	D	177.
92010B	Insat-IIDT (Arabsat 1C)	1.	D	137.
92013A	Galaxy V	1.	D	228.
92017A	Gorizont 25	1.	D	317.
92017D	Proton-K fourth stage (Block DM-2)	1.	D	442.
92021A	Telecom 2B	1.	D	262.
92021B	Inmarsat 2-F4	1.	C2	42.
92027A	Palapa B4	1.	D	333.
92032A	Intelsat K (NSS K)	1.	D	41.
92037A	USA 82 (DSCS III B-12)(DSCS III F6)	2.	C2	24.
92037C	IABS	2.	D	11.
92041A	Insat-IIA	1.	D	393.
92041B	Eutelsat II F-4	1.	D	181.
92043A	Gorizont 26	1.	D	218.
92043D	Proton-K fourth stage (Block DM-2)	1.	D	74.
92054A	Optus B1	1.	D	207.
92057A	Satcom C-4	1.	D	173.
92059A	Cosmos 2209	1.	L2	34.
92059D	Proton-K fourth stage (Block DM-2)	1.	D	306.
92060A	Hispasat 1A	1.	D	232.
92060B	Satcom C-3	1.	D	38.
92066A	DFS-Kopernikus 3	1.	D	293.
92072A	Galaxy VII	1.	D	289.
92074A	Ekran 20	1.	L1	41.
92074D	Proton-K fourth stage (Block DM-2)	1.	D	445.
92082A	Gorizont 27	1.	D	390.

COSPAR	NAME	TABLE	STATUS	No
92082D	Proton-K fourth stage (Block DM-2)	1.	D	91.
92084A	Superbird A1	1.	D	184.
92088A	Cosmos 2224	1.	L1	100.
92088D	Proton-K fourth stage (Block DM-2)	1.	D	360.
93003B	TDRS 6	1.	C2	57.
93003D	IUS stage 2	1.	D	373.
93013A	Raduga 29	1.	L1	90.
93013D	Proton-K fourth stage (Block DM-2)	1.	D	89.
93015A	USA 98 (UFO F1)	1.	D	222.
93031A	Astra 1C	1.	C2	2.
93039A	Galaxy IV	1.	L1	2.
93046A	USA 93 (DSCS III B-09)(DSCS III F7)	2.	D	72.
93046C	IABS	2.	D	7.
93048A	Hispasat 1B	1.	D	292.
93048B	Insat-IIB	1.	D	341.
93056A	USA 95 (UFO F2)	2.	C2	4.
93058B	ACTS	1.	L2	1.
93062A	Raduga 30	1.	L1	15.
93062D	Proton-K fourth stage (Block DM-2)	1.	L1	98.
93066A	Intelsat VII F-1	1.	C1	145.
93069A	Gorizont 28	1.	D	281.
93069D	Proton-K fourth stage (Block DM-2)	1.	D	408.
93072A	Gorizont 29	1.	D	382.
93072D	Proton-K fourth stage (Block DM-2)	1.	D	480.
93073A	Solidaridad 1	1.	L2	6.
93073B	Meteosat 6	1.	C2	27.
93073E	Mage 1 (Meteosat 6 AKM)	1.	D	345.
93074A	USA 97 (DSCS III B-10)(DSCS III F8)	2.	C2	8.
93074B	IABS	2.	D	68.
93076A	NATO IVB	1.	C2	15.
93077A	Telstar 4A	1.	L2	10.
93078A	DirecTV-1	1.	D	167.
93078B	Thaicom 1	1.	D	201.
94002A	Gals 1	1.	L1	71.
94002D	Proton-K fourth stage (Block DM-2M)	1.	D	255.
94008A	Raduga 1-3	1.	L1	46.
94008D	Proton-K fourth stage (Block DM-2)	1.	D	87.
94009A	USA 99 (Milstar DFS-1)	2.	C2	37.
94009B	Titan IVA stage 3 (Centaur)	2.	D	31.
94012A	Raduga 31	1.	L1	55.
94012D	Proton-K fourth stage (Block DM-2)	1.	D	95.
94013A	Galaxy IR-A	1.	D	211.
94022A	GOES 8	1.	D	159.
94030A	Gorizont 30	1.	L3	12.
94030D	Proton-K fourth stage (Block DM-2)	1.	D	485.
94034A	Intelsat VII F-2	1.	C1	64.
94035A	USA 104 (UFO F3)	2.	L2	5.
94038A	Cosmos 2282	1.	L2	32.
94038D	Proton-K fourth stage (Block DM-2)	1.	D	250.
94040A	PAS 2	1.	C2	54.
94040B	BS-3N	1.	C1	105.
94043A	Apstar 1	1.	C2	47.
94047A	DirecTV-2	1.	D	133.
94049A	Brazilsat B1	1.	D	221.
94049B	Turksat 2	1.	D	175.

COSPAR	NAME	TABLE	STATUS	No
94054A	USA 105 (MERCURY 1)	2.	C2	38.
94054B	Titan IVA stage 3 (Centaur)	2.	D	56.
94055A	Optus B3	1.	C2	53.
94060A	Cosmos 2291	1.	L2	39.
94060D	Proton-K fourth stage (Block DM-2)	1.	D	361.
94064A	Intelsat VII F-3 (NSS 703)	1.	D	363.
94065A	Solidaridad 2	1.	C2	61.
94065B	Thaicom 2	1.	D	274.
94067A	Ekspress 1	1.	D	310.
94067D	Proton-K fourth stage (Block DM-2M)	1.	L3	9.
94069A	Elektro 1	1.	L1	14.
94069D	Proton-K fourth stage (Block DM-2)	1.	D	374.
94070A	Astra 1D	1.	C2	1.
94079A	Orion 1	1.	D	124.
94080A	Zongxing 6 (A)	1.	D	434.
94082A	Luch 1	1.	L2	38.
94082D	Proton-K fourth stage (Block DM-2)	1.	D	427.
94084A	USA 107 (DSP F17)	2.	C2	35.
94084D	IUS stage 2	2.	D	19.
94087A	Raduga 32	1.	L1	5.
94087D	Proton-K fourth stage (Block DM-2)	1.	D	362.
95001A	Intelsat VII F-4	1.	D	200.
95003A	USA 108 (UFO F4)	2.	C2	26.
95011B	Himawari-5	1.	D	245.
95011D	Star 27 (Himawari-5 AKM)	1.	D	448.
95013A	Intelsat VII F-5	1.	C2	83.
95016A	Brazilsat B2	1.	C2	70.
95016B	Hot Bird 1	1.	D	231.
95019A	AMSC-1	1.	C2	67.
95022A	USA 110 (Advanced ORION 1)	2.	C2	21.
95022B	Titan IVA stage 3 (Centaur)	2.	D	33.
95023A	Intelsat VIIA F-1	1.	C1	69.
95025A	GOES 9	1.	D	150.
95027A	USA 111 (UFO F5)	2.	C2	33.
95029A	DirecTV-3	1.	D	171.
95035B	TDRS 7	1.	C2	33.
95035D	IUS stage 2	1.	D	410.
95038A	USA 113 (DSCS III B-07)(DSCS III F9)	2.	C2	22.
95038C	IABS	2.	D	16.
95040A	PAS 4	1.	D	40.
95041A	Mugunghwa 1 (Koreasat 1)	1.	D	285.
95043A	JC-Sat 3	1.	D	192.
95044A	N-Star 1	1.	D	188.
95045A	Cosmos 2319	1.	L3	14.
95045D	Proton-K fourth stage (Block DM-2)	1.	D	385.
95049A	Telstar 402R	1.	L2	12.
95054A	Luch 1-1	1.	L1	1.
95054D	Proton-K fourth stage (Block DM-2)	1.	L1	89.
95055A	Astra 1E	1.	C2	3.
95057A	USA 114 (UFO F6)	2.	C2	32.
95060A	USA 115 (Milstar DFS-2)	2.	C2	28.
95060B	Titan IVA stage 3 (Centaur)	2.	D	32.
95063A	Gals 2	1.	D	324.
95063D	Proton-K fourth stage (Block DM-2M)	1.	L1	94.
95064A	AsiaSat 2	1.	C2	10.

COSPAR	NAME	TABLE	STATUS	No
95067A	Telecom 2C	1.	D	82.
95067B	Insat-IIC	1.	D	301.
95069A	Galaxy IIIR	1.	L2	18.
95073A	EchoStar 1	1.	C1	207.
96002A	PAS 3R	1.	C2	71.
96002B	MEASAT 1	1.	C2	19.
96003A	Mugunghwa 2 (Koreasat 2)	1.	C2	30.
96005A	Gorizont 31	1.	D	325.
96005D	Proton-K fourth stage (Block DM-2)	1.	D	62.
96006A	Palapa C1	1.	C1	42.
96007A	N-Star 2	1.	D	224.
96015A	Intelsat VIIA F-2	1.	C1	227.
96020A	Inmarsat 3-F1	1.	C1	62.
96021A	Astra 1F	1.	C1	52.
96022A	MSAT	1.	C2	63.
96026A	USA 118 (MERCURY 2)	2.	C2	2.
96026B	Titan IVA stage 3 (Centaur)	2.	D	57.
96030A	Palapa C2	1.	C2	51.
96030B	AMOS 1	1.	C2	20.
96033A	Galaxy IX	1.	D	264.
96034A	Gorizont 32	1.	C2	44.
96034D	Proton-K fourth stage (Block DM-2)	1.	D	84.
96035A	Intelsat VII F-6	1.	C1	55.
96039A	Apstar 1A	1.	C2	24.
96040A	Arabsat 2A	1.	D	214.
96040B	Turksat 3	1.	L1	85.
96042A	USA 127 (UFO F7)	2.	C2	39.
96044A	Italsat 2	1.	D	426.
96044B	Telecom 2D	1.	C2	85.
96053A	Inmarsat 3-F2	1.	C1	245.
96053D	Proton-K fourth stage (Block DM1)	1.	D	93.
96054A	GE 1	1.	C1	176.
96055A	EchoStar 2	1.	L2	21.
96058A	Ekspress 2	1.	L1	50.
96058D	Proton-K fourth stage (Block DM-2M)	1.	L1	70.
96063A	Arabsat 2B	1.	C1	21.
96063B	MEASAT 2	3.	Ind	1.
96067A	Hot Bird 2	1.	C2	22.
96070A	Inmarsat 3-F3	1.	C1	144.
97002A	GE 2	1.	C1	205.
97002B	Nahuel 1A	1.	D	240.
97007A	JC-Sat 4	1.	C2	23.
97008A	USA 130 (DSP F18)	2.	C2	3.
97008D	IUS stage 2	2.	D	61.
97008E	USA 130 debris (Telescope aperture suncover)	2.	D	59.
97009A	Intelsat VIII F-1	1.	C2	82.
97011A	Tempo 2	1.	D	174.
97016A	Thaicom 3	1.	D	141.
97016B	BSAT-1a	1.	D	185.
97019A	GOES 10	1.	D	180.
97021A	Zhongxing 6 (B)	1.	L1	80.
97025A	Thor II	1.	C2	5.
97026A	Telstar 5	1.	C1	191.
97027A	Inmarsat 3-F4	1.	C2	77.
97027B	Insat-IID	1.	D	489.

COSPAR	NAME	TABLE	STATUS	No
97029A	FengYun 2A (FengYun 2-1R)	1.	D	28.
97029C	FengYun 2A AKM	1.	D	476.
97031A	Intelsat VIII F-2	1.	D	94.
97036A	Superbird C	1.	C2	52.
97040A	PAS 6	2.	D	92.
97041A	Cosmos 2345	1.	L3	8.
97041D	Proton-K fourth stage (Block DM-2)	1.	D	347.
97042A	Agila 2	1.	C1	133.
97046A	PAS 5	1.	C1	142.
97049A	Hot Bird 3	1.	C2	31.
97049B	Meteosat 7	1.	C2	25.
97049E	Mage 1 (Meteosat 7 AKM)	1.	D	418.
97050A	GE 3	1.	C1	197.
97053A	Intelsat VIII F-3 (NSS 803)	1.	C1	242.
97059A	EchoStar 3	1.	C1	221.
97062A	Apstar 2R	1.	C1	73.
97065A	USA 134 (DSCS III B-13)(DSCS III F10)	2.	C2	31.
97065C	IABS	1.	D	441.
97070A	Kupon 1	1.	L1	29.
97070D	Proton-K fourth stage (Block DM-2)	1.	D	278.
97071A	Sirius 2	1.	D	246.
97071B	Cakrawatra 1	1.	C2	41.
97075A	JC-Sat 5	1.	C2	50.
97076A	Astra 1G	1.	C1	37.
97078A	Galaxy VIII-i	1.	D	290.
97083A	Intelsat 804	1.	L3	3.
97086A	HGS-1	1.	L2	25.
98002A	Skynet 4D	1.	D	196.
98006A	Brazilsat B-3A	1.	C1	209.
98006B	Inmarsat-3 F5	1.	C2	12.
98013A	Hot Bird 4	1.	C1	15.
98014A	Intelsat 806 (NSS 806)	1.	C1	231.
98016A	USA 138 (UFO F8)	2.	C2	25.
98024A	Nilesat 101	1.	C1	252.
98024B	BSAT-1b	1.	D	194.
98025A	Cosmos 2350	1.	L1	10.
98025D	Proton-K fourth stage (Block DM-2)	1.	D	358.
98028A	EchoStar 4	1.	C2	73.
98029A	USA 139 (Advanced ORION 2)	2.	C2	41.
98029B	Titan IVB stage 3 (Centaur)	2.	L1	1.
98033A	Zhongwei 1	1.	C1	83.
98035A	Thor III	1.	C2	87.
98037A	Intelsat 805	1.	C1	226.
98044A	Sinosat 1	1.	C1	107.
98049A	ST-1	1.	C1	84.
98050A	Astra 2A	1.	C1	32.
98052A	PAS 7	1.	C1	66.
98056A	Eutelsat W2	1.	D	225.
98056B	Sirius 3	1.	C2	4.
98057A	Hot Bird 5	1.	C1	26.
98058A	USA 140 (UFO F9)	2.	D	85.
98063A	AfriStar 1	1.	C1	22.
98063B	GE 5	1.	C2	72.
98065A	PAS 8	1.	C1	141.
98068A	Bonum 1	1.	C1	57.

COSPAR	NAME	TABLE	STATUS	No
98070A	Satmex 5	1.	C1	163.
98075A	PAS 6B	1.	D	195.
99005A	Telstar 6	1.	C1	51.
99006A	JC-Sat 6	1.	C1	116.
99009A	Arabsat 3A	1.	D	383.
99009B	Skynet 4E	1.	C2	16.
99010A	Raduga 1-4	1.	L1	67.
99010D	Proton-K fourth stage (Block DM-2)	1.	D	92.
99013A	Asiasat 3S	1.	C1	97.
99016A	Insat 2E	1.	D	282.
99018A	Eutelsat W3	1.	C1	23.
99027A	Nimiq	1.	C1	193.
99033A	Astra 1H	1.	C1	18.
99042A	Telkom 1	1.	C1	99.
99046A	Mugunghwa 3 (Koreasat 3)	1.	C1	111.
99047A	Yamal-100 No. 1	1.	D	320.
99047B	Yamal-100 No. 2	1.	D	346.
99047E	Proton-K fourth stage (Block DM-2M)	1.	D	380.
99050A	EchoStar 5	1.	D	143.
99052A	Telstar 7	1.	C1	47.
99053A	LMI 1	1.	C1	72.
99056A	DirecTV-1R	1.	C1	212.
99059A	Orion 2	1.	C1	246.
99060A	GE 4	1.	C1	215.
99063A	USA 146 (UFO F10)	2.	C2	12.
99071A	Galaxy 11	1.	C1	38.
00001A	USA 148 (DSCS III B-08)(DSCS III F11)	2.	C1	3.
00001C	IABS	2.	D	21.
00002A	Galaxy 10R	1.	D	280.
00003A	Zhongxing-22 (FengHuo 1, FH-1)	1.	C2	36.
00007A	Hispasat 1C	1.	C1	236.
00011A	Garuda 1	1.	C2	45.
00012A	Superbird 4	1.	C1	140.
00013A	Ekspress 2A	1.	C2	38.
00013D	Proton-K fourth stage (Block DM-2M)	1.	D	423.
00016A	Asiastar	1.	C1	96.
00016B	Insat 3B	1.	C1	79.
00019A	Sesat	1.	C1	16.
00019D	Proton-K fourth stage (Block DM-2M)	1.	D	269.
00020A	Galaxy IVR	1.	D	313.
00022A	GOES 11	1.	C1	149.
00024A	USA 149 (DSP F20)	2.	C2	27.
00024D	IUS stage 2	2.	D	52.
00024E	DSP F20 Aperture Cover	2.	D	51.
00028A	Eutelsat W4	1.	C1	41.
00029A	Gorizont 33	1.	L3	7.
00029B	Proton-M fourth stage (Briz-M)	1.	D	397.
00031A	Ekspress 3A	1.	D	145.
00031D	Proton-K fourth stage (Block DM-2)	1.	D	251.
00032A	FengYun 2B	1.	D	364.
00032C	FengYun 2B AKM	1.	D	387.
00034A	TDRS 8	1.	C2	35.
00036A	Cosmos-2371	1.	L1	3.
00036D	Proton-K fourth stage (Block DM-2)	1.	D	389.
00038A	EchoStar 6	1.	C1	218.

COSPAR	NAME	TABLE	STATUS	No
00043A	PAS 9	1.	C1	225.
00046A	Brasilsat B4	1.	C1	202.
00046B	Nilesat 102	1.	C1	251.
00049A	Raduga 1-5	1.	L1	56.
00049D	Proton-K fourth stage (Block DM-2)	1.	D	100.
00052A	Eutelsat W1	1.	C1	3.
00054A	Astra 2B	1.	C1	31.
00054B	GE 7	1.	C1	148.
00059A	GE-1A	1.	C1	100.
00060A	N-SAT-110	1.	C1	106.
00065A	USA 153 (DSCS III B-11)(DSCS III F12)	2.	C1	8.
00065C	IABS	2.	D	20.
00066A	Thuraya 1	1.	D	168.
00067A	GE 6	1.	C1	213.
00068A	Europe*Star F1	1.	C1	46.
00069A	Beidou	1.	C2	26.
00072A	PAS 1R	1.	C1	228.
00076A	Anik F1	1.	C1	171.
00080A	USA 155 (SDS 3 F2)	2.	C2	42.
00081A	Astra 2D	1.	C1	30.
00081B	GE 8 (Aurora 3)	1.	C1	147.
00082A	Beidou 1B	1.	C2	32.
01002A	Turksat 2A (Eurasiasat 1)	1.	C1	45.
01005A	Sicral	1.	C2	9.
01005B	Skynet 4F	1.	C2	81.
01009A	USA 157 (Milstar-2 F2)	2.	C2	23.
01009B	Titan IVB stage 3 (Centaur)	2.	D	38.
01011A	Eurobird 1	1.	C1	33.
01011B	BSAT-2a	1.	C1	103.
01012A	XM Radio 2 (Rock)	3.	Ind	2.
01014A	Ekran 21 (Ekran-M)	1.	D	272.
01014C	Proton-M fourth stage (Briz-M)	1.	D	86.
01015A	GSAT-1	1.	D	484.
01018A	XM Radio 1 (Roll)	1.	C1	199.
01019A	PAS 10	1.	C1	65.
01020A	USA 158 (GeoLITE)	2.	C2	18.
01024A	Intelsat 901	1.	C1	243.
01025A	Astra 2C	1.	C1	36.
01029A	Artemis	1.	C2	11.
01031A	GOES 12	1.	C2	76.
01033A	USA 159 (DSP F21)	2.	C2	10.
01033D	IUS stage 2	2.	D	47.
01033E	USA 159 debris (Telescope aperture suncover)	2.	U	6.
01037A	Cosmos-2379	1.	L1	88.
01037D	Proton-K fourth stage (Block DM-2)	1.	L1	73.
01039A	Intelsat 902	1.	C1	60.
01042A	Atlantic Bird 2	1.	C1	249.
01045A	Raduga 1-6	1.	D	67.
01045D	Proton-K fourth stage (Block DM-2)	1.	L1	51.
01046A	USA 162 (SDS 3 F3)	2.	C2	30.
01052A	DirecTV-4S	1.	C1	180.
02001A	USA 164 (Milstar-2 F3)	2.	C2	5.
02001B	Titan IVB stage 3 (Centaur)	2.	D	44.
02002A	Insat 3C	1.	C1	70.
02006A	EchoStar 7	1.	C1	160.

COSPAR	NAME	TABLE	STATUS	No
02007A	Intelsat 904	1.	C1	59.
02011A	TDRS 9	1.	C2	75.
02015A	JC-Sat 8	1.	C1	135.
02015B	Astra 3A	1.	C1	24.
02016A	Intelsat 903	1.	C1	234.
02019A	NSS-7	1.	C1	241.
02023A	DirecTV-5	1.	C1	169.
02027A	Intelsat 905	1.	C1	240.
02029A	Ekspress A1R (Express 4A)	1.	C2	84.
02029D	Proton-K fourth stage (Block DM-2M)	1.	D	227.
02030A	Galaxy 3C	1.	C1	189.
02035A	Atlantic Bird 3	1.	C1	255.
02035B	N-Star 3 (N-Star c)	1.	C1	124.
02038A	Hot Bird 6	1.	C1	12.
02039A	EchoStar 8	1.	C1	208.
02040A	Atlantic Bird 1	1.	C1	247.
02040B	MSG 1	1.	C2	6.
02041A	Intelsat 906	1.	C1	63.
02042B	Kodama (DRTS)	1.	C1	86.
02043A	KALPANA-1 (METSAT-1)	1.	C1	71.
02044A	Hispasat 1D	1.	C1	238.
02051A	Eutelsat W5	1.	C1	68.
02055A	TDRS 10	1.	C2	80.
02057A	NSS 6	1.	C1	92.
02062A	Nimiq 2	1.	C1	192.
03007A	Intelsat 907	1.	C1	239.
03008A	USA 167 (DSCS III A-3)(DSCS III F13)	2.	C1	5.
03008C	IABS	2.	D	24.
03012A	USA 169 (Milstar-2 F4)	2.	C2	34.
03012B	Titan IVB stage 3 (Centaur)	2.	D	30.
03013A	Insat 3A	1.	C1	90.
03013B	Galaxy XII	1.	C1	151.
03014A	Asiasat 4	1.	C1	114.
03015A	Cosmos-2397	1.	D	405.
03015F	Proton-K fourth stage (Block DM-2)	1.	L1	86.
03018A	GSAT-2	1.	C1	49.
03020A	Hellas Sat 2	1.	C1	43.
03021A	Beidou 3	1.	C2	43.
03024A	AMC-9 (GE-12)	1.	C1	203.
03026A	Thuraya 2	1.	C2	18.
03028A	BSAT-2c	1.	C1	104.
03028B	Optus C1 (Defense C1)	1.	C1	137.
03033A	Rainbow 1	1.	C1	219.
03034A	EchoStar 9 (Telstar 13)	1.	C1	158.
03040A	USA 170 (DSCS III B-6)(DSCS III F14)	2.	C1	6.
03040C	IABS	2.	D	28.
03041A	USA 171 (Advanced ORION 3)	2.	C2	16.
03041B	Titan IVB stage 3 (Centaur)	2.	D	26.
03043A	Eurobird 3	1.	C1	39.
03043E	Insat 3E	1.	C1	56.
03044A	Galaxy 13/Horizons-1	1.	C1	154.
03052A	Zhongxing-20 (ShenTong 1, ST-1)	1.	C1	94.
03053A	Yamal 200 N2 (Yamal 202)	1.	C1	50.
03053B	Yamal 200 N1 (Yamal 201)	1.	C1	85.
03053E	Proton-K fourth stage (Block DM-2M)	1.	D	354.

COSPAR	NAME	TABLE	STATUS	No
03057A	USA 174 (UFO F11)	2.	C2	11.
03059A	AMOS 2	1.	C1	256.
03060A	Ekspress AM-22	1.	C1	54.
03060D	Proton-K fourth stage (Block DM-2M)	1.	L1	40.
04001A	Estrela do Sul 1 (Telstar 14)	1.	C1	217.
04003A	AMC-10 (GE 10)	1.	C1	150.
04004A	USA 176 (DSP F22)	2.	C2	20.
04004D	IUS stage 2	2.	D	49.
04007A	MBSAT	1.	C1	130.
04008A	Eutelsat W3A	1.	C1	6.
04010A	Raduga-1	1.	C2	46.
04010F	Proton-K fourth stage (Block DM-2)	1.	D	371.
04011A	Superbird A2 (Superbird 6)	1.	D	253.
04015A	Ekspress AM-11	1.	D	217.
04015D	Proton-K fourth stage (Block DM-2M)	1.	D	422.
04016A	DirecTV-7S	1.	C1	159.
04017A	AMC-11 (GE-11)	1.	C1	152.
04022A	Intelsat 10-02	1.	C1	258.
04024A	Telstar 18 (APstar 5)	1.	C1	125.
04027A	Anik F2	1.	C1	166.
04031A	Amazonas	1.	C1	222.
04036A	GSAT 3 (EDUSAT)	1.	C2	29.
04041A	AMC-15	1.	C1	173.
04042A	FengYun 2C	1.	C1	115.
04042C	FengYun 2C AKM	1.	D	454.
04043A	Ekspress AM-1	1.	C2	17.
04043D	Proton-K fourth stage (Block DM-2M)	1.	D	378.
04048A	AMC 16	1.	C1	201.
05003A	AMC 12	1.	C1	233.
05005A	XTAR-EUR	1.	C1	34.
05006A	Himawari-6	1.	C1	127.
05008A	XM Radio 3 (Rhythm)	1.	C1	200.
05009A	Inmarsat 4 F1	1.	C2	48.
05010A	Ekspress AM-2	1.	C1	76.
05010F	Proton-K fourth stage (Block DM-2M)	1.	L1	52.
05012A	Apstar 6	1.	C1	123.
05015A	Spaceway 1	1.	C1	177.
05019A	DirectTV-8	1.	C1	183.
05022A	Intelsat Americas 8 (Telstar 8)	1.	C1	196.
05023A	Ekspress AM-3	1.	C1	126.
05023H	Proton-K fourth stage (Block DM-2)	1.	D	428.
05028A	Thaicom 4 (IPStar 1)	1.	C1	113.
05030A	Galaxy 14	1.	C1	155.
05036A	Anik F1R	1.	C1	172.
05041A	Galaxy 15	1.	L2	16.
05041B	Syracuse 3A	1.	C1	48.
05044A	Inmarsat 4 F2	1.	C2	13.
05046A	Telkom 2	1.	C1	112.
05046B	Spaceway 2	1.	C1	185.
05049A	Insat 4A	1.	C1	78.
05049B	MSG 2 (Meteosat 9)	1.	C1	1.
05049E	MSG-2 debris (SEVIRI Cooler Cover)	1.	D	446.
05049F	MSG-2 debris (entry baffle cover)	1.	D	474.
05052A	AMC 23	1.	C1	143.
06003A	Echostar 10	1.	C1	168.

COSPAR	NAME	TABLE	STATUS	No
06004A	MTSAT-2	1.	C1	132.
06007A	Spainsat	1.	C1	237.
06007B	Hot Bird 7A	1.	C1	7.
06010A	JCSAT 9	1.	C1	122.
06012A	Astra 1KR	1.	C1	19.
06018A	GOES N	1.	C2	74.
06020A	Satmex 6	1.	C1	165.
06020B	Thaicom 5	1.	C1	75.
06022A	KAZSAT	1.	D	216.
06022D	Proton-K fourth stage (Block DM3)	1.	D	437.
06023A	Galaxy 16	1.	C1	186.
06024A	USA 187 (MITEx OSC satellite)	2.	C2	9.
06024B	USA 188 (MITEx Lockheed satellite)	2.	D	76.
06024C	USA 189 (NRL Upper Stage/Satellite)	2.	D	3.
06032A	Hot Bird 8	1.	C1	11.
06033A	JCSAT 3A	1.	C1	118.
06033B	Syracuse 3B	1.	C1	254.
06034A	Mugunghwa 5	1.	C1	109.
06038A	Zhongxing-22A (FengHuo 1, FH-1)	1.	C2	39.
06043A	DirecTV 9S	1.	C1	181.
06043B	Optus D1	1.	C1	139.
06048A	Xinnuo 2	1.	D	7.
06049A	XM Radio 4 (Blues)	1.	C1	164.
06051A	Badr 4	1.	C1	28.
06053A	FengYun 2D	1.	C2	34.
06053C	FengYun 2D AKM (FG-36 AKM)	1.	D	236.
06053D	FengYun 2D debris	1.	L1	23.
06054A	WildBlue 1	1.	C1	167.
06054B	AMC 18	1.	C1	174.
06056A	Measat 3	1.	C1	87.
06059A	Kiku-8 (ETS VIII)	1.	C2	49.
07003A	Beidou 4	1.	D	193.
07007A	Insat 4B	1.	C1	91.
07007B	Skynet 5A	1.	C1	5.
07009A	Anik F3	1.	C1	162.
07016A	Astra 1L	1.	C1	20.
07016B	Galaxy 17	1.	C1	194.
07018A	Nigcomsat 1	1.	L1	58.
07021A	Xinnuo 3	3.	Ind	3.
07031A	Zhongxing 6B	1.	C1	110.
07032A	DirecTV 10	1.	C1	178.
07036A	Spaceway 3	1.	C1	190.
07036B	BSAT-3A	1.	C1	102.
07037A	INSAT 4CR	1.	D	226.
07044A	Optus D2	1.	C1	134.
07044B	Intelsat IS-11	1.	C1	230.
07046A	USA 195 (WGS F1)	2.	C1	4.
07054A	USA 197 (DSP F23)	2.	L1	5.
07054B	Delta 4 second stage	2.	D	90.
07056A	Star One C1	1.	C1	216.
07056B	Skynet 5B	1.	C1	53.
07057A	Sirius 4	1.	C1	4.
07058A	Cosmos-2434 (Raduga-1M1)	1.	C1	67.
07058C	Proton-M fourth stage (Briz-M)	1.	D	488.
07063A	Rascom-QAF 1	1.	D	179.

COSPAR	NAME	TABLE	STATUS	No
07063B	Horizons 2	1.	C1	210.
08001A	Thuraya 3	1.	C2	37.
08003A	Ekspress AM-33	1.	C1	93.
08003B	Proton-M fourth stage (Briz-M)	1.	D	486.
08006A	Thor 2R	1.	C1	259.
08006C	Proton-M fourth stage (Briz-M)	2.	D	91.
08007A	Kizuna	1.	C1	128.
08011A	AMC 14	1.	C2	14.
08013A	DirecTV 11	1.	C1	184.
08016A	ICO G1	1.	C2	69.
08018A	Vinasat	1.	C1	121.
08018B	Star One C2	1.	C1	214.
08019A	Tian Lian 1A	1.	C1	74.
08022A	Amos 3	1.	C1	257.
08022B	Zenith-3SLB third stage (Block DM-SLB)	1.	D	20.
08024A	Galaxy 18	1.	C1	157.
08028A	Zhongxing 9	1.	C1	89.
08030A	Skynet 5C	1.	C1	244.
08030B	Turksat 3A	1.	C1	44.
08033A	Cosmos-2440	3.	Ind	4.
08033D	Proton-K fourth stage (Block DM-2M)	1.	L1	26.
08034A	Protostar 1	1.	C1	235.
08034B	Badr 6	1.	C1	29.
08035A	Echostar 11	1.	C1	170.
08038A	Superbird C2	1.	C1	129.
08038B	AMC 21	1.	C1	156.
08039A	Inmarsat 4 F3	1.	C2	68.
08044A	Nimiq 4	1.	C1	204.
08045A	Galaxy 19	1.	C1	187.
08055A	Simon Bolivar	1.	C1	206.
08057A	Astra 1M	1.	C1	17.
08063A	Ciel 2	1.	C1	153.
08065A	Hot Bird 9	1.	C1	10.
08065B	Eutelsat W2M	1.	C1	14.
08066A	Feng Yun 2E	1.	C2	40.
08066C	FengYun 2E AKM (FG-36 AKM)	1.	D	473.
09001A	USA 202	2.	C2	7.
09001B	Delta 4 second stage	2.	D	89.
09007A	Ekspress AM-44	1.	C1	248.
09007B	Ekspress MD-1	1.	C1	77.
09007D	Proton-M fourth stage (Briz-M)	1.	D	56.
09008A	NSS 9	1.	C1	146.
09008B	Atlantic Bird 4A	1.	C1	250.
09009A	Telstar 11N	1.	C1	232.
09010A	Raduga-1	1.	C2	8.
09010B	Proton-K fourth stage (Block DM-2)	1.	D	348.
09016A	Eutelsat W2A	1.	C1	8.
09017A	USA 204 (WGS F2)	2.	C1	2.
09018A	Beidou DW 2 (Compass G2)	1.	L1	79.
09020A	SICRAL 1B	1.	C1	9.
09027A	Indostar II/Protostar II	1.	C1	98.
09032A	Measat 3A	1.	C1	88.
09033A	GOES 14	1.	C1	175.
09034A	Sirius FM5	1.	C1	188.
09035A	Terrestar 1	1.	C2	62.

COSPAR	NAME	TABLE	STATUS	No
09042A	Asiasat 5	1.	C1	95.
09044A	JCSAT 12 (JCSAT-RA)	1.	C1	119.
09044B	Optus D3	1.	C1	136.
09046A	Palapa D	1.	C1	108.
09047A	USA 207 (PAN)	2.	C1	1.
09050A	Nimiq 5	1.	C1	211.
09054A	Amazonas 2	1.	C1	223.
09054B	COMSATBw-1	1.	C1	61.
09058A	NSS 12	1.	C1	58.
09058B	Thor 6	1.	C1	260.
09064A	Intelsat IS-14	1.	C1	229.
09065A	Eutelsat W7	1.	C1	40.
09067A	Intelsat IS-15	1.	C1	82.
09068A	USA 211 (WGS F3)	2.	C1	7.
09075A	DirecTV 12	1.	C1	179.
10001A	Beidou DW 3	1.	C1	131.
10002A	Raduga-1M	1.	C1	81.
10002B	Proton-M fourth stage (Briz-M)	1.	D	487.
10005A	Solar Dynamics Observatory	1.	C2	66.
10006A	Intelsat IS-16	1.	C1	224.
10006B	Proton-M fourth stage (Briz-M)	2.	D	93.
10008A	GOES 15	1.	C1	195.
10010A	Echostar XIV	1.	C1	161.
10016A	SES-1	1.	C1	182.
10016B	Proton-M fourth stage (Briz-M)	1.	D	526.
10021A	Astra 3B	1.	C1	25.
10021B	COMSATBw-2	1.	C1	13.
10024A	Beidou DW 4	1.	C1	80.
10025A	Badr 5	1.	C1	27.
10032A	Chollian	1.	C1	120.
10032B	Arabsat 5A	1.	C1	35.
10034A	Echostar XV	1.	C1	220.
10037A	Nilesat 201	1.	C1	253.
10037B	RASCOM-QAF 1R	1.	C1	2.
10042A	Zhongxing 6A	1.	C1	117.
10053A	Sirius XM-5	1.	C1	198.
10056B	BSAT-3B	1.	C1	101.
10057A	Beidou DW 6	1.	C1	138.
10061A	SkyTerra 1	3.	Ind	5.
10063A	USA 223 (NROL-32)	2.	C2	19.
10063B	Delta 4 second stage	2.	D	2.
10064A	Zhongxing 20A	3.	Ind	6.
10065A	Intelsat IS-17	3.	Ind	7.
10065B	Hylas	3.	Ind	8.
10069A	KA-Sat	3.	Ind	9.
10070A	Hispasat 1E	3.	Ind	10.
10070B	Koreasat 6	3.	Ind	11.

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 identification.
- Name: is the object's common name.
- Date: is the epoch of the last available TLE.
- $\bar{\lambda}$: is the mean longitude of the satellite (in degrees).
- $\bar{\dot{\lambda}}$: 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 last 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, the following data are given:

C1.nn	COSPAR	NAME					N_{Iy}	N_{tot}
	Date	$\bar{\lambda}$						
	MJD	a	e	i	Ω	ω	λ	

For explanation, see definition at the beginning of Chapter 3 on page 29.

C1. 1	05049B	MSG 2 (Meteosat 9)					
	29-DEC-10	0.07				51	243
	22277.229421	42164.80668	0.0001656	0.2683	335.1843	286.3204	359.6026
C1. 2	10037B	RASCOM-QAF 1R					
	27-DEC-10	2.86				22	22
	22275.191701	42165.25074	0.0003973	0.0026	24.9677	272.7389	2.8906
C1. 3	00052A	Eutelsat W1					
	29-DEC-10	4.02				51	517
	22277.058669	42164.36011	0.0007259	0.0751	12.2020	275.5717	4.0241
C1. 4	07057A	Sirius 4					
	30-DEC-10	4.82				52	158
	22278.117928	42164.74865	0.0003000	0.0024	270.7100	20.3952	4.7906
C1. 5	07007B	Skynet 5A					
	28-DEC-10	6.01				52	190
	22276.702442	42164.32171	0.0005338	0.0674	353.4316	264.2316	6.0231
C1. 6	04008A	Eutelsat W3A					
	29-DEC-10	7.00				51	333
	22277.058738	42164.24546	0.0003968	0.0596	353.4495	268.4197	7.0288
C1. 7	06007B	Hot Bird 7A					
	29-DEC-10	9.01				51	228
	22277.058785	42164.92471	0.0004586	0.0418	53.1389	227.2871	8.9738
C1. 8	09016A	Eutelsat W2A					
	29-DEC-10	10.01				51	87
	22277.087072	42164.84677	0.0004632	0.0631	350.5895	287.0460	9.9763
C1. 9	09020A	SICRAL 1B					
	29-DEC-10	11.80				51	88
	22277.058854	42164.86668	0.0003395	0.0657	99.1711	157.9823	11.7056
C1. 10	08065A	Hot Bird 9					
	28-DEC-10	13.01				51	106
	22276.915197	42164.21210	0.0002222	0.0788	64.4090	278.2859	13.0161
C1. 11	06032A	Hot Bird 8					
	28-DEC-10	13.01				50	212
	22276.915197	42164.39599	0.0005524	0.0833	18.3611	311.0987	13.0010
C1. 12	02038A	Hot Bird 6					
	29-DEC-10	13.02				50	336
	22277.544190	42164.71445	0.0006361	0.0337	275.4991	352.7609	13.0241
C1. 13	10021B	COMSATBw-2					
	29-DEC-10	13.22				32	32
	22277.981979	42165.69426	0.0001605	0.0307	75.1872	172.6858	13.1703

C1 . 14	08065B	Eutelsat W2M					
	28-DEC-10	15.81				52	106
	22276.896979	42165.15571	0.0004044	0.0693	91.9947	200.0680	15.8043
C1 . 15	98013A	Hot Bird 4					
	27-DEC-10	15.82				51	487
	22275.919132	42164.29339	0.0002496	0.0693	21.8184	167.6711	15.8347
C1 . 16	00019A	Sesat					
	29-DEC-10	16.02				51	540
	22277.688738	42164.09604	0.0007295	0.0764	1.8036	265.0654	16.0852
C1 . 17	08057A	Astra 1M					
	04-NOV-10	19.18				24	72
	22222.316076	42165.02535	0.0004206	0.0488	147.1366	50.8233	19.2539
C1 . 18	99033A	Astra 1H					
	06-DEC-10	19.20				30	446
	22254.987106	42164.82659	0.0000881	0.0806	106.8283	106.2047	19.2087
C1 . 19	06012A	Astra 1KR					
	29-DEC-10	19.21				28	173
	22277.453681	42164.27293	0.0005574	0.0729	263.8665	9.1838	19.2637
C1 . 20	07016A	Astra 1L					
	07-DEC-10	19.21				26	134
	22255.533125	42164.35002	0.0003087	0.0409	259.9702	12.2170	19.2438
C1 . 21	96063A	Arabsat 2B					
	29-DEC-10	19.99				51	666
	22277.981042	42165.19496	0.0003939	0.0610	90.3337	190.6707	19.9241
C1 . 22	98063A	AfriStar 1					
	29-DEC-10	21.01				51	616
	22277.686308	42164.96171	0.0004145	0.0241	333.7138	314.8634	20.9586
C1 . 23	99018A	Eutelsat W3					
	28-DEC-10	21.60				51	589
	22276.840336	42164.66427	0.0004748	0.0643	355.8684	271.4266	21.5766
C1 . 24	02015B	Astra 3A					
	04-NOV-10	23.51				26	397
	22222.506991	42164.80724	0.0005424	0.0440	246.9477	20.8133	23.5260
C1 . 25	10021A	Astra 3B					
	21-DEC-10	23.52				19	19
	22269.908646	42164.50084	0.0001305	0.0653	105.0559	184.8376	23.5435
C1 . 26	98057A	Hot Bird 5					
	29-DEC-10	25.66				51	565
	22277.661748	42163.95280	0.0004068	0.0660	359.3928	296.4856	25.5157
C1 . 27	10025A	Badr 5					
	27-DEC-10	26.00				30	30
	22275.651875	42164.60793	0.0003456	0.0180	76.1809	158.9056	25.9938
C1 . 28	06051A	Badr 4					
	27-DEC-10	26.01				51	209
	22275.651875	42164.31302	0.0002970	0.0691	32.4610	276.3177	25.9982
C1 . 29	08034B	Badr 6					
	27-DEC-10	26.01				51	131
	22275.651875	42165.48007	0.0006102	0.0545	315.1521	327.7338	25.9905

C1 . 30	00081A	Astra 2D					
	29-DEC-10	28.19				38	408
	22277.598356	42165.01105	0.0004644	0.0131	304.9883	342.1710	28.1976
C1 . 31	00054A	Astra 2B					
	29-DEC-10	28.20				38	404
	22277.619120	42164.06325	0.0004942	0.0364	340.9019	290.1840	28.2098
C1 . 32	98050A	Astra 2A					
	28-DEC-10	28.21				40	528
	22276.942361	42165.86948	0.0001933	0.0543	126.2006	69.2452	28.1729
C1 . 33	01011A	Eurobird 1					
	30-DEC-10	28.51				51	496
	22278.819086	42164.53728	0.0004010	0.0652	0.0533	271.8437	28.4721
C1 . 34	05005A	XTAR-EUR					
	30-DEC-10	29.01				51	286
	22278.791690	42164.55803	0.0002160	0.0105	28.2559	238.1780	28.9913
C1 . 35	10032B	Arabsat 5A					
	28-DEC-10	30.50				27	27
	22276.882211	42165.41699	0.0003145	0.0492	348.2739	278.8224	30.4925
C1 . 36	01025A	Astra 2C					
	21-DEC-10	31.51				34	373
	22269.746782	42164.46552	0.0001921	0.0358	54.2171	204.3591	31.5398
C1 . 37	97076A	Astra 1G					
	28-DEC-10	31.51				36	496
	22276.744051	42165.43774	0.0001081	0.0396	51.8110	201.5257	31.4972
C1 . 38	99071A	Galaxy 11					
	29-DEC-10	32.82				51	560
	22277.727813	42164.00410	0.0000294	0.0226	186.2351	98.4262	32.7656
C1 . 39	03043A	Eurobird 3					
	29-DEC-10	33.14				52	367
	22277.727813	42164.93760	0.0000755	0.0547	26.9687	255.8059	33.1003
C1 . 40	09065A	Eutelsat W7					
	29-DEC-10	35.92				51	54
	22277.688519	42164.92779	0.0003876	0.0628	349.3385	291.5510	35.8853
C1 . 41	00028A	Eutelsat W4					
	29-DEC-10	36.10				52	528
	22277.611308	42165.19075	0.0011044	0.0649	351.1418	317.7661	36.0215
C1 . 42	96006A	Palapa C1					
	28-DEC-10	38.01				52	744
	22276.136204	42165.84901	0.0002763	0.0291	185.4072	85.3693	38.0184
C1 . 43	03020A	Hellas Sat 2					
	28-DEC-10	39.01				51	382
	22276.952836	42165.11954	0.0003363	0.0274	258.5910	23.5797	38.9817
C1 . 44	08030B	Turksat 3A					
	28-DEC-10	42.00				51	134
	22276.710463	42164.48346	0.0003421	0.0206	70.4555	206.7486	41.9882
C1 . 45	01002A	Turksat 2A (Eurasiasat 1)					
	29-DEC-10	42.01				51	498
	22277.494144	42164.38338	0.0006173	0.0181	261.9709	23.4681	42.0215

C1. 46	00068A	Europe*Star F1					
	29-DEC-10	45.00				52	502
	22277.257384	42164.07474	0.0003653	0.0310	66.0557	222.5719	45.0050
C1. 47	99052A	Telstar 7					
	29-DEC-10	45.11				52	567
	22277.257384	42163.57605	0.0004975	0.0117	26.9794	278.9957	45.1397
C1. 48	05041B	Syracuse 3A					
	30-DEC-10	47.00				52	260
	22278.799549	42164.87312	0.0002339	0.0177	66.2803	201.1173	46.9702
C1. 49	03018A	GSAT-2					
	28-DEC-10	48.01				51	385
	22276.874803	42164.50757	0.0003710	0.1385	80.2487	196.9333	48.0188
C1. 50	03053A	Yamal 200 N2 (Yamal 202)					
	29-DEC-10	48.99				51	360
	22277.458495	42163.52054	0.0001750	0.0259	272.9512	312.6569	49.1295
C1. 51	99005A	Telstar 6					
	29-DEC-10	50.77				52	592
	22277.764792	42164.50056	0.0002666	0.0184	28.7781	266.9554	50.7470
C1. 52	96021A	Astra 1F					
	29-DEC-10	51.02				43	581
	22277.983287	42164.41702	0.0004073	0.0240	23.4554	252.7273	51.0043
C1. 53	07056B	Skynet 5B					
	29-DEC-10	52.74				51	162
	22277.589120	42165.29672	0.0003867	0.0673	354.1211	280.0094	52.7120
C1. 54	03060A	Ekspress AM-22					
	30-DEC-10	53.01				51	354
	22278.004606	42164.16500	0.0001257	0.0320	222.9077	81.5659	53.0225
C1. 55	96035A	Intelsat VII F-6					
	29-DEC-10	54.87				52	723
	22277.586632	42164.64773	0.0002697	0.0090	292.4742	354.9583	54.8500
C1. 56	03043E	Insat 3E					
	28-DEC-10	55.01				51	348
	22276.953796	42164.37946	0.0004126	0.0546	80.7200	171.5102	55.0211
C1. 57	98068A	Bonum 1					
	30-DEC-10	55.99				51	619
	22278.808438	42164.73380	0.0002331	0.0729	108.5477	131.4791	55.9348
C1. 58	09058A	NSS 12					
	28-DEC-10	57.01				51	62
	22276.643333	42164.41898	0.0002788	0.0393	35.9436	225.1589	57.0449
C1. 59	02007A	Intelsat 904					
	29-DEC-10	59.99				52	445
	22277.971204	42164.88097	0.0002968	0.0118	338.2806	296.0701	59.9879
C1. 60	01039A	Intelsat 902					
	30-DEC-10	61.99				52	470
	22278.846910	42164.77108	0.0003288	0.0028	355.9794	283.5985	61.9872
C1. 61	09054B	COMSATBw-1					
	28-DEC-10	63.01				51	66
	22276.814248	42164.94013	0.0002300	0.0846	104.3295	172.0998	62.9689

C1 . 62	96020A	Inmarsat 3-F1					
	28-DEC-10	64.08				51	710
	22276.611250	42165.68080	0.0005334	0.1166	24.3008	244.9199	64.4842
C1 . 63	02041A	Intelsat 906					
	29-DEC-10	64.16				52	420
	22277.729039	42164.72483	0.0002806	0.0271	41.3362	227.5353	64.1366
C1 . 64	94034A	Intelsat VII F-2					
	29-DEC-10	66.01				52	802
	22277.729329	42165.38755	0.0003115	0.0123	325.2282	316.4410	65.9711
C1 . 65	01019A	PAS 10					
	29-DEC-10	68.54				52	480
	22277.972454	42164.84537	0.0002438	0.0397	156.5434	104.7317	68.4744
C1 . 66	98052A	PAS 7					
	30-DEC-10	68.66				52	618
	22278.710347	42164.79211	0.0003111	0.0056	280.9855	337.7943	68.6546
C1 . 67	07058A	Cosmos-2434 (Raduga-1M1)					
	29-DEC-10	70.02				51	158
	22277.547350	42164.99479	0.0002654	0.0172	6.9209	234.6109	70.0473
C1 . 68	02051A	Eutelsat W5					
	29-DEC-10	70.50				51	403
	22277.703588	42164.71165	0.0004076	0.0433	321.6278	324.9066	70.5043
C1 . 69	95023A	Intelsat VIIA F-1					
	28-DEC-10	72.11				52	769
	22276.946377	42164.83948	0.0003177	0.0062	305.3786	329.8676	72.0854
C1 . 70	02002A	Insat 3C					
	28-DEC-10	74.00				51	454
	22276.734352	42166.07161	0.0004892	0.0203	143.7971	136.6456	73.9921
C1 . 71	02043A	KALPANA-1 (METSAT-1)					
	28-DEC-10	74.00				51	415
	22276.680093	42165.31382	0.0001842	0.0544	72.4138	352.0386	74.0331
C1 . 72	99053A	LMI 1					
	28-DEC-10	74.98				51	575
	22276.645752	42165.48427	0.0001872	0.0592	56.7714	189.5916	74.9897
C1 . 73	97062A	Apstar 2R					
	29-DEC-10	76.50				51	679
	22277.791690	42164.97601	0.0003726	0.0549	117.1337	160.4450	76.4859
C1 . 74	08019A	Tian Lian 1A					
	29-DEC-10	77.01				51	142
	22277.591389	42165.08674	0.0003837	0.0769	258.3867	313.1635	77.0105
C1 . 75	06020B	Thaicom 5					
	28-DEC-10	78.50				51	231
	22276.729375	42164.95162	0.0005235	0.0259	269.8009	27.3119	78.5135
C1 . 76	05010A	Ekspress AM-2					
	29-DEC-10	80.00				51	291
	22277.717361	42165.15571	0.0000499	0.0487	114.4215	145.4061	79.9764
C1 . 77	09007B	Ekspress MD-1					
	29-DEC-10	80.10				51	99
	22277.717361	42164.99872	0.0002716	0.0121	285.1677	350.6697	80.0920

C1 . 78	05049A	Insat 4A					
	29-DEC-10	82.99				51	252
	22277.531076	42166.40917	0.0001645	0.0135	25.4996	126.0226	83.0306
C1 . 79	00016B	Insat 3B					
	27-DEC-10	83.00				51	540
	22275.615012	42165.19748	0.0007762	0.0070	267.8078	7.7027	82.9873
C1 . 80	10024A	Beidou DW 4					
	30-DEC-10	84.20				31	31
	22278.631377	42165.41110	0.0001896	1.4996	314.6102	332.7599	84.0360
C1 . 81	10002A	Raduga-1M					
	30-DEC-10	85.00				49	49
	22278.784167	42165.02619	0.0003105	0.0153	48.0483	234.3213	84.9799
C1 . 82	09067A	Intelsat IS-15					
	29-DEC-10	85.13				52	57
	22277.481157	42166.25525	0.0002706	0.0279	350.7129	283.4066	85.1109
C1 . 83	98033A	Zhongwei 1					
	30-DEC-10	87.51				51	647
	22278.128588	42165.20729	0.0003475	0.0427	241.4979	67.6536	87.5073
C1 . 84	98049A	ST-1					
	29-DEC-10	88.00				51	621
	22277.702975	42165.14365	0.0004229	0.0086	355.8529	288.7542	87.9979
C1 . 85	03053B	Yamal 200 N1 (Yamal 201)					
	29-DEC-10	90.00				52	353
	22277.658218	42165.57931	0.0002935	0.0386	275.0893	340.4383	89.9656
C1 . 86	02042B	Kodama (DRTS)					
	28-DEC-10	90.74				52	418
	22276.884699	42165.54427	0.0003838	0.1774	81.2056	183.2008	90.7269
C1 . 87	06056A	Measat 3					
	28-DEC-10	91.48				52	208
	22276.612778	42165.37438	0.0001343	0.0219	59.0760	192.8885	91.4952
C1 . 88	09032A	Measat 3A					
	28-DEC-10	91.50				52	80
	22276.612778	42165.22271	0.0003418	0.0290	328.9640	310.6142	91.4940
C1 . 89	08028A	Zhongxing 9					
	30-DEC-10	92.20				52	134
	22278.783935	42164.92471	0.0004810	0.0208	66.2725	217.9439	92.1991
C1 . 90	03013A	Insat 3A					
	29-DEC-10	93.50				52	388
	22277.524433	42166.37833	0.0006930	0.0223	35.9455	237.6672	93.4806
C1 . 91	07007A	Insat 4B					
	28-DEC-10	93.50				52	195
	22276.613681	42165.07161	0.0001232	0.0454	254.6340	259.9859	93.5193
C1 . 92	02057A	NSS 6					
	29-DEC-10	95.00				47	396
	22277.649641	42165.18374	0.0002936	0.0257	228.5121	59.0096	94.9865
C1 . 93	08003A	Ekspress AM-33					
	29-DEC-10	96.49				52	151
	22277.211377	42165.47558	0.0001676	0.0368	203.4890	149.8213	96.4794

C1 . 94	03052A	Zhongxing-20 (ShenTong 1, ST-1)					
	30-DEC-10	98.11				52	360
	22278.897604	42166.18572	0.0005457	0.0364	268.6172	47.4656	98.0306
C1 . 95	09042A	Asiasat 5					
	29-DEC-10	100.56				52	72
	22277.680370	42165.20757	0.0001320	0.0212	28.6616	286.7305	100.5082
C1 . 96	00016A	Asiastar					
	29-DEC-10	105.00				52	549
	22277.718206	42165.38307	0.0004737	0.0261	357.0127	275.0090	105.0097
C1 . 97	99013A	Asiasat 3S					
	30-DEC-10	105.50				52	595
	22278.710231	42164.87789	0.0001743	0.0187	182.9066	108.0598	105.5058
C1 . 98	09027A	Indostar II/Protostar II					
	30-DEC-10	107.54				52	85
	22278.906354	42165.36653	0.0003217	0.0407	78.2875	197.4252	108.1441
C1 . 99	99042A	Telkom 1					
	29-DEC-10	107.98				52	578
	22277.583981	42164.80304	0.0001945	0.0161	335.7895	330.3064	107.9993
C1 . 100	00059A	GE-1A					
	30-DEC-10	108.20				52	519
	22278.906354	42165.03068	0.0001098	0.0284	277.6651	56.9939	108.2017
C1 . 101	10056B	BSAT-3B					
	30-DEC-10	109.78				10	10
	22278.790498	42164.67352	0.0004013	0.0645	243.2379	15.9842	109.7706
C1 . 102	07036B	BSAT-3A					
	29-DEC-10	109.87				51	169
	22277.625891	42165.07385	0.0002295	0.0724	80.5926	336.8609	109.8666
C1 . 103	01011B	BSAT-2a					
	29-DEC-10	109.87				51	485
	22277.707083	42165.62249	0.0003915	0.0369	332.0295	27.1532	109.8775
C1 . 104	03028A	BSAT-2c					
	29-DEC-10	109.89				51	364
	22277.707083	42165.62865	0.0001796	0.0530	208.0335	342.9249	109.8657
C1 . 105	94040B	BS-3N					
	29-DEC-10	109.89				51	760
	22277.625301	42165.47726	0.0004976	0.0712	286.5097	19.6726	109.8595
C1 . 106	00060A	N-SAT-110					
	29-DEC-10	110.06				52	514
	22277.625891	42164.53392	0.0000247	0.0072	304.1375	43.4206	110.0635
C1 . 107	98044A	Sinosat 1					
	29-DEC-10	110.50				52	639
	22277.468808	42167.60665	0.0007709	0.0408	23.9198	285.9818	110.4003
C1 . 108	09046A	Palapa D					
	29-DEC-10	112.96				52	70
	22277.940509	42165.23869	0.0001991	0.0206	61.4893	246.4972	112.9615
C1 . 109	06034A	Mugunghwa 5					
	30-DEC-10	113.04				52	220
	22278.687211	42165.28074	0.0000997	0.0292	81.3857	221.9606	113.0387

C1 . 110	07031A	Zhongxing 6B					
	30-DEC-10	115.55				52	181
	22278.779097	42165.80107	0.0002382	0.0200	58.1204	237.0445	115.5147
C1 . 111	99046A	Mugunghwa 3 (Koreasat 3)					
	30-DEC-10	116.01				52	561
	22278.758090	42164.80809	0.0000142	0.0321	267.2461	257.6393	116.2000
C1 . 112	05046A	Telkom 2					
	28-DEC-10	118.00				51	258
	22276.701227	42165.71781	0.0000999	0.0340	142.5015	161.7401	117.9922
C1 . 113	05028A	Thaicom 4 (IPStar 1)					
	29-DEC-10	119.46				52	271
	22277.546331	42164.93115	0.0002655	0.0064	27.3077	262.6987	119.4800
C1 . 114	03014A	Asiasat 4					
	29-DEC-10	122.16				52	392
	22277.587512	42165.73603	0.0000108	0.0136	349.0823	84.5322	122.0902
C1 . 115	04042A	FengYun 2C					
	29-DEC-10	123.50				52	314
	22277.609005	42168.86954	0.0002901	2.7542	71.7077	298.4899	123.1727
C1 . 116	99006A	JC-Sat 6					
	29-DEC-10	123.95				52	597
	22277.501319	42166.81038	0.0002899	0.0149	104.2350	225.1546	123.9752
C1 . 117	10042A	Zhongxing 6A					
	30-DEC-10	125.15				16	16
	22278.639109	42165.23280	0.0001376	0.0555	240.4475	87.0719	125.0200
C1 . 118	06033A	JCSAT 3A					
	30-DEC-10	127.70				52	219
	22278.199711	42165.47839	0.0002391	0.0115	3.9017	273.8479	127.9889
C1 . 119	09044A	JCSAT 12 (JCSAT-RA)					
	30-DEC-10	127.93				52	72
	22278.202130	42165.36793	0.0000888	0.0471	54.8266	229.9993	127.9141
C1 . 120	10032A	Chollian					
	30-DEC-10	128.21				27	27
	22278.719387	42166.07806	0.0000974	0.0134	33.3360	241.2326	128.1894
C1 . 121	08018A	Vinasat					
	30-DEC-10	131.94				52	140
	22278.856979	42165.30569	0.0001293	0.0150	325.2727	314.3583	131.9472
C1 . 122	06010A	JCSAT 9					
	30-DEC-10	132.02				52	240
	22278.856979	42165.12067	0.0001071	0.0177	294.1464	346.5545	132.0280
C1 . 123	05012A	Apstar 6					
	29-DEC-10	134.00				52	290
	22277.553102	42165.54707	0.0002611	0.0505	66.5291	214.8014	133.9887
C1 . 124	02035B	N-Star 3 (N-Star c)					
	29-DEC-10	135.96				52	422
	22277.546782	42164.82154	0.0001982	0.0464	189.4654	90.6759	136.0436
C1 . 125	04024A	Telstar 18 (APstar 5)					
	30-DEC-10	138.01				52	328
	22278.213044	42165.04217	0.0002366	0.0325	264.8305	9.7718	137.9942

C1 . 126	05023A	Ekspress AM-3					
	29-DEC-10	140.05				52	279
	22277.176111	42165.80892	0.0002329	0.0775	185.9740	92.8355	140.0502
C1 . 127	05006A	Himawari-6					
	28-DEC-10	140.27				52	294
	22276.532940	42166.92757	0.0002442	0.0638	84.8649	318.2288	139.9991
C1 . 128	08007A	Kizuna					
	29-DEC-10	143.00				52	144
	22277.622824	42164.85350	0.0002742	0.0654	270.6574	22.5643	143.0100
C1 . 129	08038A	Superbird C2					
	29-DEC-10	143.86				52	126
	22277.621192	42165.45231	0.0001461	0.0059	340.6808	282.7518	143.9418
C1 . 130	04007A	MBSAT					
	29-DEC-10	144.06				52	342
	22277.618866	42165.04918	0.0001947	0.0126	312.3627	320.6782	144.0594
C1 . 131	10001A	Beidou DW 3					
	30-DEC-10	144.50				50	50
	22278.543241	42165.88069	0.0003557	1.5045	337.9137	339.5231	144.4814
C1 . 132	06004A	MTSAT-2					
	30-DEC-10	145.01				52	245
	22278.534896	42165.16664	0.0002750	0.0418	40.0462	233.1652	145.0153
C1 . 133	97042A	Agila 2					
	30-DEC-10	145.98				52	666
	22278.440683	42165.02871	0.0005359	0.1194	97.9402	179.8944	146.0045
C1 . 134	07044A	Optus D2					
	29-DEC-10	152.01				52	166
	22277.193275	42165.24934	0.0003410	0.0015	235.0694	32.7380	151.9919
C1 . 135	02015A	JC-Sat 8					
	28-DEC-10	154.00				52	443
	22276.618310	42164.70913	0.0002082	0.0055	73.7693	190.6300	154.0192
C1 . 136	09044B	Optus D3					
	29-DEC-10	156.01				52	71
	22277.318634	42165.91742	0.0001970	0.0647	9.8866	230.7500	156.0066
C1 . 137	03028B	Optus C1 (Defense C1)					
	28-DEC-10	156.01				52	380
	22276.817292	42165.81172	0.0003205	0.0068	178.9266	65.3973	156.0044
C1 . 138	10057A	Beidou DW 6					
	29-DEC-10	160.00				9	9
	22277.545208	42164.64325	0.0001248	1.7140	285.4507	206.1088	159.9825
C1 . 139	06043B	Optus D1					
	29-DEC-10	160.01				52	210
	22277.393438	42165.57847	0.0002202	0.0411	56.5585	196.2922	160.0119
C1 . 140	00012A	Superbird 4					
	30-DEC-10	162.03				52	552
	22278.543727	42164.99731	0.0002154	0.0334	210.0176	67.1827	161.9933
C1 . 141	98065A	PAS 8					
	29-DEC-10	166.01				52	598
	22277.547627	42164.73071	0.0003476	0.0587	111.0831	144.2446	166.0001

C1 . 142	97046A	PAS 5					
	29-DEC-10	169.00				52	651
	22277.547708	42164.68586	0.0002105	0.0251	59.5551	201.2080	169.0028
C1 . 143	05052A	AMC 23					
	29-DEC-10	172.01				52	254
	22277.481713	42164.42207	0.0003124	0.0027	16.7797	241.5291	172.0230
C1 . 144	96070A	Inmarsat 3-F3					
	29-DEC-10	178.07				52	715
	22277.547963	42164.05063	0.0005662	0.1038	17.7919	270.3940	178.1294
C1 . 145	93066A	Intelsat VII F-1					
	30-DEC-10	180.01				52	831
	22278.518333	42164.52102	0.0003275	0.0338	297.9615	14.1329	179.9725
C1 . 146	09008A	NSS 9					
	29-DEC-10	182.99				47	95
	22277.548090	42165.01750	0.0001658	0.0088	321.8979	334.7519	182.9694
C1 . 147	00081B	GE 8 (Aurora 3)					
	30-DEC-10	221.03				52	508
	22278.635544	42164.52887	0.0002816	0.0281	272.8062	14.8099	220.9917
C1 . 148	00054B	GE 7					
	30-DEC-10	223.01				52	520
	22278.477963	42164.50476	0.0003009	0.0102	16.5194	232.3252	223.0001
C1 . 149	00022A	GOES 11					
	30-DEC-10	224.81				52	545
	22278.419282	42166.85019	0.0002612	0.0307	221.7081	20.0275	224.7073
C1 . 150	04003A	AMC-10 (GE 10)					
	29-DEC-10	225.01				52	348
	22277.165313	42164.28106	0.0002555	0.0012	359.0944	274.4852	225.0104
C1 . 151	03013B	Galaxy XII					
	29-DEC-10	226.98				52	389
	22277.437465	42164.42459	0.0002388	0.0260	148.5156	109.6837	226.9903
C1 . 152	04017A	AMC-11 (GE-11)					
	30-DEC-10	229.01				52	333
	22278.638947	42163.48102	0.0003319	0.0124	355.2053	296.6794	228.9964
C1 . 153	08063A	Ciel 2					
	30-DEC-10	231.17				52	106
	22278.268750	42164.60176	0.0003265	0.0354	223.8774	55.1142	231.1488
C1 . 154	03044A	Galaxy 13/Horizons-1					
	27-DEC-10	233.01				52	361
	22275.496076	42164.74052	0.0001646	0.0018	257.5742	2.7360	232.9909
C1 . 155	05030A	Galaxy 14					
	30-DEC-10	235.01				52	273
	22278.477708	42164.87733	0.0002504	0.0125	341.7052	302.1457	234.9750
C1 . 156	08038B	AMC 21					
	30-DEC-10	235.11				52	127
	22278.473333	42164.77781	0.0002647	0.0205	282.6524	0.0323	235.0794
C1 . 157	08024A	Galaxy 18					
	29-DEC-10	237.00				52	138
	22277.364410	42164.67240	0.0002657	0.0092	67.2092	208.4531	237.0005

C1 . 158	03034A	EchoStar 9 (Telstar 13)					
	29-DEC-10	239.00				52	375
	22277.054931	42164.72987	0.0002906	0.0097	18.2110	253.5736	239.0081
C1 . 159	04016A	DirecTV-7S					
	30-DEC-10	240.90				52	333
	22278.421100	42164.64016	0.0002707	0.0008	294.3445	355.2223	240.9314
C1 . 160	02006A	EchoStar 7					
	30-DEC-10	241.00				52	448
	22278.421100	42165.05254	0.0001905	0.0211	7.6261	313.6381	241.1886
C1 . 161	10010A	Echostar XIV					
	30-DEC-10	241.12				41	41
	22278.421100	42164.88994	0.0002738	0.0020	348.4301	286.2668	241.0954
C1 . 162	07009A	Anik F3					
	30-DEC-10	241.30				52	190
	22278.421100	42164.88910	0.0002560	0.0056	297.0369	338.1059	241.2776
C1 . 163	98070A	Satmex 5					
	29-DEC-10	243.21				52	612
	22277.511586	42164.64016	0.0002597	0.0296	69.5381	200.6970	243.2008
C1 . 164	06049A	XM Radio 4 (Blues)					
	30-DEC-10	245.00				52	212
	22278.500116	42164.69875	0.0000388	0.0457	268.0169	339.4867	244.7139
C1 . 165	06020A	Satmex 6					
	29-DEC-10	246.98				52	233
	22277.370590	42164.63063	0.0002419	0.0420	154.7666	120.5438	247.0116
C1 . 166	04027A	Anik F2					
	29-DEC-10	248.84				52	322
	22277.048634	42164.98890	0.0001995	0.0237	3.6991	279.3796	248.9555
C1 . 167	06054A	WildBlue 1					
	28-DEC-10	248.95				52	207
	22276.318866	42164.85574	0.0002284	0.0088	34.9157	210.5243	248.8859
C1 . 168	06003A	Echostar 10					
	30-DEC-10	249.80				52	249
	22278.498449	42164.99171	0.0001130	0.0199	323.5665	320.6712	249.7873
C1 . 169	02023A	DirecTV-5					
	30-DEC-10	249.96				52	439
	22278.184074	42164.65250	0.0003370	0.0110	202.7779	73.4641	249.8843
C1 . 170	08035A	Echostar 11					
	29-DEC-10	250.01				52	131
	22277.511782	42165.02507	0.0002935	0.0235	19.7978	268.6048	249.9872
C1 . 171	00076A	Anik F1					
	28-DEC-10	252.61				52	513
	22276.445116	42165.09992	0.0002796	0.0156	321.4319	264.2503	252.6931
C1 . 172	05036A	Anik F1R					
	28-DEC-10	252.70				52	268
	22276.445116	42165.25691	0.0002281	0.0236	122.7488	183.1682	252.6954
C1 . 173	04041A	AMC-15					
	30-DEC-10	254.97				52	312
	22278.184537	42164.69399	0.0002029	0.0279	260.4589	16.2836	254.9667

C1. 174	06054B	AMC 18					
	30-DEC-10	255.06				52	207
	22278.184537	42164.93480	0.0003058	0.0165	306.7352	324.7557	255.0428
C1. 175	09033A	GOES 14					
	29-DEC-10	255.43				52	79
	22277.334734	42164.89079	0.0003312	0.2531	260.1140	116.9937	255.6136
C1. 176	96054A	GE 1					
	30-DEC-10	256.99				52	715
	22278.492315	42164.75230	0.0003013	0.0158	321.3420	311.5493	257.0006
C1. 177	05015A	Spaceway 1					
	30-DEC-10	257.14				52	287
	22278.201644	42164.97068	0.0000163	0.0184	173.1288	132.9512	257.0733
C1. 178	07032A	DirecTV 10					
	30-DEC-10	257.24				52	180
	22278.464688	42164.57541	0.0000120	0.0234	197.0620	140.8071	257.2088
C1. 179	09075A	DirecTV 12					
	30-DEC-10	257.25				52	53
	22278.464688	42164.82182	0.0000182	0.0035	254.5005	20.2262	257.2379
C1. 180	01052A	DirecTV-4S					
	30-DEC-10	258.84				52	460
	22278.197130	42164.80052	0.0001181	0.0016	265.8755	19.3089	258.8715
C1. 181	06043A	DirecTV 9S					
	30-DEC-10	258.90				52	213
	22278.433542	42164.87144	0.0002609	0.0240	4.5687	268.4056	258.8886
C1. 182	10016A	SES-1					
	30-DEC-10	259.01				36	36
	22278.506493	42165.06376	0.0002521	0.0292	249.1941	26.2267	258.9863
C1. 183	05019A	DirectTV-8					
	30-DEC-10	259.18				52	282
	22278.236389	42164.94769	0.0002456	0.0076	341.9365	294.0699	259.1377
C1. 184	08013A	DirecTV 11					
	30-DEC-10	260.71				52	145
	22278.216539	42164.97461	0.0000579	0.0237	201.9656	176.5116	260.7726
C1. 185	05046B	Spaceway 2					
	30-DEC-10	260.85				52	262
	22278.485995	42164.02204	0.0000503	0.0227	175.7765	137.7867	260.9050
C1. 186	06023A	Galaxy 16					
	30-DEC-10	261.00				52	231
	22278.359641	42164.90817	0.0002930	0.0124	47.7745	213.2412	261.0057
C1. 187	08045A	Galaxy 19					
	29-DEC-10	262.93				52	120
	22277.472581	42164.61774	0.0002796	0.0193	260.3038	21.1741	262.9176
C1. 188	09034A	Sirius FM5					
	29-DEC-10	264.01				52	79
	22277.334965	42164.89135	0.0002428	0.0168	285.3802	287.0530	264.0116
C1. 189	02030A	Galaxy 3C					
	29-DEC-10	264.95				52	430
	22277.169051	42165.20112	0.0000197	0.0311	171.7723	60.3536	264.9363

C1 . 190	07036A	Spaceway 3					
	30-DEC-10	265.06				52	175
	22278.441678	42165.01498	0.0000118	0.0162	152.0992	113.5024	265.0579
C1 . 191	97026A	Telstar 5					
	29-DEC-10	266.91				52	686
	22277.458704	42164.96704	0.0002654	0.0070	260.5471	20.5723	266.8872
C1 . 192	02062A	Nimiq 2					
	28-DEC-10	268.87				52	405
	22276.338866	42165.21598	0.0004105	0.0411	231.1576	31.2587	268.8752
C1 . 193	99027A	Nimiq					
	28-DEC-10	268.88				52	585
	22276.358044	42165.81957	0.0004029	0.0154	223.3337	35.6158	268.8833
C1 . 194	07016B	Galaxy 17					
	30-DEC-10	269.01				52	184
	22278.463009	42164.90004	0.0003212	0.0151	350.5023	295.7217	269.0079
C1 . 195	10008A	GOES 15					
	29-DEC-10	270.56				44	44
	22277.410856	42165.58324	0.0003578	0.1304	249.0957	331.1502	270.5569
C1 . 196	05022A	Intelsat Americas 8 (Telstar 8)					
	30-DEC-10	271.00				52	280
	22278.407789	42165.07553	0.0002675	0.0217	58.0776	100.5193	270.9804
C1 . 197	97050A	GE 3					
	30-DEC-10	272.95				52	671
	22278.479630	42165.24598	0.0002797	0.0231	280.2525	354.0176	272.9874
C1 . 198	10053A	Sirius XM-5					
	30-DEC-10	274.79				12	12
	22278.422373	42165.17533	0.0001747	0.0757	82.2412	154.5986	274.7692
C1 . 199	01018A	XM Radio 1 (Roll)					
	29-DEC-10	274.83				52	486
	22277.782581	42164.94938	0.0000601	0.0875	270.2448	292.3355	274.8358
C1 . 200	05008A	XM Radio 3 (Rhythm)					
	29-DEC-10	274.91				52	292
	22277.787315	42165.44951	0.0000308	0.0441	269.4802	339.0471	274.8985
C1 . 201	04048A	AMC 16					
	29-DEC-10	275.00				52	304
	22277.795556	42165.38139	0.0002286	0.0290	253.4651	19.8782	274.9785
C1 . 202	00046A	Brasilsat B4					
	29-DEC-10	275.99				52	526
	22277.335289	42165.16496	0.0001921	0.0658	145.1076	130.1880	275.9976
C1 . 203	03024A	AMC-9 (GE-12)					
	29-DEC-10	276.56				52	381
	22277.375266	42165.19888	0.0003141	0.0168	353.9612	275.9208	276.9934
C1 . 204	08044A	Nimiq 4					
	30-DEC-10	278.00				52	120
	22278.487569	42164.83304	0.0002558	0.0102	44.5376	241.7157	278.0014
C1 . 205	97002A	GE 2					
	29-DEC-10	281.06				52	701
	22277.484618	42164.95498	0.0002732	0.0142	324.1475	331.6896	281.0485

C1 . 206	08055A	Simon Bolivar					
	30-DEC-10	282.01				52	114
	22278.144792	42165.50530	0.0001555	0.0500	142.1067	204.5949	282.0106
C1 . 207	95073A	EchoStar 1					
	30-DEC-10	282.85				52	728
	22278.430729	42164.63708	0.0002259	0.0393	265.1921	31.0523	282.8452
C1 . 208	02039A	EchoStar 8					
	30-DEC-10	283.00				52	425
	22278.430729	42165.16580	0.0002761	0.0277	273.5571	12.4538	282.9944
C1 . 209	98006A	Brazilsat B-3A					
	30-DEC-10	285.00				52	643
	22278.477257	42164.52130	0.0004839	0.0523	172.8632	84.7482	284.9966
C1 . 210	07063B	Horizons 2					
	29-DEC-10	285.95				52	155
	22277.446007	42165.47166	0.0001937	0.0054	284.6589	354.9077	285.9343
C1 . 211	09050A	Nimiq 5					
	30-DEC-10	287.30				52	68
	22278.443762	42164.89695	0.0002295	0.0034	286.7362	346.4652	287.3176
C1 . 212	99056A	DirecTV-1R					
	30-DEC-10	287.49				52	569
	22278.443762	42165.15178	0.0002586	0.0142	242.2807	29.2682	287.4936
C1 . 213	00067A	GE 6					
	30-DEC-10	288.00				52	514
	22278.430313	42165.55240	0.0002742	0.0169	281.2695	343.2365	287.9842
C1 . 214	08018B	Star One C2					
	28-DEC-10	290.01				52	141
	22276.339398	42164.89835	0.0002529	0.0631	80.8159	206.8640	290.0281
C1 . 215	99060A	GE 4					
	29-DEC-10	293.01				52	562
	22277.401528	42165.74388	0.0003493	0.0164	305.9706	332.0948	292.9723
C1 . 216	07056A	Star One C1					
	29-DEC-10	295.01				52	160
	22277.211146	42164.73155	0.0002602	0.0146	60.8723	213.7370	295.0242
C1 . 217	04001A	Estrela do Sul 1 (Telstar 14)					
	29-DEC-10	296.95				52	345
	22277.429861	42164.93760	0.0001854	0.0120	40.8241	250.1747	297.0323
C1 . 218	00038A	EchoStar 6					
	30-DEC-10	298.35				52	530
	22278.463530	42165.22776	0.0003018	0.0183	270.9357	10.9082	298.3356
C1 . 219	03033A	Rainbow 1					
	30-DEC-10	298.39				52	377
	22278.408519	42165.22103	0.0001604	0.0063	357.5120	331.7036	298.6565
C1 . 220	10034A	Echostar XV					
	29-DEC-10	298.47				25	25
	22277.429838	42165.06656	0.0002166	0.0139	329.1269	312.5686	298.4584
C1 . 221	97059A	EchoStar 3					
	29-DEC-10	298.52				52	666
	22277.374028	42165.78930	0.0002220	0.0158	327.7238	320.7478	298.5236

C1 . 222	04031A Amazonas						
	27-DEC-10	298.99				52	322
	22275.292106	42165.28551	0.0002681	0.0432	46.0244	256.5882	299.0201
C1 . 223	09054A Amazonas 2						
	29-DEC-10	299.01				52	66
	22277.210984	42166.40861	0.0003122	0.0448	138.2811	97.8521	298.9946
C1 . 224	10006A Intelsat IS-16						
	30-DEC-10	301.90				47	47
	22278.401574	42165.28859	0.0002686	0.0208	253.1428	20.8886	301.8913
C1 . 225	00043A PAS 9						
	30-DEC-10	302.00				52	529
	22278.401771	42165.14674	0.0001777	0.0195	276.1328	13.8732	301.9948
C1 . 226	98037A Intelsat 805						
	29-DEC-10	304.51				52	628
	22277.338646	42164.83472	0.0003096	0.0092	16.2122	252.8141	304.5196
C1 . 227	96015A Intelsat VIIA F-2						
	30-DEC-10	307.00				52	734
	22278.401863	42164.79239	0.0002800	0.0087	359.4905	281.5444	307.0071
C1 . 228	00072A PAS 1R						
	28-DEC-10	309.97				52	492
	22276.339884	42165.22551	0.0006262	0.0413	186.4329	28.6600	310.0727
C1 . 229	09064A Intelsat IS-14						
	29-DEC-10	314.99				52	58
	22277.336250	42165.40662	0.0001884	0.0191	263.8641	30.8727	314.9868
C1 . 230	07044B Intelsat IS-11						
	29-DEC-10	316.94				52	167
	22277.336296	42165.54343	0.0002664	0.0236	261.7591	9.2268	316.9862
C1 . 231	98014A Intelsat 806 (NSS 806)						
	29-DEC-10	319.40				49	633
	22277.336354	42165.14954	0.0003486	0.0094	346.0067	314.1352	319.4954
C1 . 232	09009A Telstar 11N						
	30-DEC-10	322.44				52	97
	22278.234155	42164.87397	0.0002257	0.0192	349.0682	292.0418	322.4284
C1 . 233	05003A AMC 12						
	30-DEC-10	322.59				52	278
	22278.332650	42165.10412	0.0002984	0.0321	276.7462	10.8360	322.5861
C1 . 234	02016A Intelsat 903						
	29-DEC-10	325.49				51	430
	22277.057685	42164.86107	0.0003952	0.0085	39.7942	249.7738	325.4962
C1 . 235	08034A Protostar 1						
	29-DEC-10	328.51				52	130
	22277.702731	42165.32335	0.0002576	0.0191	356.9935	273.8800	328.4926
C1 . 236	00007A Hispasat 1C						
	29-DEC-10	329.97				52	540
	22277.678160	42165.05787	0.0003329	0.0297	17.8838	277.0181	329.9958
C1 . 237	06007A Spainsat						
	29-DEC-10	330.00				51	229
	22277.670799	42165.37326	0.0005597	0.0248	261.5756	1.8871	330.0006

C1 . 238	02044A	Hispasat 1D					
	29-DEC-10	330.00				49	404
	22277.686308	42165.62613	0.0005550	0.0254	260.9578	19.2653	329.9848
C1 . 239	03007A	Intelsat 907					
	28-DEC-10	332.52				52	384
	22276.812569	42166.24291	0.0003090	0.0032	347.5207	297.1555	332.4802
C1 . 240	02027A	Intelsat 905					
	28-DEC-10	335.49				51	411
	22276.061701	42164.97797	0.0003274	0.0078	306.4009	316.0323	335.5050
C1 . 241	02019A	NSS-7					
	29-DEC-10	338.02				47	433
	22277.438553	42165.15879	0.0003051	0.0156	7.5346	271.6283	337.9921
C1 . 242	97053A	Intelsat VIII F-3 (NSS 803)					
	29-DEC-10	340.01				47	656
	22277.058056	42165.08394	0.0002964	0.0145	13.2914	261.5295	339.9976
C1 . 243	01024A	Intelsat 901					
	28-DEC-10	342.00				52	484
	22276.305116	42165.79490	0.0002874	0.0057	179.3924	90.3872	341.9906
C1 . 244	08030A	Skynet 5C					
	29-DEC-10	342.22				52	134
	22277.906227	42165.11730	0.0003171	0.0544	125.4066	145.7621	342.1973
C1 . 245	96053A	Inmarsat 3-F2					
	29-DEC-10	344.51				51	723
	22277.231157	42164.84649	0.0005561	0.0679	331.9841	298.0987	344.5274
C1 . 246	99059A	Orion 2					
	29-DEC-10	345.00				51	569
	22277.058183	42164.88490	0.0002709	0.0379	262.0708	0.6252	345.0017
C1 . 247	02040A	Atlantic Bird 1					
	29-DEC-10	347.51				51	417
	22277.938831	42164.99395	0.0005525	0.0630	350.6361	343.0051	347.5055
C1 . 248	09007A	Ekspress AM-44					
	30-DEC-10	349.01				52	99
	22278.013704	42164.94741	0.0000975	0.0120	95.3012	216.3795	348.9902
C1 . 249	01042A	Atlantic Bird 2					
	29-DEC-10	351.92				51	466
	22277.081563	42164.76239	0.0004473	0.0419	346.1154	293.0232	351.9485
C1 . 250	09008B	Atlantic Bird 4A					
	29-DEC-10	352.70				51	100
	22277.410972	42164.80921	0.0004046	0.0610	352.2537	231.4129	352.6682
C1 . 251	00046B	Nilesat 102					
	27-DEC-10	353.01				51	524
	22275.006400	42164.86023	0.0006215	0.0236	299.5961	331.8072	353.0160
C1 . 252	98024A	Nilesat 101					
	27-DEC-10	353.01				51	635
	22275.006181	42165.02591	0.0004660	0.0310	36.2607	246.2749	353.0177
C1 . 253	10037A	Nilesat 201					
	27-DEC-10	353.02				21	21
	22275.006331	42164.91153	0.0005203	0.0545	184.0329	62.8114	352.9892

C1 . 254	06033B	Syracuse 3B					
	29-DEC-10	354.81				51	221
	22277.159352	42164.74501	0.0003143	0.0242	80.6925	190.2273	354.7925
C1 . 255	02035A	Atlantic Bird 3					
	30-DEC-10	355.00				51	425
	22278.067014	42164.28246	0.0004006	0.0276	335.8020	296.5379	355.0108
C1 . 256	03059A	AMOS 2					
	28-DEC-10	356.01				52	347
	22276.029086	42164.91602	0.0002224	0.0157	290.5528	354.4524	355.9751
C1 . 257	08022A	Amos 3					
	28-DEC-10	356.08				52	141
	22276.029132	42164.81341	0.0001120	0.0295	99.3982	147.7779	355.9955
C1 . 258	04022A	Intelsat 10-02					
	30-DEC-10	359.05				52	326
	22278.035822	42164.98470	0.0001401	0.0142	67.8286	168.0467	359.0400
C1 . 259	08006A	Thor 2R					
	29-DEC-10	359.25				52	145
	22277.231296	42164.97965	0.0002688	0.0318	216.7679	66.7491	359.2386
C1 . 260	09058B	Thor 6					
	29-DEC-10	359.26				52	62
	22277.231296	42164.57877	0.0002158	0.0457	193.3131	79.2700	359.1553

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

In the case where the satellite is only under longitude control, the following data are given:

C2.nn	COSPAR		NAME				
	Date	$\bar{\lambda}$				N_{Iy}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

C2 . 1	94070A	Astra 1D					
	28-DEC-10	1.82				39	704
	22276.923148	42165.73603	0.0004229	3.0183	71.7018	187.5186	1.7749
C2 . 2	93031A	Astra 1C					
	17-DEC-10	2.00				47	691
	22265.241319	42164.05988	0.0003887	3.9100	70.6644	189.2757	2.0188
C2 . 3	95055A	Astra 1E					
	30-DEC-10	4.67				41	571
	22278.135370	42164.64016	0.0004535	0.5805	83.7771	204.8650	4.6300
C2 . 4	98056B	Sirius 3					
	30-DEC-10	4.98				52	608
	22278.114884	42164.54345	0.0001670	1.8191	75.7501	200.7434	4.9336
C2 . 5	97025A	Thor II					
	30-DEC-10	5.12				52	665
	22278.158275	42164.42431	0.0001611	2.4510	73.8971	214.6119	5.0952
C2 . 6	02040B	MSG 1					
	29-DEC-10	9.38				52	406
	22277.087002	42163.56624	0.0001360	0.3829	4.7504	311.6291	9.4936
C2 . 7	90021A	Intelsat VI F-3					
	29-DEC-10	11.51				52	987
	22277.960648	42164.53672	0.0001187	7.7110	60.6466	219.6001	11.4981
C2 . 8	09010A	Raduga-1					
	29-DEC-10	11.90				52	96
	22277.773553	42165.15375	0.0000307	0.9943	140.2313	240.6107	11.5014
C2 . 9	01005A	Sicral					
	29-DEC-10	16.19				51	494
	22277.058958	42164.94545	0.0003329	2.7210	72.5042	217.2028	16.1836
C2 . 10	95064A	AsiaSat 2					
	29-DEC-10	17.01				52	747
	22277.058981	42165.24654	0.0002819	0.3364	79.0695	203.2819	17.0009
C2 . 11	01029A	Artemis					
	29-DEC-10	21.41				51	479
	22277.730313	42164.22724	0.0003155	8.7715	61.4765	253.0079	21.3804
C2 . 12	98006B	Inmarsat-3 F5					
	29-DEC-10	24.97				51	656
	22277.059167	42165.47895	0.0004709	0.4791	355.0978	277.8623	24.7313
C2 . 13	05044A	Inmarsat 4 F2					
	28-DEC-10	25.09				51	260
	22276.880521	42164.60428	0.0004811	2.2118	327.7903	315.8752	25.0421

C2 . 14	08011A	AMC 14					
	30-DEC-10	34.48				51	142
	22278.832731	42164.10950	0.0044994	14.4115	105.5202	0.8934	34.4405
C2 . 15	93076A	NATO IVB					
	28-DEC-10	34.98				51	783
	22276.879387	42164.08455	0.0003300	8.9710	47.2450	238.1732	34.7019
C2 . 16	99009B	Skynet 4E					
	28-DEC-10	35.43				51	573
	22276.766308	42164.58886	0.0004667	6.6041	48.5467	266.3092	35.4385
C2 . 17	04043A	Ekspress AM-1					
	29-DEC-10	40.01				52	311
	22277.059525	42163.72490	0.0005114	0.5901	77.1162	206.0065	40.0368
C2 . 18	03026A	Thuraya 2					
	29-DEC-10	44.04				52	383
	22277.612616	42164.69988	0.0002030	2.8569	359.5994	11.1762	44.0099
C2 . 19	96002B	MEASAT 1					
	28-DEC-10	46.00				52	742
	22276.944444	42163.99344	0.0000654	2.9689	72.3364	243.9700	46.0143
C2 . 20	96030B	AMOS 1					
	28-DEC-10	47.30				52	739
	22276.806794	42164.02148	0.0002408	2.2625	75.3997	168.4217	47.3577
C2 . 21	91075A	Intelsat VI F-1					
	29-DEC-10	47.50				52	903
	22277.638356	42164.60428	0.0000654	5.8305	65.3420	250.4289	47.4745
C2 . 22	96067A	Hot Bird 2					
	29-DEC-10	48.24				52	517
	22277.059722	42163.88580	0.0005381	1.6374	75.9733	187.9682	48.2808
C2 . 23	97007A	JC-Sat 4					
	28-DEC-10	50.26				52	692
	22276.873738	42164.50673	0.0003213	2.8781	72.4366	205.7987	50.2990
C2 . 24	96039A	Apstar 1A					
	30-DEC-10	51.53				52	748
	22278.827326	42165.31831	0.0000915	5.0382	67.0637	221.9416	51.4895
C2 . 25	97049B	Meteosat 7					
	29-DEC-10	57.46				52	673
	22277.654086	42164.39796	0.0000288	6.5270	62.7608	286.2804	57.3679
C2 . 26	00069A	Beidou					
	30-DEC-10	59.04				52	519
	22278.007593	42166.21572	0.0005036	1.9154	75.3615	187.6314	58.6718
C2 . 27	93073B	Meteosat 6					
	27-DEC-10	67.48				52	811
	22275.749421	42165.78986	0.0002147	9.6253	53.2267	229.2820	67.5080
C2 . 28	90002B	Leasat 5					
	29-DEC-10	72.03				52	972
	22277.704792	42164.85518	0.0000903	9.2657	31.7810	272.0097	71.9787
C2 . 29	04036A	GSAT 3 (EDUSAT)					
	28-DEC-10	74.00				51	314
	22276.837975	42164.88798	0.0007738	1.6301	76.2159	208.2654	73.9662

C2 . 30	96003A	Mugunghwa 2 (Koreasat 2)					
	30-DEC-10	74.83				51	708
	22278.779954	42164.83808	0.0000529	3.7221	70.5196	242.7666	74.7804
C2 . 31	97049A	Hot Bird 3					
	27-DEC-10	75.31				51	506
	22275.784653	42164.98330	0.0003845	1.7078	76.0359	133.4562	75.2159
C2 . 32	00082A	Beidou 1B					
	30-DEC-10	80.34				51	510
	22278.783993	42164.43300	0.0003329	3.3776	70.9834	223.0056	80.3457
C2 . 33	95035B	TDRS 7					
	30-DEC-10	84.74				52	777
	22278.138519	42165.20281	0.0031327	12.1731	41.9242	322.0808	84.8693
C2 . 34	06053A	FengYun 2D					
	29-DEC-10	86.44				51	208
	22277.618877	42166.17086	0.0001787	1.1208	84.3930	283.9825	86.5707
C2 . 35	00034A	TDRS 8					
	28-DEC-10	89.09				51	532
	22276.878715	42167.55842	0.0004284	2.7096	87.6896	176.7721	88.6865
C2 . 36	00003A	Zhongxing-22 (FengHuo 1, FH-1)					
	29-DEC-10	97.96				52	561
	22277.657743	42165.86247	0.0001471	2.4586	72.9658	229.0162	97.7435
C2 . 37	08001A	Thuraya 3					
	29-DEC-10	98.62				52	150
	22277.384688	42166.77225	0.0005343	5.1768	334.7826	292.9676	98.5921
C2 . 38	00013A	Ekspress 2A					
	30-DEC-10	102.79				52	552
	22278.688310	42165.16608	0.0003848	4.5885	68.3548	66.1316	102.7468
C2 . 39	06038A	Zhongxing-22A (FengHuo 1, FH-1)					
	30-DEC-10	103.27				52	220
	22278.781146	42165.25102	0.0004079	1.0177	77.1917	274.1468	103.2027
C2 . 40	08066A	Feng Yun 2E					
	29-DEC-10	104.33				52	106
	22277.669884	42164.81033	0.0001138	1.0263	298.4273	147.5544	104.7353
C2 . 41	97071B	Cakrawatra 1					
	29-DEC-10	107.62				52	646
	22277.676204	42166.45823	0.0003989	4.9121	67.3150	230.9709	107.6679
C2 . 42	92021B	Inmarsat 2-F4					
	30-DEC-10	109.00				52	897
	22278.772789	42166.25890	0.0001834	5.7145	48.1394	241.6985	108.9121
C2 . 43	03021A	Beidou 3					
	28-DEC-10	110.51				52	386
	22276.834005	42165.12010	0.0007225	0.3109	102.9197	351.0911	110.6212
C2 . 44	96034A	Gorizont 32					
	29-DEC-10	117.09				52	750
	22277.719792	42167.15748	0.0008917	10.6546	49.8354	264.2308	116.8869
C2 . 45	00011A	Garuda 1					
	30-DEC-10	123.02				52	543
	22278.774375	42165.96480	0.0001514	1.3088	244.7714	23.3103	122.9479

C2 . 46	04010A	Raduga-1					
	30-DEC-10	128.01				51	340
	22278.204213	42160.98163	0.0000941	5.1897	75.1163	230.3826	127.6701
C2 . 47	94043A	Apstar 1					
	29-DEC-10	142.02				52	850
	22277.935625	42164.91966	0.0001647	5.7210	65.3371	214.7112	142.0010
C2 . 48	05009A	Inmarsat 4 F1					
	30-DEC-10	143.50				52	293
	22278.595694	42165.30261	0.0002863	2.4168	334.8645	310.4780	143.4867
C2 . 49	06059A	Kiku-8 (ETS VIII)					
	29-DEC-10	145.97				52	203
	22277.547049	42165.49633	0.0005503	0.7412	78.4225	188.9368	145.7311
C2 . 50	97075A	JC-Sat 5					
	30-DEC-10	150.01				52	652
	22278.355648	42165.38447	0.0004464	0.7634	78.1220	186.8532	149.9832
C2 . 51	96030A	Palapa C2					
	30-DEC-10	150.50				52	710
	22278.479722	42165.36008	0.0001499	0.7456	78.2656	233.2365	150.4776
C2 . 52	97036A	Superbird C					
	29-DEC-10	158.02				52	668
	22277.547396	42164.80360	0.0004738	1.9834	74.9826	194.7969	157.9991
C2 . 53	94055A	Optus B3					
	29-DEC-10	164.00				52	808
	22277.547569	42164.82238	0.0003814	2.8112	72.7740	213.4804	163.9891
C2 . 54	94040A	PAS 2					
	29-DEC-10	174.02				52	831
	22277.547847	42164.64101	0.0003196	1.8266	75.8704	197.6284	173.9936
C2 . 55	89087A	Intelsat VI F-2					
	30-DEC-10	177.84				52	937
	22278.237616	42164.55859	0.0001296	8.2188	59.0997	228.8024	177.8229
C2 . 56	87022A	GOES 7					
	30-DEC-10	187.00				52	1037
	22278.351308	42163.66379	0.0003816	13.0737	31.5315	125.8853	187.1554
C2 . 57	93003B	TDRS 6					
	28-DEC-10	189.00				52	879
	22276.349155	42164.42150	0.0011657	10.4574	51.8492	333.8738	188.5226
C2 . 58	91054B	TDRS 5					
	29-DEC-10	192.50				52	965
	22277.435567	42164.12968	0.0018852	11.0825	48.9226	312.3047	192.3221
C2 . 59	91018A	Inmarsat 2-F2					
	28-DEC-10	216.05				52	928
	22276.547569	42164.21911	0.0003504	7.1434	50.9764	219.0313	216.0218
C2 . 60	90093A	Inmarsat 2-F1					
	29-DEC-10	218.00				52	898
	22277.357824	42165.46970	0.0003096	7.8309	50.1594	221.6557	217.9947
C2 . 61	94065A	Solidaridad 2					
	30-DEC-10	246.49				52	814
	22278.461620	42165.01890	0.0002434	2.6043	73.3824	210.0910	245.0913

C2 . 62	09035A	Terrestar 1					
	29-DEC-10	249.00				52	79
	22277.468646	42164.79771	0.0003608	5.2192	320.7522	313.4966	249.0052
C2 . 63	96022A	MSAT					
	29-DEC-10	253.51				52	749
	22277.543056	42164.81229	0.0007432	3.2239	71.6358	209.3651	253.4870
C2 . 64	67111A	ATS 3					
	30-DEC-10	254.71				52	1009
	22278.323472	42164.59727	0.0017007	8.6023	314.8728	55.7985	254.6757
C2 . 65	85035A	Gstar 1					
	29-DEC-10	255.52				52	1057
	22277.145081	42164.59503	0.0008159	11.8523	44.3920	288.0793	254.5646
C2 . 66	10005A	Solar Dynamics Observatory					
	29-DEC-10	258.03				47	47
	22277.536609	42164.70072	0.0002002	27.9453	183.9309	315.4713	258.2729
C2 . 67	95019A	AMSC-1					
	28-DEC-10	258.97				52	787
	22276.211782	42164.93087	0.0003628	5.8494	65.4257	219.4064	256.7012
C2 . 68	08039A	Inmarsat 4 F3					
	29-DEC-10	262.37				52	126
	22277.471157	42165.07637	0.0002941	3.0139	337.8375	301.9980	262.3531
C2 . 69	08016A	ICO G1					
	29-DEC-10	267.16				52	142
	22277.383773	42165.01077	0.0003726	5.0039	333.1015	312.3894	267.1585
C2 . 70	95016A	Brazilsat B2					
	27-DEC-10	267.99				52	766
	22275.370127	42164.90200	0.0002435	2.6643	74.0732	201.6464	268.0372
C2 . 71	96002A	PAS 3R					
	29-DEC-10	279.00				52	731
	22277.444560	42165.19608	0.0003303	1.2944	77.1265	207.4768	278.9760
C2 . 72	98063B	GE 5					
	29-DEC-10	281.01				52	601
	22277.484618	42165.14281	0.0002597	0.5278	80.0061	209.6813	280.9560
C2 . 73	98028A	EchoStar 4					
	30-DEC-10	283.03				52	634
	22278.429549	42165.34382	0.0005111	2.3525	59.6322	210.7380	283.1534
C2 . 74	06018A	GOES N					
	30-DEC-10	285.16				52	237
	22278.477257	42163.61894	0.0002015	0.3363	78.7245	344.3086	285.0461
C2 . 75	02011A	TDRS 9					
	15-DEC-10	297.74				50	441
	22263.146551	42167.30860	0.0016181	1.4686	191.7255	175.4491	297.4435
C2 . 76	01031A	GOES 12					
	29-DEC-10	300.10				52	477
	22277.387199	42165.24065	0.0003260	1.0221	79.4480	252.2686	300.3590
C2 . 77	97027A	Inmarsat 3-F4					
	29-DEC-10	306.01				52	683
	22277.336042	42165.09291	0.0004893	1.0000	74.3856	200.4910	306.0254

C2 . 78	88091B	TDRS-West					
	26-DEC-10	311.06				51	979
	22274.829734	42168.49128	0.0034791	12.8436	34.1730	248.4205	310.6087
C2 . 79	89021B	TDRS 4					
	30-DEC-10	314.09				52	1007
	22278.263310	42163.69098	0.0006799	11.6811	45.3233	311.8720	314.1399
C2 . 80	02055A	TDRS 10					
	29-DEC-10	319.17				52	394
	22277.116123	42164.02232	0.0002603	0.4139	34.2753	235.0065	319.1907
C2 . 81	01005B	Skynet 4F					
	28-DEC-10	326.02				51	488
	22276.061447	42163.37114	0.0002946	4.9549	55.4887	217.0092	325.9278
C2 . 82	97009A	Intelsat VIII F-1					
	29-DEC-10	328.65				52	655
	22277.595590	42165.16412	0.0000703	2.0983	75.1536	252.4562	330.5082
C2 . 83	95013A	Intelsat VII F-5					
	29-DEC-10	330.51				52	785
	22277.600741	42165.44979	0.0003870	1.0348	77.4356	193.8702	330.4852
C2 . 84	02029A	Ekspress A1R (Express 4A)					
	30-DEC-10	346.01				52	436
	22278.021285	42164.70380	0.0002735	1.3183	77.2704	220.9212	346.0210
C2 . 85	96044B	Telecom 2D					
	29-DEC-10	352.20				52	702
	22277.078634	42165.05422	0.0004157	4.2515	69.0035	221.0611	352.1217
C2 . 86	90079A	Skynet 4C					
	29-DEC-10	359.00				50	951
	22277.135810	42165.37298	0.0003053	10.9757	41.5513	239.9138	358.7493
C2 . 87	98035A	Thor III					
	28-DEC-10	359.00				52	621
	22276.955289	42164.97068	0.0002829	0.7090	78.4541	177.0036	355.7175

3.3 Objects in a drift orbit

In the case where the object is in a drift orbit, the following data are given:

D.nn	COSPAR	NAME					
	Date	$\bar{\lambda}$	$\bar{\Delta a}$	$\bar{\Delta r_p}$	$\bar{\Delta r_a}$	N_{Iy}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

D . 1	80074C	Star 27 (GOES 4 AKM)					
	28-DEC-10	-67.47	6235.851	-1941.259	14412.960	52	305
	22276.823970	48399.95346	0.1693274	23.4784	3.8655	136.5124	344.7894
D . 2	81049D	Star 27 S/N 0041					
	28-DEC-10	-64.81	5946.547	-1998.076	13891.169	52	101
	22276.893252	48110.45060	0.1650921	22.7731	5.1447	15.8994	310.9949
D . 3	83041C	Star 27 (GOES 6 AKM)					
	29-DEC-10	-57.36	5155.603	-2694.821	13006.027	51	652
	22277.882569	47320.05622	0.1655706	20.9818	8.7471	346.8086	308.9377
D . 4	69011A	Intelsat III F-3					
	23-DEC-10	-55.23	4936.222	4123.449	5748.995	50	299
	22271.288171	47100.33785	0.0170532	19.1443	346.8696	238.9698	149.7382
D . 5	69045A	Intelsat III F-4					
	28-DEC-10	-36.83	3135.905	3004.091	3267.719	52	124
	22276.308044	45299.96515	0.0029511	15.0627	333.4475	316.1400	125.6646
D . 6	68116A	Intelsat III F-2					
	28-DEC-10	-36.29	3085.646	2616.515	3554.777	52	119
	22276.350324	45249.77650	0.0103836	14.7511	335.9690	320.1964	112.3824
D . 7	06048A	Xinnuo 2					
	28-DEC-10	-26.69	2215.101	2025.248	2404.953	52	210
	22276.170139	44379.19824	0.0042698	2.8532	185.8245	68.6602	28.5288
D . 8	78113D	Titan IIIC stage 3 (Transtage)					
	28-DEC-10	-23.46	1931.720	725.403	3138.038	51	813
	22276.988877	44096.03721	0.0274228	17.8422	359.9189	283.3155	263.5365
D . 9	78113A	OPS 9441 (DSCS II F-11)					
	30-DEC-10	-22.47	1845.505	1732.228	1958.781	52	939
	22278.273854	44009.60719	0.0026628	16.5470	4.4892	50.9928	167.5418
D . 10	85024A	Ekran 14					
	28-DEC-10	-19.72	1608.713	1531.302	1686.125	52	926
	22276.497847	43772.94385	0.0017721	16.2580	11.4201	236.4347	95.1830
D . 11	84115A	NATO IIID					
	29-DEC-10	-19.15	1560.189	1139.004	1981.374	51	956
	22277.094144	43724.48547	0.0101694	11.3193	38.8931	351.2958	267.3762
D . 12	73100D	Titan IIIC stage 3 (Transtage)					
	29-DEC-10	-18.99	1546.952	362.494	2731.411	51	839
	22277.955660	43711.46432	0.0271635	16.3550	343.8611	336.4403	260.2952

D . 13	83016A	Ekran 10					
	30-DEC-10	-18.88	1537.303	1385.503	1689.104	52	919
	22278.158252	43701.29797	0.0032730	16.6832	2.8536	249.5477	207.0486
D . 14	81122A	Marecs A					
	29-DEC-10	-18.84	1534.079	1015.689	2052.469	49	945
	22277.027106	43698.46603	0.0110602	14.6807	14.9005	122.1835	268.8570
D . 15	82106A	DSCS II F-16					
	27-DEC-10	-18.66	1518.628	1502.742	1534.513	51	986
	22275.292685	43682.64649	0.0005123	15.3572	15.2247	3.4581	174.2166
D . 16	88036A	Ekran 18					
	29-DEC-10	-18.45	1500.633	1446.857	1554.409	52	911
	22277.212257	43663.65452	0.0015379	15.2018	21.8864	323.0537	207.8203
D . 17	77005A	NATO IIIB					
	29-DEC-10	-18.01	1463.792	1269.648	1657.936	50	920
	22277.147627	43628.10626	0.0046747	15.0817	357.5294	273.3979	206.3594
D . 18	79098C	Titan IIIC stage 3 (Transtage)					
	28-DEC-10	-17.84	1448.891	67.743	2830.040	52	913
	22276.898553	43613.02350	0.0316167	17.0697	0.7099	287.4145	296.5440
D . 19	77034B	OPS 9438 (DSCS II F-8)					
	29-DEC-10	-17.45	1416.010	1264.970	1567.050	50	897
	22277.071042	43580.13204	0.0037612	16.6754	354.9467	3.5797	231.9909
D . 20	08022B	Zenith-3SLB third stage (Block DM-SLB)					
	29-DEC-10	-17.06	1383.305	-799.460	3566.070	51	131
	22277.931620	43547.28643	0.0500572	3.1751	80.3069	271.7551	0.5757
D . 21	77034C	Titan IIIC stage 3 (Transtage)					
	23-DEC-10	-16.97	1375.233	65.191	2685.275	50	923
	22271.480498	43540.80122	0.0303093	17.0803	353.1450	312.7128	85.7476
D . 22	79098A	OPS 9443 (DSCS II F-13)					
	24-DEC-10	-16.83	1363.549	1323.299	1403.800	50	955
	22272.590891	43527.95005	0.0012112	16.1059	4.4009	337.5278	58.6503
D . 23	87109A	Ekran 17					
	30-DEC-10	-15.81	1277.499	1095.409	1459.589	51	900
	22278.520324	43441.96904	0.0039255	14.7008	24.6368	87.6949	98.9273
D . 24	76053A	Marisat 2					
	28-DEC-10	-15.75	1272.540	728.368	1816.712	50	923
	22276.904688	43436.81350	0.0121130	15.6896	353.4848	185.8206	290.4063
D . 25	84114B	Marecs B2					
	25-DEC-10	-15.64	1263.971	752.136	1775.807	52	995
	22273.380926	43427.98248	0.0118009	15.0644	23.5926	267.7261	151.3468
D . 26	87028A	Raduga 20					
	29-DEC-10	-15.52	1253.461	1133.783	1373.139	51	868
	22277.729630	43417.83987	0.0029485	15.7502	20.4271	16.7486	19.8017
D . 27	84090A	Ekran 13					
	28-DEC-10	-15.30	1235.391	1171.547	1299.235	51	943
	22276.894433	43399.43112	0.0016336	15.9082	8.2173	51.4512	309.1369
D . 28	97029A	FengYun 2A (FengYun 2-1R)					
	29-DEC-10	-15.20	1226.810	811.903	1641.716	49	678
	22277.206528	43391.18738	0.0095031	9.7332	56.2491	88.5521	245.3854

D . 29	84028A	Ekran 12					
	29-DEC-10	-15.17	1224.037	1183.215	1264.859	51	917
	22277.507072	43388.27231	0.0011165	16.0872	4.9573	348.6247	84.5441
D . 30	91084B	Inmarsat 2-F3					
	17-DEC-10	-15.16	1223.271	1177.699	1268.842	49	878
	22265.404734	43387.23349	0.0010714	7.2488	56.0431	296.4014	184.1841
D . 31	87073A	Ekran 16					
	30-DEC-10	-13.64	1096.830	1079.101	1114.558	50	838
	22278.276053	43260.83257	0.0004941	15.0245	18.1226	354.6942	180.1416
D . 32	86038A	Ekran 15					
	25-DEC-10	-13.42	1078.355	1020.392	1136.317	51	888
	22273.632361	43242.65841	0.0010697	15.3758	13.1946	254.5639	51.4289
D . 33	88108A	Ekran 19					
	28-DEC-10	-13.03	1046.519	924.668	1168.369	51	985
	22276.674549	43211.24042	0.0026836	14.3198	27.1500	59.4687	47.5618
D . 34	77034A	OPS 9437 (DSCS II F-7)					
	29-DEC-10	-12.96	1040.320	962.792	1117.848	50	877
	22277.874560	43204.59088	0.0013946	16.5721	352.0537	222.0978	298.8984
D . 35	86090A	Gorizont 13					
	26-DEC-10	-12.77	1025.027	956.813	1093.241	52	897
	22274.743495	43189.06320	0.0016269	14.8149	19.0074	234.4057	16.0960
D . 36	88051A	Meteosat 3					
	26-DEC-10	-11.97	958.911	932.974	984.848	51	955
	22274.313553	43122.91095	0.0007571	13.7383	33.4844	275.7970	185.8345
D . 37	85028C	Leasat 3					
	30-DEC-10	-11.92	954.416	623.830	1285.002	52	1013
	22278.233438	43118.34551	0.0071250	17.3434	5.6173	150.2578	183.4357
D . 38	92060B	Satcom C-3					
	27-DEC-10	-11.75	940.245	826.276	1054.215	52	915
	22275.750880	43104.61792	0.0026995	5.7282	65.5823	233.2065	58.7751
D . 39	89020B	Meteosat 4					
	28-DEC-10	-11.39	910.945	828.538	993.352	52	925
	22276.714109	43075.33975	0.0017887	13.1942	38.5157	36.6735	44.4859
D . 40	95040A	PAS 4					
	30-DEC-10	-11.33	905.977	811.868	1000.086	51	724
	22278.279248	43069.75750	0.0024678	0.7927	79.0598	103.6186	160.8464
D . 41	92032A	Intelsat K (NSS K)					
	30-DEC-10	-11.14	890.320	497.003	1283.638	52	892
	22278.367894	43054.33736	0.0091511	7.8811	62.7318	213.3425	190.9122
D . 42	71095C	Titan IIC stage 3 (Transtage)					
	30-DEC-10	-11.11	887.580	207.452	1567.708	51	902
	22278.163079	43051.55207	0.0156943	13.9093	335.7675	26.7538	179.3726
D . 43	84023A	Intelsat V F-8					
	28-DEC-10	-10.74	857.540	769.611	945.470	50	1012
	22276.917627	43021.59120	0.0016720	13.9972	29.1497	53.1467	321.6906
D . 44	89070A	Himawari-4					
	26-DEC-10	-10.30	821.851	629.544	1014.158	50	976
	22274.745058	42986.09633	0.0048211	12.9811	39.1831	354.7731	35.8013

D . 45	84093C	Leasat 2					
	27-DEC-10	-10.14	808.795	677.755	939.835	51	996
	22275.699722	42972.90879	0.0027623	16.2108	7.8425	126.7829	20.1452
D . 46	85107F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-10.00	797.106	713.037	881.174	51	885
	22278.279803	42960.92663	0.0020862	14.8475	13.7607	332.5207	174.3165
D . 47	73100B	OPS 9434 (DSCS II F-4)					
	28-DEC-10	-9.92	790.359	490.004	1090.714	51	931
	22276.734456	42954.27047	0.0073245	14.5659	341.5573	291.5129	339.2882
D . 48	78073F	Proton-K fourth stage (Block DM)					
	16-DEC-10	-9.74	775.627	709.744	841.511	50	910
	22264.483808	42941.67803	0.0017519	15.5508	347.6982	12.4553	88.5679
D . 49	82113F	Proton-K fourth stage (Block DM)					
	25-DEC-10	-9.72	774.705	679.162	870.248	52	904
	22273.434294	42939.09781	0.0019006	15.2970	3.4312	131.5197	113.4372
D . 50	76101A	Marisat 3					
	28-DEC-10	-9.66	769.279	344.445	1194.112	49	978
	22276.975544	42933.74466	0.0098464	13.2961	352.2157	214.1385	263.0523
D . 51	86082F	Proton-K fourth stage (Block DM)					
	26-DEC-10	-9.63	766.694	650.464	882.925	51	830
	22274.476458	42931.20932	0.0028860	14.6348	17.1770	15.7588	110.9061
D . 52	83088F	Proton-K fourth stage (Block DM)					
	20-DEC-10	-9.57	761.884	693.030	830.738	51	906
	22268.604826	42926.63434	0.0019070	15.3323	6.2104	349.2313	59.3812
D . 53	83066F	Proton-K fourth stage (Block DM)					
	29-DEC-10	-9.56	761.162	717.106	805.217	51	903
	22277.041690	42925.97003	0.0011748	15.2930	5.8191	21.5139	253.4814
D . 54	69013B	Titan IIIC stage 3 (Transtage)					
	27-DEC-10	-9.55	760.729	202.209	1319.249	50	844
	22275.607894	42924.67137	0.0128168	10.4085	321.6364	56.7607	8.0959
D . 55	80016D	Proton-K fourth stage (Block DM)					
	29-DEC-10	-9.54	759.883	696.946	822.821	49	930
	22277.031944	42924.68368	0.0011508	15.6710	351.9579	135.6997	243.1734
D . 56	09007D	Proton-M fourth stage (Briz-M)					
	29-DEC-10	-9.51	757.604	-54.791	1569.999	52	97
	22277.963831	42921.34838	0.0188926	1.7128	82.8027	276.5381	354.6817
D . 57	73100A	OPS 9433 (DSCS II F-3)					
	26-DEC-10	-9.43	750.361	627.360	873.362	51	831
	22274.416852	42914.85520	0.0029873	15.1659	341.0983	70.0035	96.5686
D . 58	87040A	Gorizont 14					
	30-DEC-10	-9.42	749.648	627.737	871.560	52	940
	22278.316412	42913.37869	0.0028830	15.0607	11.4976	55.8886	159.2258
D . 59	81027F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-9.40	748.101	676.040	820.162	51	905
	22278.277616	42911.99633	0.0018266	15.9259	354.9486	51.2705	156.5681
D . 60	79062D	Proton-K fourth stage (Block DM)					
	19-DEC-10	-9.37	746.158	727.762	764.554	48	869
	22267.507419	42910.99779	0.0003427	15.7169	351.6439	49.8010	81.0321

D . 61	86044F	Proton-K fourth stage (Block DM)					
	20-DEC-10	-9.37	745.838	704.558	787.119	50	922
	22268.637986	42910.66768	0.0009476	14.6424	16.1255	35.6710	57.4326
D . 62	96005D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-9.36	744.581	692.907	796.255	50	687
	22277.204051	42909.21906	0.0013041	11.1411	50.1191	23.5301	239.1441
D . 63	86027F	Proton-K fourth stage (Block DM)					
	25-DEC-10	-9.30	740.110	585.892	894.328	50	908
	22273.701632	42904.72929	0.0037564	15.2719	15.7898	353.1314	29.0826
D . 64	81069F	Proton-K fourth stage (Block DM)					
	28-DEC-10	-9.27	737.349	646.144	828.554	50	908
	22276.850637	42901.66455	0.0022533	15.7226	356.2903	29.8151	312.9974
D . 65	82113A	Raduga 11					
	30-DEC-10	-9.24	734.992	557.228	912.756	50	847
	22278.265787	42898.70572	0.0037477	15.1667	3.6466	138.6598	169.6655
D . 66	77071F	Proton-K fourth stage (Block DM)					
	28-DEC-10	-9.12	725.878	676.645	775.110	51	887
	22276.759769	42890.03329	0.0013719	15.2205	344.4650	347.9718	333.8154
D . 67	01045A	Raduga 1-6					
	28-DEC-10	-9.10	724.172	653.973	794.371	49	465
	22276.719873	42888.81282	0.0015289	7.1225	64.9147	48.5237	68.7210
D . 68	88028D	Proton-K fourth stage (Block DM)					
	30-DEC-10	-8.96	712.809	621.991	803.627	51	922
	22278.328900	42876.30513	0.0023054	14.5727	23.0715	335.3186	165.9066
D . 69	85076D	Leasat 4					
	27-DEC-10	-8.91	708.253	680.256	736.251	49	896
	22275.327407	42872.01508	0.0007580	13.0037	14.3681	257.8669	160.7320
D . 70	86007F	Proton-K fourth stage (Block DM)					
	26-DEC-10	-8.91	708.016	577.121	838.911	49	905
	22274.724340	42872.48326	0.0033148	14.8171	14.0502	22.3892	18.3493
D . 71	85070F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-8.89	706.495	658.059	754.931	51	912
	22278.334236	42870.33244	0.0012406	14.8632	12.5506	16.0521	153.6085
D . 72	77108D	Mage 1 (Meteosat 1 AKM)					
	28-DEC-10	-8.89	706.441	324.526	1088.356	49	505
	22276.228588	42870.55277	0.0089997	15.8275	345.4988	347.2525	166.3987
D . 73	88028A	Gorizont 15					
	29-DEC-10	-8.81	700.050	554.847	845.253	52	950
	22277.184028	42864.27245	0.0036444	14.5111	23.2941	37.8657	219.7817
D . 74	92043D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.79	698.368	593.026	803.709	52	795
	22277.014919	42862.77020	0.0024811	12.8581	39.1843	35.2025	296.6117
D . 75	89101G	Cosmos 2054 debris					
	25-DEC-10	-8.72	693.299	555.334	831.263	44	545
	22273.276435	42857.26240	0.0028809	13.7280	29.5393	184.3773	196.3453
D . 76	89098D	Proton-K fourth stage (Block DM)					
	29-DEC-10	-8.71	691.939	616.503	767.375	50	875
	22277.279039	42856.32922	0.0019385	13.9746	29.8432	27.3058	191.8708

D . 77	90102D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.66	688.007	608.916	767.099	51	838
	22277.011574	42852.48174	0.0018142	13.4686	32.9032	48.1960	291.5379
D . 78	89048D	Proton-K fourth stage (Block DM)					
	30-DEC-10	-8.57	681.109	588.042	774.177	51	844
	22278.673380	42845.62094	0.0023750	13.8777	27.5452	351.2878	46.0944
D . 79	89030D	Proton-K fourth stage (Block DM)					
	30-DEC-10	-8.45	671.502	598.356	744.647	50	911
	22278.688681	42836.34362	0.0016969	13.8638	26.6313	42.8220	39.8287
D . 80	80049F	Proton-K fourth stage (Block DM)					
	28-DEC-10	-8.41	667.670	544.062	791.278	49	921
	22276.828831	42831.95423	0.0030138	15.6644	354.0040	56.0057	318.7407
D . 81	88095F	Proton-K fourth stage (Block DM)					
	28-DEC-10	-8.40	667.302	607.518	727.085	50	902
	22276.605116	42831.86209	0.0010521	14.0241	25.0424	101.2973	70.3687
D . 82	95067A	Telecom 2C					
	29-DEC-10	-8.40	666.900	597.036	736.764	51	757
	22277.963021	42830.68512	0.0017486	6.5267	64.0615	163.1394	339.0075
D . 83	90116D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	-8.38	665.586	518.857	812.315	52	895
	22276.561111	42830.52507	0.0034952	13.4251	33.3681	307.1060	94.1397
D . 84	96034D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.37	664.918	529.772	800.063	52	699
	22277.543287	42829.22546	0.0032380	10.9649	51.0647	308.3710	117.2771
D . 85	88018B	Telecom 1C					
	21-DEC-10	-8.34	662.243	248.036	1076.450	51	882
	22269.780370	42826.50412	0.0100757	12.5770	43.1161	1.5778	31.9833
D . 86	01014C	Proton-M fourth stage (Briz-M)					
	30-DEC-10	-8.31	659.467	-93.847	1412.781	50	476
	22278.615567	42823.88783	0.0163037	7.6146	68.8354	78.5825	109.9938
D . 87	94008D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.30	658.857	563.794	753.920	52	762
	22277.765637	42823.36444	0.0022074	12.2226	44.6368	275.5785	30.6312
D . 88	89004F	Proton-K fourth stage (Block DM)					
	23-DEC-10	-8.20	650.845	550.287	751.403	50	915
	22271.695417	42815.57152	0.0024634	13.9086	25.9479	337.2298	43.4003
D . 89	93013D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	-8.14	645.773	576.984	714.562	50	746
	22276.122477	42810.23814	0.0018335	12.6223	41.6274	332.1572	260.9538
D . 90	91087D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.11	643.678	565.113	722.242	51	795
	22277.048438	42808.49022	0.0019427	13.1177	37.0238	286.7145	281.9756
D . 91	92082D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.10	642.479	598.904	686.054	50	789
	22277.043750	42806.90581	0.0011712	12.7485	40.2082	311.2736	286.9616
D . 92	99010D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-8.02	636.274	547.319	725.228	51	558
	22277.870197	42800.28936	0.0021118	10.4198	62.1334	190.5662	10.5542

D . 93	96053D	Proton-K fourth stage (Block DM1)					
	30-DEC-10	-7.85	622.737	407.280	838.195	52	613
	22278.576319	42786.85097	0.0052571	9.7849	55.8578	169.0752	109.5369
D . 94	97031A	Intelsat VIII F-2					
	28-DEC-10	-7.79	617.952	499.667	736.237	52	673
	22276.700926	42782.51174	0.0027452	0.0723	0.6480	239.9370	11.9014
D . 95	94012D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	-7.79	617.867	473.264	762.469	52	740
	22276.777060	42782.01957	0.0035585	12.1655	44.4901	330.3139	27.4094
D . 96	88012A	Sakura 3A					
	30-DEC-10	-7.69	609.877	573.966	645.787	48	902
	22278.358275	42773.71688	0.0008642	12.1760	45.7828	211.4663	178.0445
D . 97	88063B	Eutelsat I F-5 (ECS 5)					
	30-DEC-10	-7.59	601.693	551.177	652.209	50	871
	22278.441713	42765.43246	0.0011776	12.8759	39.1296	354.8812	141.3226
D . 98	83088A	Raduga 13					
	25-DEC-10	-7.56	599.173	525.225	673.121	52	829
	22273.736632	42763.00088	0.0018966	15.1169	5.7658	292.7698	6.2688
D . 99	69069C	JPL SR-28-3 (ATS 5 AKM)					
	28-DEC-10	-7.54	597.410	41.788	1153.031	49	680
	22276.703414	42760.91400	0.0129104	11.7426	328.2433	148.5833	338.7699
D . 100	00049D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-7.50	594.506	518.589	670.422	51	502
	22277.238299	42758.81547	0.0017433	7.9905	60.8877	234.3238	237.2738
D . 101	89101D	Proton-K fourth stage (Block DM)					
	28-DEC-10	-7.28	576.950	534.502	619.399	52	865
	22276.670787	42741.76069	0.0008201	13.6267	29.4066	65.6462	50.9880
D . 102	76023J	LES 8, LES 9 operational debris					
	30-DEC-10	-7.25	573.911	-20.586	1168.408	51	689
	22278.029664	42738.04325	0.0153065	10.6424	140.4053	277.4354	29.4848
D . 103	76023F	Titan IIIC stage 3 (Transtage)					
	29-DEC-10	-7.24	573.533	-14.920	1161.986	50	889
	22277.842697	42737.78837	0.0151137	10.6432	140.3831	278.3633	96.9848
D . 104	83118A	Gorizont 8					
	28-DEC-10	-7.22	571.507	463.168	679.846	52	836
	22276.977257	42735.91911	0.0027695	14.8906	6.8732	29.6705	277.9016
D . 105	91001A	NATO IVA					
	29-DEC-10	-7.16	567.179	543.923	590.436	52	946
	22277.224757	42731.54786	0.0005148	10.1908	39.6994	95.7783	221.2574
D . 106	85025A	Intelsat VA F-10					
	28-DEC-10	-7.15	566.214	426.489	705.938	51	997
	22276.714838	42730.76470	0.0034294	13.3931	32.9727	232.4553	38.2533
D . 107	88109B	Astra 1A					
	29-DEC-10	-6.97	551.866	487.822	615.910	50	881
	22277.752685	42716.53226	0.0016715	8.9398	57.6367	317.2142	48.3971
D . 108	83066A	Gorizont 7					
	28-DEC-10	-6.94	548.853	499.056	598.649	50	851
	22276.977106	42713.32844	0.0008211	14.9691	5.3591	220.5117	276.2218

D . 109	79098B	OPS 9444 (DSCS II F-14)					
	30-DEC-10	-6.92	547.727	526.324	569.130	51	932
	22278.295891	42711.38977	0.0007374	15.2103	0.2915	320.6266	155.0974
D . 110	84081B	Telecom 1A					
	28-DEC-10	-6.73	532.723	375.642	689.804	51	890
	22276.813762	42696.77600	0.0038531	13.9213	26.0455	257.4289	355.4986
D . 111	82097A	Intelsat V F-5					
	29-DEC-10	-6.71	530.840	422.851	638.828	50	959
	22277.170220	42695.41015	0.0028333	13.9773	22.6793	266.8096	223.5673
D . 112	90056A	Intelsat VI F-4					
	29-DEC-10	-6.62	523.595	492.124	555.065	50	891
	22277.245231	42688.19802	0.0006985	8.0189	61.3091	201.9339	235.3228
D . 113	78113B	OPS 9442 (DSCS II F-12)					
	26-DEC-10	-6.59	521.417	496.187	546.647	46	906
	22274.778310	42685.23048	0.0007185	15.2986	358.8019	7.0583	343.4788
D . 114	91074A	Gorizont 24					
	28-DEC-10	-6.59	521.142	442.242	600.043	51	929
	22276.750000	42685.32876	0.0015920	12.9518	36.1971	108.5667	29.2700
D . 115	91015B	Meteosat 5					
	30-DEC-10	-6.56	518.630	495.720	541.540	52	951
	22278.300752	42682.60247	0.0004559	12.0922	43.0827	149.9305	196.1887
D . 116	86082A	Raduga 19					
	29-DEC-10	-6.53	516.109	469.939	562.278	51	930
	22277.118438	42680.79126	0.0012280	14.3148	16.6693	21.3111	236.6286
D . 117	78106A	NATO IIIC					
	30-DEC-10	-6.43	508.598	486.613	530.584	51	918
	22278.289410	42672.67365	0.0004199	14.4499	6.1375	261.6903	163.2913
D . 118	91015A	Astra 1B					
	30-DEC-10	-6.35	501.658	477.132	526.185	51	766
	22278.684780	42666.53311	0.0008710	4.8477	68.4012	204.6125	82.6023
D . 119	82020A	Gorizont 5					
	29-DEC-10	-6.27	495.725	355.791	635.659	51	860
	22277.684051	42660.64215	0.0032404	15.5531	358.3828	89.6973	14.4862
D . 120	90001B	JC-Sat 2					
	30-DEC-10	-6.25	493.775	239.463	748.087	51	939
	22278.369282	42657.83581	0.0063310	8.7024	69.5287	172.8722	197.8789
D . 121	79038A	OPS 6392 (FLTSATCOM F2)					
	29-DEC-10	-6.23	492.286	419.934	564.638	51	1011
	22277.817338	42656.11899	0.0019592	14.9702	357.2518	294.8529	324.6560
D . 122	84113C	Leasat 1					
	30-DEC-10	-6.23	491.835	363.955	619.716	50	898
	22278.094815	42656.52791	0.0026378	12.3642	23.8592	154.6340	251.4233
D . 123	88040A	Intelsat VA F-13 (NSS 513)					
	27-DEC-10	-6.11	482.613	429.681	535.545	51	1047
	22275.547083	42647.06590	0.0015624	12.3178	42.5007	305.8498	109.4916
D . 124	94079A	Orion 1					
	28-DEC-10	-6.09	481.043	391.795	570.290	51	754
	22276.329931	42645.18030	0.0019664	6.1676	64.9393	232.7860	209.1817

D . 125	75011F	Aerojet SVM-5 (SMS 2 AKM)					
	28-DEC-10	-6.07	479.380	54.885	903.875	47	708
	22276.786690	42643.53165	0.0101462	14.0189	338.4286	335.3905	317.6086
D . 126	81073A	FLTSATCOM F5					
	28-DEC-10	-6.00	473.776	433.173	514.379	52	916
	22276.831632	42637.68697	0.0011888	18.9804	13.1974	343.0257	336.6052
D . 127	90063A	TDF 2					
	30-DEC-10	-5.99	472.879	274.010	671.748	52	900
	22278.231759	42636.44142	0.0050870	10.7348	52.5526	178.2120	230.5341
D . 128	74033A	SMS 1					
	28-DEC-10	-5.98	472.237	406.630	537.844	49	836
	22276.397755	42636.95566	0.0017852	15.1081	332.5269	287.2743	92.3943
D . 129	91079D	Proton-K fourth stage (Block DM-2)					
	26-DEC-10	-5.95	469.951	445.068	494.834	50	794
	22274.791667	42633.92150	0.0006060	13.0400	36.1450	304.2928	15.9315
D . 130	76029A	RCA Satcom II					
	29-DEC-10	-5.94	468.685	222.686	714.684	49	861
	22277.008727	42633.54944	0.0054996	15.0701	3.1266	79.3564	263.2667
D . 131	84041D	Proton-K fourth stage (Block DM)					
	29-DEC-10	-5.93	468.076	405.120	531.032	51	919
	22277.867824	42632.30881	0.0014817	14.7589	7.5432	54.6634	317.0662
D . 132	80049A	Gorizont 4					
	28-DEC-10	-5.92	467.625	447.033	488.218	51	838
	22276.966435	42632.21487	0.0002215	15.2540	353.3760	261.4569	268.1228
D . 133	94047A	DirecTV-2					
	29-DEC-10	-5.90	465.669	413.795	517.544	52	834
	22277.959167	42629.29249	0.0012892	3.7695	70.8496	196.8534	346.9397
D . 134	82020F	Proton-K fourth stage (Block DM)					
	25-DEC-10	-5.89	465.282	351.899	578.664	51	911
	22273.450637	42629.94653	0.0028013	15.6180	358.0167	45.4957	102.1888
D . 135	88066D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	-5.81	458.763	317.883	599.644	50	905
	22276.560220	42623.38413	0.0034898	13.8648	23.5180	350.0132	84.8677
D . 136	79105E	Proton-K fourth stage (Block DM)					
	30-DEC-10	-5.72	451.481	382.358	520.605	50	884
	22278.272083	42615.34416	0.0013615	15.2673	351.4921	143.0028	155.0404
D . 137	92010B	Insat-IIDT (Arabsat 1C)					
	28-DEC-10	-5.72	451.218	349.117	553.320	50	846
	22276.483900	42614.79028	0.0024738	7.4874	62.4436	133.5087	151.5216
D . 138	87078B	Eutelsat I F-4 (ECS 4)					
	30-DEC-10	-5.71	450.228	415.019	485.437	50	935
	22278.499850	42614.41259	0.0010313	13.0577	35.0355	262.2138	116.1312
D . 139	89048A	Raduga 1-1					
	29-DEC-10	-5.64	444.642	366.920	522.364	52	1004
	22277.012859	42609.17069	0.0021247	13.6174	27.1978	357.1194	285.2050
D . 140	81057A	Meteosat 2					
	25-DEC-10	-5.58	439.876	313.067	566.686	49	916
	22273.572882	42604.86918	0.0031579	14.5865	11.6067	240.9521	71.1094

D . 141	97016A	Thaicom 3					
	29-DEC-10	-5.52	435.285	65.618	804.952	50	672
	22277.511458	42599.98055	0.0086623	4.0729	70.3187	262.8679	147.1218
D . 142	83026B	TDRS-1					
	28-DEC-10	-5.50	434.168	347.517	520.819	52	1048
	22276.949977	42598.64803	0.0018753	13.4813	6.8410	114.1115	287.7566
D . 143	99050A	EchoStar 5					
	29-DEC-10	-5.50	433.621	411.034	456.207	51	572
	22277.146215	42598.16687	0.0007560	1.4989	76.2421	164.7617	285.4038
D . 144	84093B	SBS IV					
	29-DEC-10	-5.44	428.863	389.134	468.593	51	1057
	22277.123565	42593.65767	0.0012110	12.9305	34.0962	315.0262	252.0456
D . 145	00031A	Ekspress 3A					
	30-DEC-10	-5.43	428.516	418.092	438.940	50	533
	22278.273623	42593.15078	0.0002149	2.3686	73.5993	130.3591	236.0291
D . 146	89070C	Star 27 (Himawari-4 AKM)					
	28-DEC-10	-5.43	428.169	-643.708	1500.046	45	527
	22276.712164	42592.56743	0.0247365	13.1687	28.0984	269.3127	31.8196
D . 147	87022F	Star 27 (GOES 7 AKM)					
	28-DEC-10	-5.41	426.760	-4197.753	5051.273	43	270
	22276.988160	42591.35795	0.1071330	14.5616	12.7544	291.9883	268.6114
D . 148	91060A	Yuri 3B					
	29-DEC-10	-5.34	421.190	400.397	441.982	51	840
	22277.043900	42585.56648	0.0004399	9.8646	44.1131	342.7318	290.8804
D . 149	84081A	Eutelsat I F-2 (ECS 2)					
	29-DEC-10	-5.32	419.054	387.945	450.163	48	923
	22277.155694	42583.64255	0.0006339	13.8540	25.3003	37.7812	231.7989
D . 150	95025A	GOES 9					
	29-DEC-10	-5.31	418.286	402.784	433.789	52	788
	22277.509815	42582.55123	0.0003093	6.6650	63.7538	318.4721	142.2337
D . 151	90077A	Yuri 3A					
	30-DEC-10	-5.27	415.322	375.800	454.844	50	907
	22278.433866	42578.71031	0.0008132	11.1857	53.6129	141.2464	158.6731
D . 152	83081A	Sakura 2B					
	29-DEC-10	-5.26	414.687	391.880	437.493	48	870
	22277.028785	42579.45751	0.0006970	14.3399	16.5713	295.9909	268.7703
D . 153	86007A	Raduga 18					
	28-DEC-10	-5.26	414.540	117.029	712.052	50	904
	22276.988252	42579.21706	0.0074377	14.4644	13.2872	46.2497	280.8073
D . 154	72090A	Anik A1					
	29-DEC-10	-5.20	410.079	352.457	467.701	51	804
	22277.080683	42574.57243	0.0014351	14.7081	350.1832	28.0593	223.7940
D . 155	71006A	Intelsat IV F-2					
	28-DEC-10	-5.17	407.311	345.559	469.063	49	853
	22276.422350	42572.37550	0.0016179	14.3129	340.7558	306.8921	91.7941
D . 156	81050A	Intelsat V F-1					
	30-DEC-10	-5.10	401.936	379.840	424.032	52	988
	22278.432083	42566.27557	0.0001464	14.2282	16.3513	197.2679	122.0451

D . 157	83058A	Eutelsat I F-1 (ECS 1)					
	28-DEC-10	-5.05	398.000	357.682	438.317	51	951
	22276.582211	42563.07804	0.0009667	13.9570	21.6352	29.7504	75.1690
D . 158	80098A	Intelsat V F-2					
	30-DEC-10	-4.99	393.490	335.019	451.962	52	983
	22278.272731	42556.74216	0.0010176	14.0624	18.5315	195.2982	181.7183
D . 159	94022A	GOES 8					
	30-DEC-10	-4.92	387.909	360.052	415.766	52	838
	22278.659896	42552.90419	0.0007104	7.1154	65.9519	191.1278	89.2658
D . 160	87078A	Optus A3					
	30-DEC-10	-4.92	387.627	353.403	421.851	50	917
	22278.452477	42551.25699	0.0008022	11.6003	44.0144	252.3682	142.2323
D . 161	84113B	Arabsat 1D					
	17-DEC-10	-4.92	387.551	268.418	506.684	48	968
	22265.744120	42551.99295	0.0028694	12.9272	34.4732	240.3431	40.0388
D . 162	91046A	Gorizont 23					
	24-DEC-10	-4.92	387.268	359.650	414.885	51	846
	22272.738044	42551.58281	0.0005748	13.0709	34.7769	213.2580	35.9186
D . 163	77118A	Sakura					
	28-DEC-10	-4.89	385.453	367.261	403.645	51	872
	22276.850278	42549.47975	0.0005306	15.1767	354.8507	327.0863	311.5282
D . 164	87095A	TV-Sat 1					
	30-DEC-10	-4.88	384.431	132.921	635.941	50	699
	22278.082488	42549.25722	0.0062626	13.8703	18.9563	340.4087	250.6121
D . 165	91003B	Eutelsat II F-2					
	29-DEC-10	-4.80	378.043	358.740	397.346	49	878
	22277.313646	42542.08915	0.0005381	9.8257	55.1466	325.5163	204.4925
D . 166	91084A	Telecom 2A					
	27-DEC-10	-4.76	374.787	359.336	390.238	51	919
	22275.909931	42538.33244	0.0003312	8.6580	58.7626	202.3981	354.8422
D . 167	93078A	DirecTV-1					
	26-DEC-10	-4.64	364.922	328.227	401.617	52	869
	22274.949375	42528.36555	0.0009922	1.9476	75.4723	62.0395	357.9678
D . 168	00066A	Thuraya 1					
	29-DEC-10	-4.63	364.772	329.657	399.887	52	505
	22277.585660	42530.98850	0.0010174	4.0529	24.8317	261.9455	75.8828
D . 169	90091A	SBS VI					
	29-DEC-10	-4.61	363.069	335.034	391.104	51	966
	22277.838681	42527.30498	0.0007192	3.1639	73.1846	325.9104	32.7080
D . 170	90001A	Skynet 4A					
	29-DEC-10	-4.60	361.684	308.351	415.016	49	933
	22277.720093	42526.09841	0.0011721	10.7803	35.4694	180.8353	38.1584
D . 171	95029A	DirecTV-3					
	29-DEC-10	-4.58	360.520	347.773	373.267	50	760
	22277.459479	42524.52195	0.0001703	1.6638	76.3704	201.8166	172.4883
D . 172	91037A	Aurora II					
	30-DEC-10	-4.54	357.237	340.921	373.553	50	948
	22278.404444	42519.72561	0.0003151	8.9574	58.1047	160.1711	173.7166

D . 173	92057A	Satcom C-4					
	29-DEC-10	-4.52	356.025	344.259	367.792	52	834
	22277.815336	42520.29302	0.0002389	6.1904	64.9746	181.6023	33.1649
D . 174	97011A	Tempo 2					
	30-DEC-10	-4.47	351.727	226.743	476.712	50	685
	22278.037523	42515.58573	0.0031320	4.5705	68.7329	172.9993	316.6805
D . 175	94049B	Turksat 2					
	29-DEC-10	-4.41	347.331	284.680	409.982	52	769
	22277.581968	42511.61425	0.0014842	6.0993	65.1322	314.4340	117.4445
D . 176	84005A	Yuri 2A					
	29-DEC-10	-4.39	345.576	296.379	394.774	50	885
	22277.163391	42510.28033	0.0005140	14.2418	16.9211	62.8277	220.6477
D . 177	92010A	Superbird B1					
	28-DEC-10	-4.39	345.354	278.182	412.526	52	928
	22276.364688	42508.99772	0.0014959	8.6545	58.7004	318.8040	190.5229
D . 178	89004A	Gorizont 17					
	28-DEC-10	-4.35	342.045	257.314	426.777	52	1032
	22276.981968	42506.44682	0.0022657	13.5869	25.2537	10.3296	294.4721
D . 179	07063A	Rascom-QAF 1					
	28-DEC-10	-4.34	341.596	315.312	367.880	52	153
	22276.823947	42505.42937	0.0006624	0.2394	88.8765	264.3080	326.1995
D . 180	97019A	GOES 10					
	29-DEC-10	-4.33	340.386	315.652	365.120	52	689
	22277.796875	42504.90422	0.0004950	4.8852	66.4825	52.5889	41.3326
D . 181	92041B	Eutelsat II F-4					
	29-DEC-10	-4.30	338.308	312.799	363.817	48	810
	22277.141597	42503.30513	0.0003967	8.9372	58.6264	134.9790	270.1342
D . 182	89006A	Intelsat VA F-15					
	29-DEC-10	-4.20	330.527	243.316	417.737	51	1002
	22277.661632	42495.73016	0.0021365	11.3115	48.7496	321.7043	72.3883
D . 183	85087A	Intelsat VA F-12					
	24-DEC-10	-4.17	327.726	307.335	348.118	50	998
	22272.813657	42491.54868	0.0005816	12.8366	37.8852	199.3232	11.7364
D . 184	92084A	Superbird A1					
	30-DEC-10	-4.16	326.956	269.539	384.373	51	886
	22278.041007	42490.89392	0.0012360	4.3489	62.5293	16.3189	309.2281
D . 185	97016B	BSAT-1a					
	29-DEC-10	-4.15	326.703	297.825	355.580	49	670
	22277.178553	42490.15660	0.0003763	0.3815	33.4909	214.2258	198.0573
D . 186	83059B	Anik C2					
	28-DEC-10	-4.14	325.620	165.258	485.983	50	1016
	22276.586817	42490.80819	0.0038118	13.4703	29.1022	325.3135	80.6624
D . 187	91026A	Anik E2					
	30-DEC-10	-4.12	324.291	289.910	358.673	51	964
	22278.465069	42487.06421	0.0009097	7.1305	62.8244	237.0087	156.4066
D . 188	95044A	N-Star 1					
	30-DEC-10	-4.12	324.205	282.115	366.295	51	737
	22278.738611	42489.26215	0.0012243	4.8809	67.7422	231.7197	62.4633

D . 189	78044A	OTS 2						
	25-DEC-10	-4.08	320.694	288.267	353.122	48	815	
	22273.333472	42484.16749	0.0007133	14.8941	359.3689	229.4006	145.5440	
D . 190	90100B	Gstar 4						
	28-DEC-10	-4.07	320.027	303.776	336.277	50	995	
	22276.788715	42484.50345	0.0004522	7.7035	61.4535	201.5196	40.2746	
D . 191	73058A	Intelsat IV F-7						
	30-DEC-10	-4.06	319.244	295.456	343.032	50	865	
	22278.335069	42482.90771	0.0006818	15.0461	354.6736	16.0884	135.4070	
D . 192	95043A	JC-Sat 3						
	30-DEC-10	-4.05	318.374	255.196	381.552	50	737	
	22278.363241	42481.90166	0.0016410	5.4823	60.3781	281.9340	190.5853	
D . 193	07003A	Beidou 4						
	29-DEC-10	-4.04	317.816	62.794	572.839	51	195	
	22277.461493	42481.35753	0.0061362	2.8915	269.3852	325.3719	5.4718	
D . 194	98024B	BSAT-1b						
	29-DEC-10	-4.04	317.589	294.468	340.710	49	626	
	22277.783079	42482.34184	0.0004972	5.2339	67.4254	225.9945	47.1783	
D . 195	98075A	PAS 6B						
	29-DEC-10	-4.03	317.001	243.556	390.446	52	591	
	22277.480625	42480.92995	0.0014999	2.6292	73.1745	20.0546	161.9931	
D . 196	98002A	Skynet 4D						
	29-DEC-10	-4.03	316.815	296.949	336.682	51	613	
	22277.937384	42480.32359	0.0003912	6.7697	52.5715	356.6928	336.7483	
D . 197	70003A	Intelsat III F-6						
	30-DEC-10	-4.02	315.989	272.924	359.054	47	452	
	22278.125590	42479.28685	0.0013218	10.4326	322.4494	316.8252	178.7185	
D . 198	83047A	Intelsat V F-6						
	30-DEC-10	-3.99	313.793	269.149	358.438	51	951	
	22278.379236	42477.26039	0.0020188	13.6399	26.1913	168.1714	151.0110	
D . 199	91067A	Anik E1						
	29-DEC-10	-3.97	312.221	291.476	332.966	52	944	
	22277.130162	42477.03195	0.0006045	7.1109	63.4499	215.7571	278.9730	
D . 200	95001A	Intelsat VII F-4						
	29-DEC-10	-3.93	309.066	296.260	321.871	52	774	
	22277.110116	42473.41120	0.0002268	1.5017	75.0204	93.0275	297.2375	
D . 201	93078B	Thaicom 1						
	29-DEC-10	-3.93	308.654	292.423	324.885	48	795	
	22277.325995	42472.95413	0.0001410	1.6934	74.0156	74.9892	218.3681	
D . 202	89027A	Tele-X						
	30-DEC-10	-3.93	308.449	282.239	334.660	50	910	
	22278.379028	42471.74056	0.0001355	11.6651	47.2684	266.6506	172.0692	
D . 203	90100A	Satcom C-1						
	25-DEC-10	-3.92	308.303	283.845	332.762	49	995	
	22273.582778	42472.48822	0.0006907	6.1669	62.2338	239.7814	118.2991	
D . 204	89067A	Sirius 1						
	29-DEC-10	-3.91	307.417	276.478	338.356	49	918	
	22277.091157	42472.11367	0.0009242	10.0053	54.2402	256.5490	283.8406	

D . 205	88098A	TDF 1					
	23-DEC-10	-3.88	305.040	282.180	327.900	51	918
	22271.875278	42468.46200	0.0005275	11.9410	45.1555	94.2487	357.8283
D . 206	78068A	Comstar 3					
	29-DEC-10	-3.87	304.428	217.808	391.048	51	898
	22277.650081	42468.76254	0.0017492	14.5694	8.1903	172.7424	36.1954
D . 207	92054A	Optus B1					
	28-DEC-10	-3.84	302.022	266.583	337.461	51	894
	22276.666007	42467.07581	0.0006709	4.1879	69.5271	320.2568	92.4869
D . 208	76017A	Marisat 1					
	28-DEC-10	-3.84	301.717	260.037	343.396	48	945
	22276.451875	42466.80841	0.0010383	14.2124	350.1510	37.5975	90.7532
D . 209	90074A	Thor I					
	25-DEC-10	-3.83	300.757	287.356	314.157	51	894
	22273.799919	42465.19892	0.0001839	8.5624	59.4501	169.4590	37.2405
D . 210	82058A	Westar V					
	29-DEC-10	-3.81	299.233	231.656	366.809	49	864
	22277.126366	42464.26354	0.0012541	13.4185	30.5644	125.6168	247.7175
D . 211	94013A	Galaxy IR-A					
	28-DEC-10	-3.79	297.362	283.410	311.315	49	845
	22276.750012	42462.45314	0.0003414	4.5014	66.8461	210.9619	59.5294
D . 212	88086A	Sakura 3B					
	28-DEC-10	-3.78	296.618	273.111	320.125	49	889
	22276.926910	42460.07581	0.0005154	11.3859	48.5526	225.8165	337.5283
D . 213	82017A	Intelsat V F-4					
	30-DEC-10	-3.76	295.238	171.611	418.866	52	947
	22278.327083	42458.46924	0.0033306	13.9483	19.6000	68.9455	163.5573
D . 214	96040A	Arabsat 2A					
	29-DEC-10	-3.76	295.216	251.781	338.651	51	715
	22277.849896	42458.90995	0.0008684	7.8929	60.3586	260.8249	16.0260
D . 215	80074A	GOES 4					
	29-DEC-10	-3.76	295.047	145.345	444.749	48	813
	22277.086875	42459.81023	0.0036581	14.9626	359.0350	310.8712	230.0161
D . 216	06022A	KAZSAT					
	29-DEC-10	-3.74	294.062	283.044	305.080	52	230
	22277.924086	42457.50885	0.0001651	1.4482	76.9011	57.0122	5.1855
D . 217	04015A	Ekspress AM-11					
	29-DEC-10	-3.73	293.089	267.239	318.939	50	330
	22277.523796	42457.28352	0.0005664	4.3661	68.9317	152.5858	142.3180
D . 218	92043A	Gorizont 26					
	30-DEC-10	-3.71	291.411	165.556	417.266	50	924
	22278.344248	42454.68961	0.0028442	12.4487	37.9197	119.4981	175.5901
D . 219	90030A	AsiaSat 1					
	29-DEC-10	-3.71	291.243	276.445	306.041	51	939
	22277.101042	42456.06737	0.0003857	10.3306	53.5014	246.0707	279.6006
D . 220	77065A	Himawari					
	28-DEC-10	-3.69	289.548	223.040	356.057	51	837
	22276.610764	42453.88798	0.0015241	14.8769	351.4214	78.7718	34.7637

D . 221	94049A	Brazilsat B1					
	30-DEC-10	-3.68	290.000	282.000	298.000	52	799
	22278.414387	42452.95380	0.0001484	3.5846	71.1652	358.3606	182.9425
D . 222	93015A	USA 98 (UFO F1)					
	29-DEC-10	-3.68	288.933	259.359	318.508	50	775
	22277.133646	42453.19960	0.0008719	17.1826	182.9927	79.4372	37.5050
D . 223	75042A	Intelsat IV F-1					
	29-DEC-10	-3.65	286.349	235.323	337.375	52	895
	22277.524421	42451.63474	0.0009076	14.8043	1.0077	106.8466	74.4567
D . 224	96007A	N-Star 2					
	28-DEC-10	-3.65	286.288	258.118	314.458	52	714
	22276.803426	42451.02999	0.0008751	3.7732	70.7175	170.4871	44.1016
D . 225	98056A	Eutelsat W2					
	28-DEC-10	-3.64	285.909	272.556	299.262	49	611
	22276.876771	42450.80503	0.0000346	0.9425	78.9879	128.7597	24.9724
D . 226	07037A	INSAT 4CR					
	27-DEC-10	-3.62	283.945	276.301	291.588	48	170
	22275.423056	42449.08017	0.0002146	0.2642	81.7047	258.0921	111.8988
D . 227	02029D	Proton-K fourth stage (Block DM-2M)					
	30-DEC-10	-3.62	284.313	225.166	343.459	49	419
	22278.014120	42447.85321	0.0013481	7.6438	61.1834	236.3884	317.5307
D . 228	92013A	Galaxy V					
	30-DEC-10	-3.55	278.442	219.211	337.672	50	949
	22278.584491	42442.72593	0.0014577	5.5946	66.4991	296.0635	116.8547
D . 229	86016A	Yuri 2B					
	29-DEC-10	-3.54	277.668	202.170	353.166	51	914
	22277.214444	42441.97816	0.0015242	13.7207	25.0668	62.9214	210.4698
D . 230	91083A	Eutelsat II F-3					
	29-DEC-10	-3.52	276.023	262.840	289.207	51	876
	22277.217743	42441.03665	0.0002757	9.7090	55.5614	205.0788	239.5556
D . 231	95016B	Hot Bird 1					
	29-DEC-10	-3.45	270.713	259.193	282.233	52	571
	22277.651875	42435.91200	0.0001810	4.5327	69.3375	172.4310	96.4646
D . 232	92060A	Hispasat 1A					
	26-DEC-10	-3.44	270.193	247.518	292.868	51	824
	22274.922627	42433.57513	0.0006384	7.5972	61.6470	200.6195	354.1107
D . 233	91055A	Intelsat VI F-5					
	30-DEC-10	-3.41	267.981	256.559	279.403	50	946
	22278.147604	42432.92317	0.0001959	5.7985	66.2895	194.9695	274.5124
D . 234	87070A	Kiku-5					
	28-DEC-10	-3.38	265.462	228.856	302.068	48	972
	22276.980741	42429.66491	0.0010999	13.5203	28.5222	280.7437	298.0084
D . 235	90079B	Eutelsat II F-1					
	30-DEC-10	-3.34	261.904	239.586	284.222	51	841
	22278.734734	42426.71847	0.0002986	10.5165	52.5842	210.8237	48.9587
D . 236	06053C	FengYun 2D AKM (FG-36 AKM)					
	29-DEC-10	-3.30	259.198	-179.396	697.791	47	199
	22277.241424	42424.36777	0.0101429	1.0914	85.3870	255.6118	258.6972

D . 237	81057F	Mage 1 (Meteosat 2 AKM)					
	28-DEC-10	-3.24	254.229	-56.365	564.824	47	673
	22276.836447	42418.51450	0.0072576	15.0963	356.4426	53.3358	318.8073
D . 238	78071A	ESA GEOS 2					
	29-DEC-10	-3.22	253.025	228.847	277.204	47	838
	22277.647558	42416.65805	0.0002914	14.5854	347.2215	288.0485	16.0889
D . 239	82106D	IUS stage 2					
	30-DEC-10	-3.21	251.735	59.334	444.135	52	863
	22278.527951	42417.17621	0.0047204	15.0661	5.9026	277.1314	76.4532
D . 240	97002B	Nahuel 1A					
	28-DEC-10	-3.20	250.838	227.105	274.571	52	694
	22276.703715	42416.07361	0.0002881	3.1269	72.1146	106.3847	81.4496
D . 241	88051C	PAS 1					
	29-DEC-10	-3.17	248.956	228.003	269.908	49	955
	22277.434340	42411.95550	0.0005564	8.9488	57.7747	219.2610	163.5320
D . 242	77048A	GOES 2					
	28-DEC-10	-3.15	247.372	180.057	314.688	50	1005
	22276.884213	42411.76263	0.0016681	14.7051	351.6340	273.1902	295.8969
D . 243	89052A	Gorizont 18					
	29-DEC-10	-3.14	246.591	100.923	392.260	50	944
	22277.178727	42411.32656	0.0034823	13.4019	26.8660	205.0444	224.8339
D . 244	85016F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-3.13	245.451	139.499	351.403	51	925
	22278.345197	42408.93050	0.0023611	14.4633	9.3395	90.4430	146.6744
D . 245	95011B	Himawari-5					
	30-DEC-10	-3.12	245.084	217.767	272.400	48	719
	22278.805903	42409.18846	0.0007634	8.8257	56.2394	338.1710	26.8775
D . 246	97071A	Sirius 2					
	29-DEC-10	-3.12	245.068	229.707	260.428	52	649
	22277.333669	42409.61907	0.0000362	1.8750	75.7950	174.2993	217.4145
D . 247	83006A	Sakura 2A					
	29-DEC-10	-3.12	244.904	203.045	286.762	49	862
	22277.893299	42408.78630	0.0007355	14.2992	13.1303	200.7253	313.2909
D . 248	83094A	RCA Satcom IIR					
	30-DEC-10	-3.10	242.809	172.617	313.001	48	995
	22278.674606	42408.20753	0.0018283	12.5187	40.6962	279.4864	58.6104
D . 249	84031F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-3.06	239.677	174.128	305.226	50	903
	22278.277801	42402.90941	0.0013048	14.5623	6.1502	86.0004	167.6953
D . 250	94038D	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	-3.04	238.038	135.497	340.580	52	738
	22278.510509	42401.83503	0.0026395	10.8685	46.5980	349.6511	123.8973
D . 251	00031D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	-3.00	235.627	179.583	291.671	50	516
	22276.607488	42401.35856	0.0014115	9.2246	56.8056	316.7797	100.9925
D . 252	77041A	Intelsat IVA F-4					
	28-DEC-10	-2.99	234.578	181.942	287.214	47	908
	22276.608345	42399.53752	0.0008923	14.6230	5.0678	106.3286	49.2110

D . 253	04011A	Superbird A2 (Superbird 6)					
	30-DEC-10	-2.92	228.952	204.131	253.774	50	332
	22278.431319	42390.96768	0.0028510	5.7062	65.8804	239.2950	171.4047
D . 254	85048B	Morelos 1					
	30-DEC-10	-2.90	227.179	212.015	242.342	52	929
	22278.517072	42391.66433	0.0005443	12.8346	37.4527	317.2241	112.4142
D . 255	94002D	Proton-K fourth stage (Block DM-2M)					
	29-DEC-10	-2.90	227.136	63.414	390.858	51	763
	22277.264907	42391.08161	0.0044549	12.6105	38.2236	349.8207	205.1547
D . 256	81119A	Intelsat V F-3					
	29-DEC-10	-2.89	226.571	128.582	324.561	51	964
	22277.213275	42390.64266	0.0018618	13.9030	19.4092	75.2623	205.2875
D . 257	78062D	Aerojet SVM-5 (GOES 3 AKM)					
	29-DEC-10	-2.87	224.679	-253.687	703.045	48	757
	22277.091852	42389.42701	0.0116012	15.3585	348.9731	289.4813	217.2180
D . 258	69069A	ATS 5					
	30-DEC-10	-2.81	220.610	199.302	241.917	48	797
	22278.179826	42383.39040	0.0002253	11.1844	325.8228	254.4614	162.5915
D . 259	75011A	SMS 2					
	29-DEC-10	-2.75	215.327	159.701	270.953	48	785
	22277.015752	42380.56385	0.0009674	14.6847	346.1899	87.1676	243.2741
D . 260	83077A	Arabsat 1D-R					
	28-DEC-10	-2.70	211.248	106.043	316.454	51	970
	22276.655417	42376.83872	0.0026089	12.9040	36.3578	9.4226	63.4508
D . 261	90034A	Palapa B-2R					
	30-DEC-10	-2.68	210.124	170.495	249.752	47	925
	22278.778067	42374.69588	0.0010280	9.4016	57.1479	340.2277	37.8371
D . 262	92021A	Telecom 2B					
	30-DEC-10	-2.67	209.403	186.049	232.757	51	887
	22278.403900	42372.29392	0.0009105	9.1094	57.0413	326.5407	172.7844
D . 263	89020A	JC-Sat 1					
	28-DEC-10	-2.66	208.372	191.321	225.423	52	933
	22276.926551	42371.48653	0.0003048	11.4160	48.5016	323.0563	337.6284
D . 264	96033A	Galaxy IX					
	28-DEC-10	-2.64	206.792	168.842	244.743	51	725
	22276.685220	42372.33422	0.0007223	2.1725	74.1725	8.0724	90.0070
D . 265	90063B	DFS-Kopernikus 2					
	29-DEC-10	-2.61	204.430	189.045	219.816	51	904
	22277.298206	42368.90541	0.0002860	9.1360	57.1507	261.8763	212.0660
D . 266	85015B	Brazilsat 1					
	29-DEC-10	-2.61	204.261	185.348	223.174	51	1020
	22277.490069	42368.11181	0.0005380	12.5590	39.5451	236.6974	125.2271
D . 267	81076A	Himawari-2					
	29-DEC-10	-2.59	203.331	157.643	249.018	49	836
	22277.166748	42367.25014	0.0006883	14.7733	359.8813	178.0318	202.3512
D . 268	86003B	Satcom Ku-1					
	28-DEC-10	-2.59	202.979	186.721	219.237	51	999
	22276.484178	42366.16667	0.0002061	11.7175	46.3120	266.2011	135.1325

D . 269	00019D	Proton-K fourth stage (Block DM-2M)					
	29-DEC-10	-2.58	201.956	143.163	260.748	52	520
	22277.542060	42365.79475	0.0014305	9.5870	56.1507	179.3442	123.0773
D . 270	85109B	Morelos 2					
	29-DEC-10	-2.55	200.069	179.843	220.295	51	1054
	22277.122627	42365.36156	0.0006960	10.6485	51.4147	323.4165	269.7201
D . 271	91028A	Spacenet 4					
	26-DEC-10	-2.53	198.524	184.745	212.303	52	963
	22274.564236	42362.30345	0.0003415	6.5980	63.7761	219.1615	125.5921
D . 272	01014A	Ekran 21 (Ekran-M)					
	29-DEC-10	-2.47	193.383	64.205	322.561	52	495
	22277.974120	42356.26799	0.0030226	7.2887	68.4533	275.5124	339.0008
D . 273	82004A	RCA Satcom IV					
	30-DEC-10	-2.46	193.000	174.298	211.702	49	908
	22278.595926	42358.76381	0.0002992	13.4232	29.1067	342.9880	75.6214
D . 274	94065B	Thaicom 2					
	28-DEC-10	-2.46	192.068	188.364	195.773	51	739
	22276.972581	42357.84478	0.0000909	0.7923	74.7001	175.1000	272.5408
D . 275	75117A	RCA Satcom I					
	30-DEC-10	-2.43	190.120	93.513	286.726	48	855
	22278.440174	42354.40898	0.0016560	14.7218	0.1214	122.0799	103.0607
D . 276	85109D	Satcom Ku-2					
	28-DEC-10	-2.40	188.135	153.652	222.619	52	1039
	22276.552118	42352.55811	0.0006665	11.4715	47.5971	148.6773	111.9445
D . 277	71116A	Intelsat IV F-3					
	29-DEC-10	-2.35	183.742	129.907	237.576	50	887
	22277.599236	42348.29896	0.0015466	14.8377	351.0301	323.8834	37.2651
D . 278	97070D	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	-2.30	180.380	117.461	243.299	50	618
	22278.221574	42345.19973	0.0016608	11.1140	49.3045	353.4529	230.9354
D . 279	86026B	Brazilsat 2					
	30-DEC-10	-2.28	178.204	161.613	194.796	52	1045
	22278.735741	42343.07647	0.0004592	11.7425	45.3718	244.1872	41.3709
D . 280	00002A	Galaxy 10R					
	29-DEC-10	-2.28	178.122	166.848	189.395	51	559
	22277.129676	42343.00366	0.0001174	2.4400	73.7883	32.5548	289.2142
D . 281	93069A	Gorizont 28					
	24-DEC-10	-2.24	175.020	36.431	313.609	50	883
	22272.805706	42338.54298	0.0033161	11.9222	42.1310	13.0246	18.9599
D . 282	99016A	Insat 2E					
	30-DEC-10	-2.22	173.674	140.717	206.630	51	582
	22278.429560	42338.66279	0.0006862	0.4359	78.5223	144.3845	296.4185
D . 283	88018A	Spacenet 3R					
	26-DEC-10	-2.20	172.257	157.873	186.641	46	954
	22274.924306	42334.91061	0.0000913	9.9905	54.1532	187.8685	346.0655
D . 284	85028B	Anik C1					
	29-DEC-10	-2.20	171.830	112.292	231.369	49	983
	22277.051574	42336.53186	0.0016066	11.5502	47.6716	341.5233	291.6294

D . 285	95041A	Mugunghwa 1 (Koreasat 1)					
	28-DEC-10	-2.18	170.438	155.903	184.973	51	709
	22276.842072	42333.66781	0.0000915	10.2199	53.2232	37.4493	12.8566
D . 286	88109A	Skynet 4B					
	28-DEC-10	-2.12	165.851	148.337	183.365	51	941
	22276.650104	42332.31637	0.0003960	13.3706	31.0996	210.1981	60.0396
D . 287	76010A	Intelsat IVA F-2					
	30-DEC-10	-2.11	165.158	142.148	188.168	50	876
	22278.223623	42327.81436	0.0000838	14.7159	359.7109	112.5364	180.6653
D . 288	83105A	Intelsat V F-7					
	29-DEC-10	-2.08	162.749	134.438	191.061	50	943
	22277.060162	42328.45266	0.0008446	13.6472	24.1539	297.1650	265.0105
D . 289	92072A	Galaxy VII					
	30-DEC-10	-2.07	161.977	130.539	193.415	51	876
	22278.252662	42327.12541	0.0010120	9.1530	56.8650	250.1188	227.1518
D . 290	97078A	Galaxy VIII-i					
	26-DEC-10	-2.06	161.465	133.267	189.662	49	652
	22274.939491	42324.12287	0.0007831	7.5407	61.4312	251.7887	347.7411
D . 291	91074D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-2.04	159.860	147.307	172.414	52	782
	22277.232025	42324.31559	0.0003241	12.7708	35.1641	331.4397	214.0381
D . 292	93048A	Hispasat 1B					
	30-DEC-10	-1.98	154.704	129.494	179.914	51	779
	22278.092824	42319.52260	0.0011004	6.7212	63.0730	209.1598	291.0491
D . 293	92066A	DFS-Kopernikus 3					
	30-DEC-10	-1.95	152.836	136.142	169.530	51	833
	22278.337697	42316.41194	0.0002849	8.2261	59.4753	278.6773	199.1235
D . 294	89041A	Superbird A					
	29-DEC-10	-1.89	148.216	121.719	174.713	52	863
	22277.542685	42313.81063	0.0009158	13.5716	25.5441	248.6895	92.1995
D . 295	84080E	Star 27 (Himawari-3 AKM)					
	29-DEC-10	-1.89	147.740	-435.903	731.384	45	487
	22277.483773	42314.50610	0.0137234	14.3243	9.3993	313.6020	96.2901
D . 296	84114A	Spacenet 2					
	29-DEC-10	-1.86	145.509	105.450	185.568	51	979
	22277.205208	42311.08814	0.0010912	11.4921	47.4167	286.5445	235.8502
D . 297	90091B	Galaxy VI					
	26-DEC-10	-1.84	143.966	128.404	159.527	51	935
	22274.932813	42306.36871	0.0000728	7.4980	61.5895	262.9695	350.3942
D . 298	85076B	Optus A1					
	28-DEC-10	-1.84	143.763	123.995	163.532	48	837
	22276.622882	42310.19572	0.0005315	13.1240	33.1061	268.7430	71.8334
D . 299	82014A	Westar IV					
	29-DEC-10	-1.81	141.387	123.858	158.915	50	923
	22277.091238	42307.36807	0.0001868	13.4003	28.6007	253.0568	258.3015
D . 300	84093D	Telstar 3C					
	29-DEC-10	-1.78	138.942	120.993	156.890	48	998
	22277.039549	42303.98688	0.0003885	12.4419	40.4008	321.1457	288.7382

D . 301	95067B	Insat-IIC					
	30-DEC-10	-1.77	138.273	118.031	158.516	52	707
	22278.162419	42304.29384	0.0006992	8.0207	61.2454	233.6797	264.1274
D . 302	74093A	Intelsat IV F-8					
	26-DEC-10	-1.75	136.990	115.340	158.640	51	882
	22274.648912	42301.32587	0.0006339	14.6718	0.3178	0.6510	31.6937
D . 303	88081B	SBS V					
	30-DEC-10	-1.73	135.638	110.076	161.200	52	994
	22278.155532	42301.70345	0.0006736	9.6715	55.1933	204.5441	260.6263
D . 304	86026A	Gstar 2					
	25-DEC-10	-1.72	134.755	117.363	152.147	49	981
	22273.458183	42296.76852	0.0005022	12.3822	41.0614	291.0416	142.2191
D . 305	73023A	Anik A2					
	28-DEC-10	-1.71	133.760	74.774	192.747	48	825
	22276.889803	42298.33808	0.0014075	14.7797	354.3541	286.9022	296.6040
D . 306	92059D	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	-1.71	133.510	82.480	184.540	50	787
	22278.461435	42296.93465	0.0010639	12.5997	38.0107	193.8913	133.0678
D . 307	78116A	Anik B1					
	29-DEC-10	-1.65	128.751	97.392	160.110	47	900
	22277.148588	42293.99113	0.0015071	14.3145	9.4197	196.1457	218.3946
D . 308	80091A	SBS I					
	25-DEC-10	-1.62	126.907	99.154	154.659	52	954
	22273.747789	42289.75432	0.0007611	14.3957	11.6947	4.4665	8.3779
D . 309	76042A	Comstar 1A					
	28-DEC-10	-1.62	126.817	107.950	145.683	49	880
	22276.889109	42290.93289	0.0004125	14.6566	0.3840	288.2623	303.0280
D . 310	94067A	Ekspress 1					
	28-DEC-10	-1.61	125.952	107.788	144.116	52	814
	22276.817789	42289.72099	0.0001575	9.3919	55.9586	71.1003	24.3569
D . 311	72003A	Intelsat IV F-4					
	30-DEC-10	-1.60	124.733	105.647	143.819	51	897
	22278.303924	42286.91766	0.0005477	14.7674	353.3632	331.7695	145.3043
D . 312	84080A	Himawari-3					
	26-DEC-10	-1.59	123.991	95.028	152.955	49	842
	22274.343287	42285.70548	0.0008041	13.9546	16.3597	337.8470	158.0338
D . 313	00020A	Galaxy IVR					
	28-DEC-10	-1.58	123.188	111.663	134.712	52	545
	22276.888669	42286.09005	0.0001066	4.0494	69.7241	223.1653	12.3412
D . 314	84101A	Galaxy III					
	29-DEC-10	-1.56	122.329	90.718	153.940	48	1012
	22277.213137	42287.74305	0.0008893	12.4600	40.2137	258.0565	225.8198
D . 315	76035A	NATO IIIA					
	30-DEC-10	-1.55	120.842	16.706	224.978	51	899
	22278.268067	42282.60413	0.0020834	13.2950	349.0075	173.9292	153.9378
D . 316	89062A	TV-Sat 2					
	30-DEC-10	-1.52	119.167	86.754	151.579	49	892
	22278.336678	42282.18944	0.0000474	10.7481	50.9424	119.9194	191.0434

D . 317	92017A	Gorizont 25					
	25-DEC-10	-1.52	119.095	6.727	231.463	52	970
	22273.809850	42281.81992	0.0027136	12.5547	36.5628	318.3319	10.6255
D . 318	74075A	Westar II					
	28-DEC-10	-1.51	117.963	99.005	136.921	50	791
	22276.557743	42284.39683	0.0005409	14.6536	356.6390	5.4347	58.9296
D . 319	83030A	RCA Satcom IR					
	29-DEC-10	-1.49	116.584	74.831	158.337	50	919
	22277.361157	42279.12120	0.0010048	13.1142	32.7788	330.7613	165.0012
D . 320	99047A	Yamal-100 No. 1					
	30-DEC-10	-1.47	114.706	-272.397	501.810	50	539
	22278.405752	42276.29422	0.0086713	9.9533	54.0609	264.9375	168.2179
D . 321	84022F	Proton-K fourth stage (Block DM)					
	29-DEC-10	-1.46	113.779	14.601	212.958	51	897
	22277.004375	42279.99137	0.0026427	15.6605	4.5641	349.7839	265.5921
D . 322	87028D	Proton-K fourth stage (Block DM)					
	26-DEC-10	-1.45	113.416	-2.566	229.399	51	904
	22274.415035	42276.07326	0.0029357	14.7061	16.5227	317.8391	132.1049
D . 323	85048D	Telstar 3D					
	30-DEC-10	-1.43	111.633	99.836	123.430	50	1002
	22278.357361	42273.25780	0.0001327	12.2955	41.4855	299.7105	174.1239
D . 324	95063A	Gals 2					
	28-DEC-10	-1.39	108.707	78.851	138.563	51	773
	22276.058125	42273.23325	0.0007656	9.2444	56.5221	204.1265	299.0987
D . 325	96005A	Gorizont 31					
	25-DEC-10	-1.38	107.494	21.734	193.253	48	763
	22273.941701	42269.59456	0.0019805	10.7838	48.9294	80.3677	335.8246
D . 326	91064B	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	-1.36	106.278	88.112	124.445	52	790
	22278.372141	42267.85420	0.0005864	12.9232	34.1449	284.5454	161.4054
D . 327	74022A	Westar I					
	29-DEC-10	-1.35	105.418	75.938	134.899	48	815
	22277.662604	42269.58046	0.0007452	14.6976	355.6670	285.8320	19.0567
D . 328	82110C	Anik C3					
	29-DEC-10	-1.32	103.309	87.405	119.212	50	999
	22277.212569	42267.96477	0.0004947	13.4062	27.8653	298.2828	213.7378
D . 329	78002A	Intelsat IVA F-3					
	30-DEC-10	-1.31	102.365	85.744	118.986	51	876
	22278.536111	42269.66142	0.0002739	14.3996	6.6033	10.3602	74.7566
D . 330	87029A	Agila 1					
	28-DEC-10	-1.30	101.782	80.944	122.619	51	988
	22276.490995	42264.69832	0.0006630	12.0291	43.6129	278.4369	129.9254
D . 331	75091A	Intelsat IVA F-1					
	30-DEC-10	-1.24	96.722	74.038	119.405	51	891
	22278.416389	42261.81849	0.0003622	14.6037	0.0952	55.6992	111.4861
D . 332	82110B	SBS III					
	30-DEC-10	-1.22	95.221	59.506	130.937	51	1020
	22278.202523	42261.16099	0.0010471	13.3869	28.0864	305.7363	216.5509

D . 333	92027A	Palapa B4					
	29-DEC-10	-1.20	93.682	74.639	112.725	46	853
	22277.059109	42257.56041	0.0005768	5.6025	65.2871	245.5052	306.3954
D . 334	82009A	Ekran 8					
	30-DEC-10	-1.19	93.364	-24.294	211.022	52	930
	22278.087616	42259.37865	0.0024891	14.7980	355.0520	191.2184	225.0404
D . 335	85109C	Optus A2					
	29-DEC-10	-1.18	92.461	76.111	108.811	50	1018
	22277.045185	42258.51574	0.0003217	12.9005	34.5010	237.9114	280.8105
D . 336	79072A	Westar III					
	25-DEC-10	-1.17	91.715	73.583	109.847	42	841
	22273.848206	42253.41331	0.0003982	14.0674	14.2076	265.0067	334.6001
D . 337	74101A	Symphonie A					
	28-DEC-10	-1.13	88.174	69.354	106.995	45	800
	22276.871574	42255.20433	0.0002228	14.2481	342.6995	331.6200	291.6954
D . 338	91003A	Italsat 1					
	27-DEC-10	-1.11	86.381	23.413	149.350	49	854
	22275.889398	42248.06564	0.0016181	11.4851	47.0282	260.0946	350.4011
D . 339	80081F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-1.10	86.331	61.044	111.618	51	896
	22278.213426	42247.45487	0.0006699	14.6476	350.6551	297.9594	175.2159
D . 340	75077A	Symphonie B					
	29-DEC-10	-1.09	85.023	61.098	108.948	47	837
	22277.409954	42252.74486	0.0006453	13.9318	340.7466	290.7757	95.3545
D . 341	93048B	Insat-IIB					
	30-DEC-10	-1.09	85.079	20.691	149.466	50	787
	22278.244815	42251.12712	0.0012243	9.2165	56.5596	58.2286	229.9091
D . 342	88071A	Gorizont 16					
	30-DEC-10	-1.07	83.808	22.266	145.349	51	927
	22278.385914	42244.83429	0.0016406	13.5360	22.4962	295.1467	144.6878
D . 343	76073A	Comstar 2					
	30-DEC-10	-1.06	82.965	67.918	98.013	50	991
	22278.229560	42244.01128	0.0004527	14.5390	0.6198	334.4338	179.4024
D . 344	84049A	Chinasat 5 (Spacenet 1)					
	29-DEC-10	-1.04	80.870	61.007	100.732	50	1015
	22277.131007	42248.28256	0.0003245	11.9799	43.8028	190.0366	259.1410
D . 345	93073E	Mage 1 (Meteosat 6 AKM)					
	26-DEC-10	-1.03	80.734	-202.062	363.531	45	583
	22274.747477	42245.73115	0.0065476	12.1124	42.3896	312.0620	37.6219
D . 346	99047B	Yamal-100 No. 2					
	28-DEC-10	-1.03	80.039	70.881	89.197	52	579
	22276.089653	42245.44299	0.0003354	6.7471	63.1890	210.9088	294.3517
D . 347	97041D	Proton-K fourth stage (Block DM-2)					
	26-DEC-10	-0.97	75.691	-1383.922	1535.304	50	636
	22274.952407	42236.75653	0.0348686	10.1076	52.8302	148.3036	336.7485
D . 348	09010B	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	-0.95	74.828	58.003	91.654	50	88
	22276.243218	42234.84671	0.0004745	1.0015	146.9677	169.6328	175.7635

D . 349	77014A	Kiku-2					
	26-DEC-10	-0.95	74.259	55.206	93.311	44	761
	22274.591192	42239.72445	0.0005153	14.4423	346.2542	308.6412	38.4273
D . 350	90016D	Proton-K fourth stage (Block DM)					
	29-DEC-10	-0.88	69.155	-99.680	237.990	49	821
	22277.185891	42235.72615	0.0037970	13.1984	28.6216	82.7380	224.6056
D . 351	90112D	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	-0.88	69.043	-41.429	179.516	51	849
	22278.398611	42229.23587	0.0027930	12.9641	31.7871	19.1333	149.6656
D . 352	81057B	APPLE					
	28-DEC-10	-0.85	66.558	-30.913	164.029	50	847
	22276.879560	42231.06176	0.0024402	14.7198	355.2487	59.8836	301.6244
D . 353	77092J	Ekran 2 fragmentation debris					
	28-DEC-10	-0.83	65.147	4.284	126.011	50	336
	22276.861412	42230.49748	0.0011865	14.1180	341.5781	76.6311	294.3326
D . 354	03053E	Proton-K fourth stage (Block DM-2M)					
	28-DEC-10	-0.83	64.941	-833.554	963.435	51	341
	22276.607083	42230.78342	0.0222587	6.5978	64.0585	154.1952	109.5538
D . 355	77018A	Palapa 2					
	25-DEC-10	-0.83	64.948	41.709	88.186	50	823
	22273.744491	42225.78811	0.0006700	14.4394	4.9058	317.1644	2.7055
D . 356	87084D	Proton-K fourth stage (Block DM)					
	26-DEC-10	-0.81	63.712	-56.075	183.498	50	912
	22274.653206	42231.21261	0.0026721	13.6542	19.1764	84.8345	49.3137
D . 357	83028F	Proton-K fourth stage (Block DM)					
	29-DEC-10	-0.81	63.502	-39.859	166.863	51	902
	22277.167743	42227.25881	0.0025738	14.5962	2.0741	57.2550	204.4312
D . 358	98025D	Proton-K fourth stage (Block DM-2)					
	22-DEC-10	-0.81	63.225	-68.564	195.014	51	610
	22270.957118	42223.31661	0.0033480	8.6459	55.8192	335.1045	339.6563
D . 359	75038A	Anik A3					
	28-DEC-10	-0.80	62.975	43.563	82.386	45	838
	22276.204063	42224.10852	0.0004842	14.6172	359.2304	313.5355	189.1750
D . 360	92088D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-0.75	58.622	17.351	99.894	51	793
	22277.231597	42225.04423	0.0010560	11.5512	41.8536	349.7203	220.8670
D . 361	94060D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-0.71	55.595	23.463	87.728	49	706
	22277.264745	42220.66912	0.0009688	11.5569	45.0368	338.0978	212.0614
D . 362	94087D	Proton-K fourth stage (Block DM-2)					
	27-DEC-10	-0.70	54.770	10.836	98.703	51	718
	22275.883634	42214.39747	0.0011507	11.4244	46.0499	333.8644	351.6248
D . 363	94064A	Intelsat VII F-3 (NSS 703)					
	29-DEC-10	-0.69	53.138	40.754	65.522	48	741
	22277.254850	42214.04180	0.0001371	1.2567	77.0163	216.2867	355.3556
D . 364	00032A	FengYun 2B					
	26-DEC-10	-0.67	51.977	33.993	69.961	50	531
	22274.556701	42214.08651	0.0003564	5.6744	65.5629	202.8387	130.0764

D . 365	76066A	Palapa 1					
	26-DEC-10	-0.65	50.913	33.743	68.083	48	794
	22274.385139	42213.59168	0.0002552	14.5056	0.6844	3.7999	127.2856
D . 366	85055A	Intelsat VA F-11					
	29-DEC-10	-0.63	49.014	-3.488	101.517	51	978
	22277.527419	42216.51223	0.0015744	13.0195	33.3401	295.5875	105.4367
D . 367	88034D	Proton-K fourth stage (Block DM)					
	28-DEC-10	-0.60	47.322	-55.440	150.084	50	904
	22276.634688	42217.50320	0.0025438	13.7029	20.7187	26.7487	55.3851
D . 368	75097F	Proton-K fourth stage (Block DM)					
	30-DEC-10	-0.58	45.672	-48.942	140.286	50	874
	22278.140093	42205.16999	0.0023407	12.9407	334.1152	48.7541	185.4232
D . 369	72041A	Intelsat IV F-5					
	30-DEC-10	-0.58	45.538	28.162	62.915	49	873
	22278.154086	42207.08574	0.0002175	14.5368	348.6015	38.9297	194.6645
D . 370	81114A	RCA Satcom IIR					
	30-DEC-10	-0.56	44.069	25.636	62.501	47	858
	22278.339641	42201.34533	0.0003649	13.5134	25.6737	221.4691	164.7078
D . 371	04010F	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-0.56	43.770	-85.589	173.130	50	327
	22277.488461	42200.67164	0.0030013	5.1777	75.4261	215.4309	161.3608
D . 372	82082A	Anik D1					
	26-DEC-10	-0.56	43.721	17.020	70.422	51	910
	22274.805243	42203.15809	0.0005680	13.4084	26.6800	235.1174	1.5472
D . 373	93003D	IUS stage 2					
	30-DEC-10	-0.55	43.259	-244.746	331.264	50	767
	22278.280370	42204.16766	0.0068672	11.1759	31.8882	334.4923	192.0014
D . 374	94069D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-0.55	43.083	-52.158	138.324	52	707
	22277.533947	42209.67263	0.0024973	11.8412	45.3202	349.0620	115.1584
D . 375	91010F	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	-0.52	41.117	-25.888	108.122	48	840
	22277.110347	42211.78146	0.0015163	12.3188	35.6156	63.2655	258.5862
D . 376	83065A	Galaxy I					
	28-DEC-10	-0.52	40.483	26.211	54.755	50	974
	22276.953808	42202.91982	0.0003159	12.7323	36.6874	269.6949	315.9780
D . 377	77092K	Ekran 2 fragmentation debris					
	30-DEC-10	-0.51	40.362	-31.736	112.460	49	230
	22278.208194	42196.85052	0.0014307	13.9882	341.0997	177.6991	167.6233
D . 378	04043D	Proton-K fourth stage (Block DM-2M)					
	30-DEC-10	-0.50	39.735	12.229	67.241	52	305
	22278.787118	42207.78245	0.0008090	5.7327	64.6760	340.8271	42.0154
D . 379	91015E	Mage 1 (Meteosat 5 AKM)					
	28-DEC-10	-0.49	38.534	-638.396	715.464	46	572
	22276.812199	42196.35030	0.0155611	12.4910	30.0454	78.4810	2.2588
D . 380	99047E	Proton-K fourth stage (Block DM-2M)					
	29-DEC-10	-0.49	38.511	-413.972	490.993	48	535
	22277.217153	42208.94942	0.0101897	9.9106	54.0297	263.6633	237.0899

D . 381	81096A	SBS II					
	28-DEC-10	-0.48	38.008	15.506	60.510	49	1002
	22276.954097	42204.98143	0.0003746	13.9854	14.6415	14.3250	293.8851
D . 382	93072A	Gorizont 29					
	29-DEC-10	-0.47	37.581	-15.128	90.290	51	867
	22277.222269	42206.98344	0.0012459	11.9058	42.1101	227.3731	224.4129
D . 383	99009A	Arabsat 3A					
	29-DEC-10	-0.45	34.824	11.616	58.033	52	579
	22277.449745	42192.05590	0.0007412	2.0558	75.0897	188.3876	174.8595
D . 384	85107A	Raduga 17					
	29-DEC-10	-0.41	32.389	-14.741	79.519	49	914
	22277.107778	42203.85408	0.0010649	13.9990	11.2574	57.8456	235.1167
D . 385	95045D	Proton-K fourth stage (Block DM-2)					
	26-DEC-10	-0.40	32.105	-58.473	122.684	50	690
	22274.916690	42189.44840	0.0019307	11.0577	48.2210	263.1137	342.6954
D . 386	79035E	Proton-K fourth stage (Block DM)					
	24-DEC-10	-0.38	30.124	-94.045	154.293	52	875
	22272.664942	42191.55358	0.0027426	14.4419	345.9851	81.7272	13.8671
D . 387	00032C	FengYun 2B AKM					
	30-DEC-10	-0.37	29.919	-78.846	138.684	45	448
	22278.560787	42195.57317	0.0025493	8.4510	60.7357	243.9577	119.6207
D . 388	83059C	Palapa Pacific System					
	28-DEC-10	-0.33	26.274	5.036	47.512	49	921
	22276.470775	42194.28047	0.0006868	13.5745	22.8991	308.1558	116.5424
D . 389	00036D	Proton-K fourth stage (Block DM-2)					
	22-DEC-10	-0.30	24.641	-58.877	108.158	48	502
	22270.957049	42181.33451	0.0020185	7.9176	59.6151	280.4004	343.3785
D . 390	92082A	Gorizont 27					
	26-DEC-10	-0.30	23.900	-34.457	82.257	49	912
	22274.920301	42183.37721	0.0014345	12.3550	38.8508	246.7269	332.1019
D . 391	87091D	Proton-K fourth stage (Block DM)					
	26-DEC-10	-0.29	3.997	-82.009	90.004	52	912
	22274.768009	42180.12567	0.0018833	13.6585	18.5233	98.3737	7.1307
D . 392	83098A	Galaxy II					
	29-DEC-10	-0.27	22.357	-4.380	49.093	50	1011
	22277.789086	42185.42661	0.0007600	12.6693	37.1074	297.6117	14.8250
D . 393	92041A	Insat-IIA					
	26-DEC-10	-0.25	20.284	2.274	38.294	50	860
	22274.953194	42181.72821	0.0003145	11.3392	47.6548	163.2031	329.1815
D . 394	81102F	Proton-K fourth stage (Block DM)					
	29-DEC-10	-0.23	20.527	-27.915	68.970	51	885
	22277.165799	42185.10945	0.0011747	14.5852	353.5288	42.8583	196.4292
D . 395	64047A	Syncom 3					
	28-DEC-10	-0.22	16.156	6.294	26.017	41	135
	22276.499977	42186.41997	0.0001847	5.2574	296.9746	193.4271	20.3085
D . 396	67001A	Intelsat II F-2					
	11-DEC-10	-0.21	17.654	-49.546	84.854	37	601
	22259.670961	42176.37457	0.0012381	8.5304	314.9792	236.7746	353.0917

D . 397	00029B	Proton-M fourth stage (Briz-M)					
	27-DEC-10	0.24	-21.216	-1122.009	1079.577	50	509
	22275.735243	42129.50180	0.0276071	7.7563	57.1893	186.1802	55.9792
D . 398	66110A	ATS 1					
	28-DEC-10	0.26	-17.057	-48.457	14.344	52	821
	22276.936493	42132.20805	0.0003602	6.9549	308.0709	202.0017	233.7458
D . 399	82103E	Proton-K fourth stage (Block DM)					
	30-DEC-10	0.30	-24.829	-77.736	28.078	48	890
	22278.279120	42151.80460	0.0014795	14.3758	358.1544	22.5833	159.1398
D . 400	81027A	Raduga 8					
	29-DEC-10	0.37	-29.546	-389.308	330.217	51	899
	22277.047199	42126.37084	0.0084803	14.7130	351.2454	106.5330	237.8036
D . 401	85048C	Arabsat 1B					
	28-DEC-10	0.50	-39.095	-101.886	23.696	51	923
	22276.392130	42132.42377	0.0017180	13.2587	28.4165	244.7089	150.3306
D . 402	85015A	Arabsat 1A					
	28-DEC-10	0.53	-41.737	-66.595	-16.880	50	830
	22276.441736	42124.55904	0.0004472	13.4167	24.9812	293.9118	129.1208
D . 403	69013A	TACSAT 1					
	30-DEC-10	0.54	-41.995	-120.237	36.248	51	699
	22278.171053	42129.63608	0.0016624	8.6715	317.5994	189.6948	157.5630
D . 404	89020E	Mage 1 (Meteosat 4 AKM)					
	30-DEC-10	0.60	-47.916	-607.734	511.902	40	545
	22278.462986	42115.24305	0.0126912	12.8682	22.2367	98.0477	118.2205
D . 405	03015A	Cosmos-2397					
	29-DEC-10	0.71	-55.216	-243.848	133.417	49	384
	22277.314282	42107.72579	0.0045189	4.7337	65.7839	217.8895	214.4821
D . 406	88091D	IUS stage 2					
	27-DEC-10	0.71	-55.629	-136.582	25.325	51	909
	22275.037512	42105.13744	0.0014160	13.6694	26.1718	152.8634	277.3456
D . 407	79087C	Proton-K fourth stage (Block DM)					
	30-DEC-10	0.73	-56.696	-224.933	111.541	49	870
	22278.294988	42111.08690	0.0038362	14.3868	346.9749	196.6234	142.0383
D . 408	93069D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	0.76	-59.534	-86.519	-32.549	49	742
	22277.160706	42100.47299	0.0007297	11.8906	41.8380	272.2407	246.3815
D . 409	75123F	Proton-K fourth stage (Block DM)					
	23-DEC-10	0.80	-61.985	-124.970	1.000	50	901
	22271.703380	42106.17636	0.0016512	12.9776	335.3907	38.8984	350.1972
D . 410	95035D	IUS stage 2					
	27-DEC-10	0.80	-62.367	-105.357	-19.377	52	685
	22275.683368	42097.39265	0.0012547	14.1085	43.4521	356.9449	61.3890
D . 411	90054D	Proton-K fourth stage (Block DM)					
	30-DEC-10	0.84	-65.224	-132.236	1.789	51	855
	22278.004676	42097.46302	0.0017186	13.0964	29.8206	306.1611	289.6339
D . 412	88071D	Proton-K fourth stage (Block DM)					
	28-DEC-10	0.99	-77.061	-156.079	1.958	52	926
	22276.935579	42087.86423	0.0017673	13.3704	22.1543	72.0438	308.2641

D . 413	87096D	Proton-K fourth stage (Block DM)					
	30-DEC-10	1.07	-83.025	-174.436	8.385	51	934
	22278.373576	42084.86488	0.0020294	13.5488	19.2925	82.4623	146.3455
D . 414	77048G	Aerojet SVM-5 (GOES 2 AKM)					
	28-DEC-10	1.08	-84.329	-1012.623	843.965	49	593
	22276.631169	42082.20472	0.0227885	13.8348	341.8290	298.7338	15.3481
D . 415	89081D	Proton-K fourth stage (Block DM)					
	28-DEC-10	1.21	-94.297	-214.808	26.213	50	854
	22276.290648	42072.46296	0.0030428	13.1175	26.3826	326.0454	184.9129
D . 416	89021D	IUS stage 2					
	28-DEC-10	1.21	-94.369	-197.339	8.600	49	879
	22276.273958	42073.03536	0.0025739	13.0903	9.7185	38.5431	174.6576
D . 417	85102D	Proton-K fourth stage (Block DM-2)					
	25-DEC-10	1.27	-98.968	-186.782	-11.153	51	885
	22273.853727	42067.56451	0.0022127	13.8502	11.2916	357.4053	329.7184
D . 418	97049E	Mage 1 (Meteosat 7 AKM)					
	29-DEC-10	1.34	-104.225	-417.302	208.852	48	515
	22277.710660	42057.88024	0.0078749	9.6087	53.7194	180.5161	59.7752
D . 419	89041B	DFS-Kopernikus 1					
	28-DEC-10	1.40	-108.709	-160.408	-57.011	48	848
	22276.308160	42056.80530	0.0012115	11.9724	42.5491	171.5665	194.9558
D . 420	74039C	Titan IIIC stage 3 (Transtage)					
	30-DEC-10	1.41	-109.626	-213.582	-5.670	49	885
	22278.327118	42054.79655	0.0020457	13.2083	335.2146	190.3921	118.7638
D . 421	88034A	Cosmos 1940					
	30-DEC-10	1.42	-109.954	-196.030	-23.878	52	852
	22278.511493	42052.89664	0.0015745	13.5605	20.1316	134.9210	97.2905
D . 422	04015D	Proton-K fourth stage (Block DM-2M)					
	27-DEC-10	1.58	-122.636	-202.115	-43.157	52	331
	22275.913241	42043.41926	0.0018356	6.1346	64.7307	188.1028	359.5475
D . 423	00013D	Proton-K fourth stage (Block DM-2M)					
	28-DEC-10	1.76	-136.243	-170.455	-102.032	50	514
	22276.317940	42028.44846	0.0008456	9.3922	56.1679	273.3147	204.8950
D . 424	68081M	Transtage 5 debris					
	28-DEC-10	1.80	-139.583	-759.238	480.071	40	77
	22276.781285	42025.12884	0.0156504	9.2226	328.9409	285.5998	308.8678
D . 425	74017A	Cosmos 637					
	27-DEC-10	1.82	-141.240	-308.304	25.824	51	901
	22275.286169	42024.01512	0.0039215	11.6318	330.0914	266.7706	130.9921
D . 426	96044A	Italsat 2					
	27-DEC-10	1.84	-142.813	-246.708	-38.918	50	661
	22275.037257	42021.90687	0.0023905	7.8715	59.5626	349.0697	310.6309
D . 427	94082D	Proton-K fourth stage (Block DM-2)					
	25-DEC-10	1.89	-146.429	-263.944	-28.914	50	722
	22273.823021	42018.51850	0.0029701	10.8648	51.1034	337.2305	20.4628
D . 428	05023H	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	1.94	-150.191	-212.439	-87.943	50	271
	22277.781968	42012.82866	0.0014506	5.0392	67.3198	191.7907	47.4795

D . 429	87109D	Proton-K fourth stage (Block DM)					
	29-DEC-10	2.02	-156.764	-429.308	115.781	51	914
	22277.184896	42007.62704	0.0060567	13.4616	20.1931	118.7767	216.7197
D . 430	90094D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	2.12	-164.140	-311.391	-16.888	51	877
	22277.144525	41998.83134	0.0036101	12.9133	30.6911	354.7373	241.1373
D . 431	68081J	Transtage 5 debris					
	30-DEC-10	2.26	-175.270	-731.769	381.229	45	159
	22278.182106	41990.59374	0.0143811	9.0027	327.9386	286.4153	162.3397
D . 432	91046D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	2.37	-183.432	-252.010	-114.855	52	847
	22277.605567	41980.26992	0.0016806	12.6619	33.4797	93.1528	77.7256
D . 433	68081N	Transtage 5 debris					
	30-DEC-10	2.39	-185.373	-1103.219	732.473	45	81
	22278.106250	41980.58658	0.0289939	8.9437	327.7076	291.2018	187.7701
D . 434	94080A	Zongxing 6 (A)					
	17-DEC-10	2.49	-193.183	-589.884	203.518	49	751
	22265.994653	41971.72493	0.0099482	12.0799	40.7004	225.4209	315.2781
D . 435	82009F	Proton-K fourth stage (Block DM)					
	28-DEC-10	2.55	-197.467	-355.945	-38.990	52	892
	22276.480000	41965.19154	0.0039753	14.3695	353.8226	35.8799	84.4621
D . 436	74017F	Proton-K fourth stage (Block DM)					
	29-DEC-10	2.62	-202.956	-397.491	-8.421	51	898
	22277.427882	41959.61305	0.0046460	11.4925	329.7282	277.0876	77.4116
D . 437	06022D	Proton-K fourth stage (Block DM3)					
	29-DEC-10	2.64	-204.046	-428.080	19.989	51	230
	22277.507419	41962.48100	0.0051760	4.1197	69.2406	246.5789	147.9524
D . 438	81061F	Proton-K fourth stage (Block DM)					
	29-DEC-10	2.64	-204.624	-223.058	-186.190	50	923
	22277.114259	41959.72521	0.0005427	14.2784	351.5956	317.0402	212.9621
D . 439	68081G	LES 6 operational debris					
	26-DEC-10	2.74	-211.697	-698.232	274.837	52	601
	22274.701748	41953.60565	0.0117316	8.9935	327.7709	265.7320	338.7751
D . 440	83100F	Proton-K fourth stage (Block DM)					
	28-DEC-10	2.80	-216.814	-300.265	-133.363	51	912
	22276.857789	41948.09494	0.0021723	14.1237	359.1247	355.9573	313.1046
D . 441	97065C	IABS					
	28-DEC-10	2.84	-219.575	-312.477	-126.673	49	617
	22276.270752	41944.64949	0.0038295	10.9530	48.4477	347.9944	214.2408
D . 442	92017D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	2.94	-227.130	-323.864	-130.396	51	810
	22277.614387	41936.99128	0.0024165	12.4197	35.9050	273.2784	76.4945
D . 443	83016F	Proton-K fourth stage (Block DM)					
	29-DEC-10	2.97	-229.576	-288.542	-170.610	49	880
	22277.569618	41933.53677	0.0010416	14.2010	355.3197	163.1831	52.3857
D . 444	88036E	Proton-K fourth stage (Block DM)					
	28-DEC-10	3.04	-235.129	-328.245	-142.013	49	902
	22276.523414	41928.45613	0.0023980	13.5478	16.3626	22.1302	91.1696

D . 445	92074D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	3.13	-242.374	-331.532	-153.216	50	773
	22277.690012	41921.05620	0.0023235	12.1299	38.2207	345.1469	51.7065
D . 446	05049E	MSG-2 debris (SEVIRI Cooler Cover)					
	30-DEC-10	3.23	-249.822	-280.290	-219.355	35	152
	22278.643275	41915.29708	0.0010087	3.1831	87.5707	121.9309	116.7282
D . 447	85024D	Proton-K fourth stage (Block DM)					
	29-DEC-10	3.43	-265.423	-323.414	-207.432	50	910
	22277.495139	41897.64532	0.0013345	14.0422	4.4067	73.0844	88.4730
D . 448	95011D	Star 27 (Himawari-5 AKM)					
	25-DEC-10	3.53	-272.812	-1239.035	693.410	42	542
	22273.934201	41891.78971	0.0233516	11.3018	43.7018	215.8793	331.4698
D . 449	82093F	Proton-K fourth stage (Block DM)					
	29-DEC-10	3.53	-272.833	-297.566	-248.100	52	916
	22277.945382	41890.93082	0.0002412	14.0719	355.0889	116.8352	276.5034
D . 450	84090F	Proton-K fourth stage (Block DM)					
	28-DEC-10	3.57	-275.545	-345.906	-205.184	51	921
	22276.990729	41888.03730	0.0019233	14.0206	2.3378	1.9104	268.3526
D . 451	77092G	Proton-K fourth stage (Block DM)					
	29-DEC-10	3.63	-280.700	-326.197	-235.203	51	934
	22277.461806	41882.57346	0.0012694	13.4849	339.6314	9.0423	75.6117
D . 452	79015D	Proton-K fourth stage (Block DM)					
	29-DEC-10	3.84	-296.226	-333.830	-258.621	52	890
	22277.114884	41867.88669	0.0005471	13.8279	343.7088	150.7355	204.9313
D . 453	80104E	Proton-K fourth stage (Block DM)					
	30-DEC-10	3.85	-296.820	-428.407	-165.232	51	919
	22278.200903	41868.62486	0.0033229	14.1061	349.4763	29.4973	178.8122
D . 454	04042C	FengYun 2C AKM					
	30-DEC-10	3.85	-297.011	-396.261	-197.760	51	298
	22278.380810	41868.02193	0.0024934	4.7920	65.2612	192.2608	189.2062
D . 455	76023K	LES 8, LES 9 operational debris					
	29-DEC-10	3.85	-297.482	-314.831	-280.134	52	890
	22277.127940	41867.28737	0.0004160	13.9854	345.8279	298.2454	202.2616
D . 456	89053A	Olympus 1					
	29-DEC-10	3.95	-304.594	-371.061	-238.126	50	959
	22277.222674	41859.53228	0.0015551	13.0204	29.5195	200.0621	211.7301
D . 457	86038D	Proton-K fourth stage (Block DM)					
	30-DEC-10	3.96	-305.401	-391.651	-219.150	48	850
	22278.533796	41858.18699	0.0022262	13.8000	8.2799	16.7534	77.3375
D . 458	87073D	Proton-K fourth stage (Block DM)					
	25-DEC-10	4.00	-308.384	-383.827	-232.941	50	924
	22273.860347	41856.76061	0.0019547	13.5531	13.5794	354.6042	329.6050
D . 459	68081P	Transtage 5 debris					
	24-DEC-10	4.04	-311.614	-684.859	61.630	43	82
	22272.774039	41853.11896	0.0090369	8.8175	326.6066	270.4677	313.8136
D . 460	84028F	Proton-K fourth stage (Block DM)					
	27-DEC-10	4.15	-320.413	-405.589	-235.236	50	909
	22275.447211	41843.06312	0.0020643	14.0164	358.3601	268.3670	101.3232

D . 461	76107F	Proton-K fourth stage (Block DM)					
	29-DEC-10	4.27	-329.244	-375.470	-283.018	51	918
	22277.091493	41835.50590	0.0013386	13.0388	336.3847	18.2040	206.0707
D . 462	88108D	Proton-K fourth stage (Block DM)					
	30-DEC-10	4.47	-344.715	-405.488	-283.942	50	929
	22278.328947	41820.91583	0.0015203	13.3081	22.8430	34.3032	165.8668
D . 463	68081E	Titan IIC stage 3 (Transtage)					
	30-DEC-10	4.48	-345.479	-745.223	54.265	49	888
	22278.238009	41819.62664	0.0095069	8.8720	326.6958	261.7485	141.4141
D . 464	79007A	Scatha					
	30-DEC-10	4.52	-348.292	-7918.880	7222.296	51	929
	22278.306065	41816.51806	0.1801932	18.2410	358.6456	311.5102	135.6079
D . 465	68081A	OV2 5					
	26-DEC-10	4.62	-356.262	-702.254	-10.270	45	684
	22274.413750	41807.07256	0.0083574	8.8292	326.6848	267.8697	82.0269
D . 466	79007C	Scatha AKM					
	28-DEC-10	4.74	-364.940	-7845.702	7115.823	44	221
	22276.391157	41798.91357	0.1783739	18.1729	358.6881	311.2470	106.9767
D . 467	80060F	Proton-K fourth stage (Block DM)					
	28-DEC-10	4.80	-369.477	-442.447	-296.506	51	882
	22276.994225	41794.25312	0.0015921	13.9979	347.6753	119.1390	252.5795
D . 468	68081H	LES 6 operational debris					
	29-DEC-10	5.16	-397.475	-704.838	-90.112	45	404
	22277.054722	41768.13089	0.0079143	8.7895	326.1414	321.7827	208.5318
D . 469	68081L	Transtage 5 debris					
	30-DEC-10	5.54	-425.733	-719.245	-132.222	37	65
	22278.088785	41737.65651	0.0079099	8.7727	325.9822	292.2087	194.7428
D . 470	75100F	Aerojet SVM-5 (GOES 1 AKM)					
	30-DEC-10	5.97	-458.688	-1637.272	719.896	50	717
	22278.026123	41705.41795	0.0288880	12.7603	334.3515	271.4298	223.2843
D . 471	74039A	ATS 6					
	28-DEC-10	6.15	-472.058	-598.078	-346.039	51	943
	22276.968727	41691.98210	0.0026056	12.4724	332.9215	152.7679	247.0182
D . 472	68081K	Transtage 5 debris					
	28-DEC-10	6.38	-489.493	-704.083	-274.903	44	88
	22276.929433	41673.20292	0.0065835	8.9088	326.2652	348.2656	254.2224
D . 473	08066C	FengYun 2E AKM (FG-36 AKM)					
	28-DEC-10	6.55	-502.716	-661.866	-343.566	51	105
	22276.848611	41660.97713	0.0039185	1.1054	296.0107	328.5179	253.7883
D . 474	05049F	MSG-2 debris (entry baffle cover)					
	27-DEC-10	7.05	-540.071	-787.519	-292.622	40	124
	22275.328947	41623.91566	0.0056002	3.1471	87.8809	250.8055	232.8313
D . 475	70055A	Intelsat III F-8					
	30-DEC-10	7.16	-548.621	-1939.823	842.580	52	888
	22278.163032	41615.94150	0.0345584	6.4228	305.0848	133.3054	150.9803
D . 476	97029C	FengYun 2A AKM					
	25-DEC-10	9.38	-714.623	-1657.755	228.509	49	524
	22273.675336	41449.21094	0.0215854	10.2331	52.2779	273.1009	72.6082

D . 477	87040D	Proton-K fourth stage (Block DM)					
	29-DEC-10	9.88	-752.297	-815.525	-689.068	52	907
	22277.407569	41412.04134	0.0011623	13.4178	5.2435	159.1952	120.8158
D . 478	85007D	Proton-K fourth stage (Block DM)					
	28-DEC-10	9.90	-753.972	-819.656	-688.288	51	935
	22276.648553	41410.68213	0.0013448	13.1653	6.3332	133.6208	35.9724
D . 479	89052D	Proton-K fourth stage (Block DM)					
	28-DEC-10	10.04	-764.166	-892.185	-636.146	51	897
	22276.582454	41399.96625	0.0028302	12.5784	24.0682	108.7503	77.7623
D . 480	93072D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	10.41	-791.737	-867.146	-716.329	52	753
	22276.740255	41372.45823	0.0020326	11.4033	40.4928	0.5344	36.9004
D . 481	84063F	Proton-K fourth stage (Block DM)					
	29-DEC-10	10.86	-825.153	-893.894	-756.412	52	929
	22277.058102	41339.16385	0.0015762	13.2127	2.8036	85.0655	244.6712
D . 482	87100D	Proton-K fourth stage (Block DM)					
	28-DEC-10	11.26	-854.665	-918.598	-790.731	52	921
	22276.997685	41309.91454	0.0013445	13.2329	17.2244	93.7370	280.8754
D . 483	91014D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	11.38	-863.226	-968.247	-758.206	52	882
	22277.497674	41302.26853	0.0027254	12.8055	30.4990	340.2608	113.3989
D . 484	01015A	GSAT-1					
	27-DEC-10	12.78	-966.662	-1900.868	-32.455	52	493
	22275.746308	41197.45203	0.0226378	7.4781	58.8274	134.5150	55.8426
D . 485	94030D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	12.84	-971.333	-1153.910	-788.757	51	750
	22277.036620	41192.90875	0.0046680	11.1902	41.3377	23.4309	290.9729
D . 486	08003B	Proton-M fourth stage (Briz-M)					
	29-DEC-10	13.43	-1014.127	-1767.282	-260.972	52	129
	22277.013229	41150.24351	0.0180827	2.4655	72.9956	82.9216	332.5288
D . 487	10002B	Proton-M fourth stage (Briz-M)					
	28-DEC-10	13.56	-1024.311	-1823.173	-225.448	48	48
	22276.962824	41139.46120	0.0196928	0.6801	98.9912	86.2215	275.8655
D . 488	07058C	Proton-M fourth stage (Briz-M)					
	30-DEC-10	14.96	-1126.051	-2132.702	-119.401	52	153
	22278.340359	41038.13562	0.0239469	2.7218	71.9346	56.8376	212.6280
D . 489	97027B	Insat-IID					
	29-DEC-10	16.26	-1220.656	-2555.212	113.900	52	648
	22277.209572	40943.39283	0.0321697	10.6413	45.5934	321.3276	230.3201
D . 490	68050J	Titan IIC stage 3 (Transtage)					
	28-DEC-10	19.16	-1429.264	-2128.798	-729.731	52	879
	22276.885289	40735.10845	0.0174984	3.3693	297.2982	6.4122	241.8405
D . 491	66053J	Titan IIC stage 3 (Transtage)					
	28-DEC-10	23.21	-1715.563	-2375.366	-1055.759	51	897
	22276.461632	40448.61805	0.0169215	2.3048	290.8115	169.2738	28.6035
D . 492	68050H	OPS 9348 (IDSCS 27)					
	30-DEC-10	23.38	-1727.428	-2038.435	-1416.421	52	344
	22278.454954	40436.77892	0.0079489	3.9440	301.3008	132.3681	39.6533

D . 493	66053H	IDCSP 7					
	26-DEC-10	23.74	-1753.149	-2089.084	-1417.215	47	314
	22274.712778	40410.91818	0.0081410	2.1799	292.2336	170.5709	301.1653
D . 494	68050G	OPS 9347 (IDSCS 26)					
	29-DEC-10	24.34	-1794.989	-2044.728	-1545.250	50	338
	22277.807535	40369.09368	0.0062836	3.8272	301.3260	132.7919	273.2345
D . 495	66053G	IDCSP 6					
	29-DEC-10	24.78	-1825.311	-2093.223	-1557.400	49	320
	22277.839988	40338.65883	0.0064377	2.0477	292.3581	176.2398	252.3291
D . 496	67003H	IDCSP 15					
	29-DEC-10	25.04	-1843.806	-2135.570	-1552.042	48	394
	22277.960845	40320.41286	0.0070687	2.4989	295.6565	33.5001	212.2827
D . 497	68050F	OPS 9346 (IDSCS 25)					
	26-DEC-10	25.24	-1857.913	-2042.888	-1672.938	52	355
	22274.846678	40305.81264	0.0047140	3.6738	300.7047	134.8211	261.3091
D . 498	66053F	IDCSP 5					
	30-DEC-10	25.64	-1885.712	-2104.407	-1667.017	51	301
	22278.405405	40278.05687	0.0050188	1.8906	292.0227	184.0598	47.6262
D . 499	68050E	OPS 9345 (IDSCS 24)					
	29-DEC-10	25.93	-1905.642	-2058.424	-1752.860	52	349
	22277.984375	40258.29281	0.0036211	3.5965	300.8681	135.0404	208.7234
D . 500	67003G	IDCSP 14					
	28-DEC-10	26.05	-1913.871	-2146.831	-1680.912	50	358
	22276.887454	40249.92329	0.0055787	2.3419	295.2590	44.7494	239.3684
D . 501	66053E	IDCSP 4					
	30-DEC-10	26.32	-1932.493	-2100.500	-1764.485	49	268
	22278.119039	40231.77097	0.0039984	1.8214	292.6823	190.7556	151.8401
D . 502	68050D	OPS 9344 (IDSCS 23)					
	29-DEC-10	26.51	-1945.990	-2046.828	-1845.152	52	344
	22277.832975	40217.75549	0.0025503	3.4836	300.3526	137.6094	262.7739
D . 503	67003F	IDCSP 13					
	26-DEC-10	26.91	-1973.106	-2157.277	-1788.934	47	304
	22274.859398	40190.66896	0.0043938	2.2339	295.6789	57.7668	251.8781
D . 504	66053D	IDCSP 3					
	26-DEC-10	26.93	-1974.488	-2119.182	-1829.793	51	364
	22274.784595	40189.29587	0.0032000	1.7092	291.9841	204.7663	274.7530
D . 505	68050C	OPS 9343 (IDSCS 22)					
	26-DEC-10	26.94	-1975.280	-2050.749	-1899.811	50	374
	22274.832211	40188.54871	0.0018184	3.4265	300.2291	139.2813	265.8274
D . 506	68050B	OPS 9342 (IDSCS 21)					
	30-DEC-10	27.16	-1990.812	-2050.765	-1930.860	51	330
	22278.019664	40173.47509	0.0014533	3.3900	300.1785	139.7195	195.1235
D . 507	66053C	IDCSP 2					
	29-DEC-10	27.27	-1998.372	-2130.432	-1866.312	49	361
	22277.899850	40165.44453	0.0027753	1.6527	292.1493	213.4480	230.3244
D . 508	68050A	OPS 9341 (IDSCS 20)					
	26-DEC-10	27.29	-1999.511	-2054.758	-1944.265	51	479
	22274.823669	40164.54008	0.0012785	3.4057	300.5179	138.8335	269.1597

D . 509	66053B	IDCSP 1					
	24-DEC-10	27.49	-2013.250	-2129.520	-1896.981	50	517
	22272.764711	40150.88097	0.0025815	1.6275	292.2133	219.5112	284.2189
D . 510	67003E	IDCSP 12					
	25-DEC-10	27.61	-2021.327	-2222.204	-1820.449	49	323
	22273.778229	40142.45659	0.0038214	2.1222	295.1722	74.6915	281.6547
D . 511	66053A	GGTS 1					
	29-DEC-10	27.75	-2031.246	-2139.274	-1923.218	52	373
	22277.973611	40134.18778	0.0024869	1.6101	292.7414	235.5755	204.3183
D . 512	67003D	IDCSP 11					
	30-DEC-10	28.19	-2061.692	-2201.230	-1922.153	50	251
	22278.392558	40102.26591	0.0035108	2.0397	296.1867	90.4997	56.9127
D . 513	67003C	IDCSP 10					
	28-DEC-10	28.61	-2090.319	-2230.015	-1950.623	51	250
	22276.772882	40073.50844	0.0034751	1.9833	296.1767	103.3840	281.5965
D . 514	67003B	IDCSP 9					
	30-DEC-10	28.83	-2105.392	-2240.333	-1970.452	49	333
	22278.058194	40058.99796	0.0035252	1.9518	295.9764	110.9033	177.3008
D . 515	67003A	IDCSP 8					
	30-DEC-10	28.95	-2114.023	-2253.142	-1974.904	52	355
	22278.401481	40050.07568	0.0036169	1.9218	294.8729	114.3926	52.4329
D . 516	67066G	Titan IIIC stage 3 (Transtage)					
	28-DEC-10	31.08	-2258.740	-2572.157	-1945.323	51	923
	22276.583102	39905.51128	0.0074586	8.7182	321.0121	195.3456	13.9971
D . 517	67066F	DODGE 1					
	30-DEC-10	32.02	-2322.458	-2528.545	-2116.371	52	901
	22278.444051	39841.60045	0.0047863	8.6479	320.2402	218.0753	61.3413
D . 518	67066E	LES 5					
	26-DEC-10	32.92	-2383.481	-2595.355	-2171.608	51	914
	22274.830729	39780.60496	0.0050397	8.5369	319.6739	239.3312	284.9789
D . 519	67066D	IDCSP 19					
	29-DEC-10	33.66	-2433.057	-2654.538	-2211.576	50	555
	22277.955729	39731.06962	0.0053262	8.4509	319.1770	251.6107	236.3083
D . 520	67066C	IDCSP 18					
	28-DEC-10	34.24	-2472.038	-2708.105	-2235.971	51	534
	22276.435880	39691.99929	0.0058868	8.4238	318.8310	261.0837	64.5241
D . 521	67066B	IDCSP 17					
	26-DEC-10	34.64	-2498.791	-2749.938	-2247.644	52	383
	22274.939630	39665.29178	0.0063058	8.3408	318.5492	267.7615	244.3155
D . 522	67066A	IDCSP 16					
	29-DEC-10	34.85	-2512.819	-2770.968	-2254.671	52	585
	22277.435417	39651.96748	0.0064892	8.3522	318.4340	270.3538	63.2247
D . 523	74033F	SMS 1 AKM					
	28-DEC-10	57.29	-3943.685	-4971.346	-2916.023	52	570
	22276.492176	38220.76610	0.0264372	5.6449	284.0388	39.5984	12.0590
D . 524	70093A	OPS 5960 (DSP F1)					
	29-DEC-10	71.80	-4802.715	-9969.348	363.917	52	912
	22277.685741	37361.42882	0.1302762	7.3550	191.2929	349.4301	203.9356

D . 525	70093B	Titan IIIC stage 3 (Transtage)					
	28-DEC-10	71.85	-4805.795	-10005.100	393.509	52	940
	22276.260961	37358.38699	0.1309923	7.3414	190.8360	349.4389	357.7831
D . 526	10016B	Proton-M fourth stage (Briz-M)					
	29-DEC-10	72.63	-4850.680	-7581.439	-2119.920	30	30
	22277.437546	37313.51561	0.0730096	0.9115	75.5477	15.5051	113.1007

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), the following data are given:

L1.nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

L1 . 1	95054A	Luch 1-1					
	28-DEC-10	740	5.0	72.5	77.5	51	755
	22276.675174	42163.01290	0.0007383	10.2583	56.0915	326.0863	75.9164
L1 . 2	93039A	Galaxy IV					
	28-DEC-10	741	6.3	71.9	78.2	51	845
	22276.661667	42162.60506	0.0008620	10.7634	50.4535	177.4466	75.2175
L1 . 3	00036A	Cosmos-2371					
	29-DEC-10	742	10.0	70.1	80.1	51	535
	22277.671736	42164.49888	0.0003269	7.9491	59.5735	313.5317	79.6332
L1 . 4	90061A	Cosmos 2085					
	28-DEC-10	742	10.2	70.0	80.2	49	885
	22276.593924	42164.03465	0.0004240	13.0881	30.2011	327.2133	79.4247
L1 . 5	94087A	Raduga 32					
	29-DEC-10	742	10.3	69.9	80.2	50	800
	22277.660301	42163.49139	0.0003998	11.4161	45.9657	130.7170	70.2694
L1 . 6	88066A	Cosmos 1961					
	28-DEC-10	742	10.4	69.8	80.3	48	991
	22276.596782	42162.73848	0.0005077	13.4808	22.4301	326.6231	70.6166
L1 . 7	84022A	Cosmos 1540					
	29-DEC-10	742	10.8	69.6	80.5	51	793
	22277.535023	42167.86152	0.0005336	15.5468	4.3026	82.9360	73.8803
L1 . 8	81018A	Comstar 4					
	27-DEC-10	742	11.2	69.5	80.6	50	959
	22275.524248	42163.87543	0.0005948	14.3382	5.4017	310.1532	80.7398
L1 . 9	91010A	Cosmos 2133					
	28-DEC-10	742	11.2	69.5	80.7	51	954
	22276.635856	42162.85397	0.0007066	12.3100	36.1299	352.8318	70.2186
L1 . 10	98025A	Cosmos 2350					
	28-DEC-10	743	12.2	69.0	81.2	50	620
	22276.678889	42168.51231	0.0005770	8.6532	55.7232	348.0349	74.2229
L1 . 11	84031A	Cosmos 1546					
	28-DEC-10	743	12.7	68.7	81.4	50	805
	22276.527847	42160.88998	0.0020878	14.2935	5.4228	236.0189	78.3261
L1 . 12	90051A	Insat-ID					
	23-DEC-10	744	14.0	68.0	82.1	48	926
	22271.691366	42164.16080	0.0013545	11.0133	49.6498	39.1511	68.7317

L1 . 13	82044A	Cosmos 1366					
	28-DEC-10	744	14.6	67.7	82.4	51	809
	22276.535683	42166.98589	0.0008278	15.5670	358.7756	325.4395	68.9935
L1 . 14	94069A	Elektro 1					
	30-DEC-10	744	14.6	67.7	82.4	51	784
	22278.656458	42167.77095	0.0004067	11.8604	45.2105	109.5031	69.9257
L1 . 15	93062A	Raduga 30					
	30-DEC-10	746	17.6	66.3	83.8	51	890
	22278.647222	42162.49714	0.0002813	11.9740	41.9201	217.5109	69.9138
L1 . 16	83028A	Raduga 12					
	30-DEC-10	747	20.0	65.0	85.0	51	880
	22278.495799	42162.50723	0.0003887	14.5648	1.9893	325.4087	84.6555
L1 . 17	81102A	Raduga 10					
	28-DEC-10	748	20.9	64.6	85.4	51	787
	22276.506794	42171.22343	0.0005069	14.6342	353.7424	50.9992	74.4892
L1 . 18	79035A	Raduga 5					
	29-DEC-10	748	21.2	64.4	85.6	51	869
	22277.505764	42168.35922	0.0003507	14.4728	346.1107	1.0668	66.1930
L1 . 19	75123A	Raduga 1					
	28-DEC-10	748	21.6	64.2	85.8	50	819
	22276.445023	42157.95803	0.0006600	13.1787	336.0224	74.3657	79.0994
L1 . 20	84016A	Raduga 14					
	29-DEC-10	750	23.2	63.4	86.6	51	779
	22277.557014	42169.50636	0.0004356	14.3002	4.8373	355.0920	66.4187
L1 . 21	76092A	Raduga 2					
	30-DEC-10	750	23.3	63.3	86.7	51	867
	22278.432569	42169.55178	0.0024841	13.6323	338.3001	236.9703	83.5839
L1 . 22	77080A	SIRIO 1					
	28-DEC-10	750	1.5	74.4	75.9	51	708
	22276.514039	42164.03269	0.0008663	14.6193	356.6221	355.9915	74.6915
L1 . 23	06053D	FengYun 2D debris					
	28-DEC-10	750	23.8	63.1	86.9	39	89
	22276.721528	42164.56616	0.0078296	1.1153	85.0943	183.5643	87.2063
L1 . 24	88014A	STTW-2					
	30-DEC-10	753	27.1	61.4	88.6	51	947
	22278.647870	42167.98573	0.0005933	12.8908	34.1550	10.9351	61.9565
L1 . 25	79062A	Gorizont 2					
	28-DEC-10	757	30.6	59.7	90.3	52	901
	22276.449016	42162.01195	0.0002313	14.5922	348.2966	262.8440	89.8254
L1 . 26	08033D	Proton-K fourth stage (Block DM-2M)					
	28-DEC-10	758	31.7	59.1	90.8	51	132
	22276.504190	42174.00482	0.0034665	0.5414	336.9272	298.5760	81.2348
L1 . 27	83118F	Proton-K fourth stage (Block DM)					
	29-DEC-10	761	33.8	58.0	91.8	52	839
	22277.486215	42165.56305	0.0042132	14.2562	4.8307	191.6422	91.8744
L1 . 28	88063A	Insat-IC					
	29-DEC-10	766	38.2	55.8	94.0	51	810
	22277.524977	42163.85973	0.0006203	13.7023	20.9911	342.7466	94.1208

L1 . 29	97070A	Kupon 1					
	28-DEC-10	767	38.2	55.8	94.0	51	624
	22276.659942	42153.40108	0.0003326	10.8520	49.9761	211.2633	75.3413
L1 . 30	85102A	Cosmos 1700					
	29-DEC-10	768	39.2	55.3	94.5	50	890
	22277.604375	42161.68037	0.0004617	14.0059	11.6827	37.2444	56.2087
L1 . 31	90054A	Gorizont 20					
	28-DEC-10	775	44.0	52.8	96.8	50	996
	22276.658275	42157.42393	0.0005564	13.1657	30.0157	52.6102	56.0829
L1 . 32	84041A	Gorizont 9					
	28-DEC-10	776	44.5	52.6	97.1	50	798
	22276.541204	42150.46259	0.0002406	14.2310	6.0156	94.3882	74.3202
L1 . 33	87096A	Cosmos 1897					
	28-DEC-10	776	44.5	52.6	97.1	49	866
	22276.603137	42151.59339	0.0008256	13.6502	19.6136	331.1321	65.4917
L1 . 34	79087A	Ekran 4					
	25-DEC-10	777	44.7	52.5	97.2	49	811
	22273.476076	42150.99338	0.0010466	14.5566	347.6432	351.1078	82.3917
L1 . 35	90112A	Raduga 26					
	30-DEC-10	777	45.1	52.3	97.4	51	948
	22278.610845	42178.42705	0.0006624	12.9379	31.6333	316.6517	72.7390
L1 . 36	76092F	Proton-K fourth stage (Block DM)					
	29-DEC-10	777	45.1	52.3	97.4	51	849
	22277.405602	42172.14443	0.0017954	13.6002	338.4120	24.2997	94.7461
L1 . 37	76107A	Ekran 1					
	28-DEC-10	778	45.4	52.1	97.5	50	883
	22276.401852	42166.03601	0.0066900	13.6873	338.6845	15.3761	97.4722
L1 . 38	90011A	DFH-2A					
	30-DEC-10	780	46.4	51.6	98.0	51	976
	22278.606065	42151.32364	0.0005060	12.2044	41.9185	346.3328	84.7748
L1 . 39	80104A	Ekran 6					
	29-DEC-10	780	46.9	51.3	98.3	52	892
	22277.538171	42175.14506	0.0008697	14.6288	351.1352	299.3043	59.4336
L1 . 40	03060D	Proton-K fourth stage (Block DM-2M)					
	26-DEC-10	783	48.3	50.6	98.9	51	339
	22274.762072	42172.69611	0.0013672	6.4605	63.9871	72.8988	54.5575
L1 . 41	92074A	Ekran 20					
	28-DEC-10	785	49.2	50.2	99.4	50	900
	22276.697164	42161.41494	0.0003597	12.2975	38.7896	23.4204	50.7730
L1 . 42	84016F	Proton-K fourth stage (Block DM)					
	28-DEC-10	785	49.3	50.1	99.4	50	875
	22276.597535	42157.13559	0.0037805	14.2886	4.9290	67.0680	53.2764
L1 . 43	77092A	Ekran 2					
	27-DEC-10	785	49.3	50.1	99.4	50	862
	22275.406887	42160.64419	0.0032814	14.0436	341.4238	216.4752	98.9394
L1 . 44	79015A	Ekran 3					
	30-DEC-10	786	50.0	49.7	99.8	51	888
	22278.504248	42150.15700	0.0035036	14.3843	345.4696	209.7521	64.9127

L1 . 45	81061A	Ekran 7					
	28-DEC-10	788	50.9	49.3	100.2	51	900
	22276.433021	42167.60805	0.0003839	14.6486	352.6957	302.2409	99.9932
L1 . 46	94008A	Raduga 1-3					
	29-DEC-10	790	51.8	48.8	100.6	51	843
	22277.636285	42148.22446	0.0002757	11.8615	43.3587	306.3145	76.2770
L1 . 47	90116A	Raduga 1-2					
	28-DEC-10	790	51.9	48.8	100.7	51	979
	22276.577755	42178.84875	0.0006379	12.9541	31.8229	331.9368	86.8684
L1 . 48	83100A	Ekran 11					
	29-DEC-10	795	54.3	47.6	101.8	50	797
	22277.445671	42162.17704	0.0002183	14.4614	0.1462	289.6637	101.8975
L1 . 49	86010A	STTW-1					
	29-DEC-10	800	56.6	46.4	103.0	48	845
	22277.561134	42183.07608	0.0002570	13.8962	16.6742	13.6659	76.7842
L1 . 50	96058A	Ekspress 2					
	28-DEC-10	801	57.1	46.1	103.2	51	715
	22276.589919	42157.26869	0.0006710	10.9124	49.8529	218.8528	100.4662
L1 . 51	01045D	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	803	57.8	45.8	103.5	51	447
	22277.752199	42177.45773	0.0028328	6.9808	64.2043	234.3579	54.9482
L1 . 52	05010F	Proton-K fourth stage (Block DM-2M)					
	28-DEC-10	805	59.0	45.1	104.1	52	289
	22276.786829	42169.88044	0.0018848	5.3076	66.4921	124.6453	46.1263
L1 . 53	82093A	Ekran 9					
	28-DEC-10	809	60.3	44.5	104.7	50	801
	22276.510984	42183.11537	0.0023080	14.4699	356.4787	220.0708	75.5001
L1 . 54	89098A	Raduga 24					
	29-DEC-10	809	60.6	44.3	104.9	50	900
	22277.538981	42178.56874	0.0001305	13.4469	28.1065	338.8053	96.1971
L1 . 55	94012A	Raduga 31					
	30-DEC-10	810	60.9	44.2	105.0	51	777
	22278.723067	42165.73911	0.0005502	11.8358	43.2787	308.9348	43.8579
L1 . 56	00049A	Raduga 1-5					
	30-DEC-10	817	63.4	42.8	106.3	52	529
	22278.826690	42181.70857	0.0001540	7.8192	60.1390	293.7051	61.4447
L1 . 57	80016A	Raduga 6					
	26-DEC-10	822	65.4	41.8	107.2	51	811
	22274.581782	42157.02267	0.0001592	14.5242	348.5448	38.3420	44.1666
L1 . 58	07018A	Nigcomsat 1					
	28-DEC-10	824	66.4	41.3	107.7	51	187
	22276.803657	42176.38804	0.0003416	1.9661	74.5722	327.3703	47.5633
L1 . 59	74060A	Molniya 1-S					
	28-DEC-10	826	66.9	41.0	107.9	51	886
	22276.385440	42180.36193	0.0009865	12.2200	330.5652	76.1452	95.1932
L1 . 60	78039A	Yuri					
	25-DEC-10	828	67.6	40.7	108.3	49	834
	22273.565255	42151.15333	0.0013737	14.5130	347.1262	157.7476	49.7509

L1 . 61	86044A	Gorizont 12					
	25-DEC-10	834	69.9	39.5	109.4	50	852
	22273.567998	42185.67642	0.0000953	13.8864	13.8525	301.3837	75.4244
L1 . 62	79105A	Gorizont 3					
	28-DEC-10	835	70.0	39.4	109.5	51	831
	22276.563449	42150.10407	0.0010991	14.6010	349.4615	91.9418	49.8373
L1 . 63	88111A	STTW-3					
	28-DEC-10	846	73.6	37.6	111.2	51	1030
	22276.585139	42145.53720	0.0007073	12.2889	41.0269	356.9853	93.4257
L1 . 64	78073A	Raduga 4					
	29-DEC-10	846	73.7	37.5	111.2	51	875
	22277.575127	42159.05178	0.0009142	14.2859	343.8446	245.3607	38.7959
L1 . 65	75097A	Cosmos 775					
	29-DEC-10	863	78.5	35.0	113.5	49	891
	22277.355185	42154.65283	0.0014413	12.9329	334.0818	8.1359	108.5583
L1 . 66	89081A	Gorizont 19					
	28-DEC-10	864	78.9	34.8	113.7	50	985
	22276.558681	42142.76414	0.0000995	13.2231	26.6209	279.1177	88.5711
L1 . 67	99010A	Raduga 1-4					
	28-DEC-10	865	79.1	34.7	113.8	52	604
	22276.734745	42144.16125	0.0002392	10.1914	61.0669	132.8399	59.4480
L1 . 68	77071A	Raduga 3					
	29-DEC-10	866	79.5	34.5	114.0	51	879
	22277.466829	42188.07841	0.0007401	13.9916	340.8678	102.4600	75.0844
L1 . 69	81069A	Raduga 9					
	28-DEC-10	866	79.5	34.5	114.0	51	813
	22276.462222	42142.82097	0.0004781	14.6510	353.0939	351.1364	89.8737
L1 . 70	96058D	Proton-K fourth stage (Block DM-2M)					
	30-DEC-10	872	81.0	33.7	114.7	50	626
	22278.584201	42183.95030	0.0010598	11.4305	46.4203	320.8765	97.0986
L1 . 71	94002A	Gals 1					
	28-DEC-10	879	83.1	32.6	115.7	51	853
	22276.709502	42187.06053	0.0008586	10.9797	49.3605	54.7431	56.9404
L1 . 72	84078F	Proton-K fourth stage (Block DM)					
	29-DEC-10	890	85.3	31.5	116.8	50	813
	22277.617095	42147.46383	0.0023997	14.1918	7.3526	48.3249	47.4607
L1 . 73	01037D	Proton-K fourth stage (Block DM-2)					
	28-DEC-10	892	86.3	30.9	117.2	51	454
	22276.578484	42167.68740	0.0021429	6.1301	62.8389	285.3407	117.3063
L1 . 74	91087A	Raduga 28					
	30-DEC-10	900	88.3	29.9	118.1	49	941
	22278.739630	42166.30712	0.0005926	12.6903	35.5461	348.3563	30.1977
L1 . 75	89030A	Raduga 23					
	29-DEC-10	908	90.0	28.9	118.9	49	989
	22277.467581	42167.78385	0.0019803	13.3021	24.9046	38.3041	118.9103
L1 . 76	82031A	Insat-IA					
	29-DEC-10	916	91.8	28.0	119.8	49	472
	22277.429167	42144.54709	0.0022947	14.6092	356.2434	275.8637	103.7173

L1 . 77	74060F	Proton-K fourth stage (Block DM)					
	30-DEC-10	932	95.1	26.2	121.3	50	775
	22278.311100	42158.35847	0.0020738	12.2176	330.3882	43.8802	119.9168
L1 . 78	90061D	Proton-K fourth stage (Block DM-2)					
	27-DEC-10	941	96.9	25.2	122.2	49	865
	22275.509965	42180.82549	0.0032755	13.0646	30.2032	54.2765	111.0533
L1 . 79	09018A	Beidou DW 2 (Compass G2)					
	29-DEC-10	959	100.3	23.4	123.7	51	89
	22277.588391	42145.57557	0.0049598	0.5473	70.0323	157.1618	109.2302
L1 . 80	97021A	Zhongxing 6 (B)					
	28-DEC-10	984	104.7	21.0	125.7	51	695
	22276.846817	42171.05068	0.0007937	6.4035	63.9136	327.8844	21.7066
L1 . 81	86090D	Proton-K fourth stage (Block DM)					
	29-DEC-10	1007	108.4	19.0	127.4	49	903
	22277.718669	42162.73315	0.0011637	13.8344	15.5830	15.4364	18.8525
L1 . 82	91014A	Raduga 27					
	28-DEC-10	1025	111.0	17.6	128.6	50	963
	22276.765208	42171.60259	0.0004128	13.4312	32.8002	315.8862	20.1814
L1 . 83	84063A	Raduga 15					
	30-DEC-10	1032	112.0	17.0	129.0	51	808
	22278.425718	42145.49464	0.0005026	14.2698	5.9098	14.9176	113.9127
L1 . 84	77092H	Ekran 2 fragmentation debris					
	29-DEC-10	1049	114.3	15.7	130.0	49	558
	22277.584734	42183.75721	0.0007212	13.9792	341.1517	101.0115	32.8170
L1 . 85	96040B	Turksat 3					
	29-DEC-10	1049	114.3	15.7	130.1	52	709
	22277.879931	42169.66535	0.0001862	2.5456	72.6982	325.9621	17.2614
L1 . 86	03015F	Proton-K fourth stage (Block DM-2)					
	29-DEC-10	1076	117.8	13.8	131.6	50	372
	22277.631563	42138.03833	0.0012749	4.7201	65.9041	250.1133	100.2451
L1 . 87	83089B	Insat-IB					
	29-DEC-10	1078	118.1	13.6	131.7	47	880
	22277.425046	42171.59642	0.0005760	13.6997	20.3177	121.2973	129.6089
L1 . 88	01037A	Cosmos-2379					
	30-DEC-10	1098	120.5	12.3	132.7	52	477
	22278.552894	42151.31439	0.0000752	6.1761	62.7099	64.1868	124.6613
L1 . 89	95054D	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	1106	121.3	11.8	133.1	50	620
	22278.659225	42196.04922	0.0020822	10.2452	56.0904	301.6327	79.5256
L1 . 90	93013A	Raduga 29					
	25-DEC-10	1111	121.9	11.5	133.3	49	913
	22273.480602	42159.63917	0.0006186	12.2115	40.1656	321.2429	133.2402
L1 . 91	77108A	Meteosat 1					
	28-DEC-10	1127	123.6	10.5	134.0	47	891
	22276.587373	42142.08242	0.0019386	14.3634	345.4173	313.4187	36.8738
L1 . 92	88095A	Raduga 22					
	26-DEC-10	1134	124.3	10.0	134.3	50	1015
	22274.766991	42171.07115	0.0004973	13.4351	23.2308	27.8021	12.0193

L1 . 93	84035A	STW F-2					
	23-DEC-10	1141	125.0	9.6	134.6	48	789
	22271.576412	42196.40338	0.0010163	13.9415	10.7459	35.5356	71.3232
L1 . 94	95063D	Proton-K fourth stage (Block DM-2M)					
	29-DEC-10	1172	128.0	7.9	135.9	50	629
	22277.492234	42152.18361	0.0043850	11.8357	43.5218	29.2570	128.7151
L1 . 95	90102A	Gorizont 22					
	30-DEC-10	1317	138.8	1.2	139.9	49	969
	22278.516470	42137.36408	0.0003722	12.9602	31.1435	257.0581	106.3290
L1 . 96	74094A	Skynet 2B					
	28-DEC-10	1370	141.7	359.2	140.9	41	687
	22276.537211	42134.57081	0.0004888	13.2629	341.1201	3.0410	50.8485
L1 . 97	78035A	Intelsat IVA F-6					
	28-DEC-10	1431	144.4	357.3	141.7	43	831
	22276.442593	42190.51247	0.0002110	14.2937	6.0804	170.2726	109.9559
L1 . 98	93062D	Proton-K fourth stage (Block DM-2)					
	30-DEC-10	1578	149.0	353.8	142.8	52	662
	22278.719606	42192.83090	0.0011490	11.9484	41.8862	296.1147	43.6504
L1 . 99	85035B	Telecom 1B					
	25-DEC-10	1672	150.8	352.3	143.1	46	891
	22273.805613	42163.98924	0.0005399	13.9505	14.2757	290.4434	350.0220
L1 . 100	92088A	Cosmos 2224					
	26-DEC-10	1672	150.8	352.3	143.1	49	897
	22274.790208	42145.85951	0.0001680	11.5369	41.6194	200.3302	21.9714
L1 . 101	67026A	Intelsat II F-3					
	15-NOV-10	1700	153.5	351.3	144.8	37	418
	22233.718565	42171.25540	0.0022766	7.5813	314.1541	238.3670	0.4856

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), the following data are given:

L2.nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

L2 . 1	93058B	ACTS					
	29-DEC-10	900	1.1	254.2	255.3	52	868
	22277.163981	42164.81481	0.0010088	10.6680	51.0343	346.2182	254.4354
L2 . 2	88081A	Gstar 3					
	28-DEC-10	900	0.3	254.5	254.8	52	949
	22276.383854	42164.46888	0.0007820	14.9709	15.6031	354.9833	254.6398
L2 . 3	71009A	NATO IIB					
	28-DEC-10	902	0.9	254.2	255.1	52	861
	22276.938310	42164.29872	0.0005992	12.0455	329.7464	27.6793	254.7179
L2 . 4	69101A	Skynet 1A					
	28-DEC-10	910	0.8	254.3	255.1	52	777
	22276.923738	42163.83394	0.0021023	10.6419	326.1445	162.5605	256.4437
L2 . 5	78062A	GOES 3					
	30-DEC-10	911	8.1	250.7	258.8	52	1054
	22278.003889	42162.42454	0.0004683	14.5193	355.3588	9.4040	255.6378
L2 . 6	93073A	Solidaridad 1					
	29-DEC-10	911	8.2	250.7	258.9	52	854
	22277.184514	42162.86238	0.0002148	9.1905	56.5323	136.5255	252.5429
L2 . 7	70021A	NATO I					
	29-DEC-10	912	10.6	249.4	260.1	52	784
	22277.948449	42163.33414	0.0002711	11.0220	329.9536	40.7769	250.2858
L2 . 8	71095A	OPS 9431 (DSCS II F-1)					
	28-DEC-10	913	13.0	248.3	261.3	52	984
	22276.928530	42162.36232	0.0000560	12.3714	331.4206	84.6934	259.8972
L2 . 9	76023A	LES 8 (RTGPP)					
	29-DEC-10	913	14.8	247.4	262.2	52	1037
	22277.384109	42165.69173	0.0011041	11.5808	133.0426	340.3217	256.8668
L2 . 10	93077A	Telstar 4A					
	29-DEC-10	914	16.6	246.5	263.1	52	873
	22277.171435	42162.81893	0.0008198	11.5183	46.5820	336.7896	247.2916
L2 . 11	76023B	LES 9 (RTGPP)					
	29-DEC-10	920	5.0	252.5	257.5	52	1047
	22277.470544	42164.02484	0.0022485	11.5406	133.0624	347.7945	257.1383
L2 . 12	95049A	Telstar 402R					
	29-DEC-10	925	32.2	238.8	271.1	52	765
	22277.162963	42158.92511	0.0004355	6.6749	63.0353	233.5430	266.7121

L2 . 13	85076C	ASC 1						
	29-DEC-10	940	45.6	232.3	277.9	52	992	
	22277.095301	42154.25920	0.0007159	12.5432	38.6175	267.5057	266.7804	
L2 . 14	75100A	GOES 1						
	29-DEC-10	943	48.5	230.9	279.4	52	1014	
	22277.041366	42163.39244	0.0002910	14.1989	343.1403	302.4691	230.8376	
L2 . 15	82105A	Aurora I						
	29-DEC-10	950	0.7	254.4	255.1	52	1046	
	22277.095046	42164.40160	0.0006875	13.4036	26.1301	279.0990	254.3994	
L2 . 16	05041A	Galaxy 15						
	29-DEC-10	956	56.7	227.0	283.7	52	263	
	22277.502037	42150.61300	0.0001600	0.6916	78.2158	208.8291	261.5267	
L2 . 17	83041A	GOES 6						
	30-DEC-10	962	60.1	225.4	285.4	52	1046	
	22278.134005	42158.65524	0.0002861	13.9625	14.3857	347.7890	227.6795	
L2 . 18	95069A	Galaxy IIR						
	29-DEC-10	965	61.3	224.8	286.1	52	759	
	22277.135150	42154.80300	0.0003186	5.8127	65.2082	254.9420	278.9001	
L2 . 19	81049A	GOES 5						
	30-DEC-10	995	75.3	218.1	293.4	52	985	
	22278.094780	42148.05027	0.0001774	14.1904	9.3900	247.4708	236.8317	
L2 . 20	76004A	Hermes						
	28-DEC-10	1006	79.6	216.1	295.7	52	981	
	22276.971644	42144.52161	0.0012673	13.9004	340.1281	97.5959	253.1650	
L2 . 21	96055A	EchoStar 2						
	29-DEC-10	1032	88.3	212.0	300.3	52	704	
	22277.311192	42179.39222	0.0001761	2.2380	73.8979	240.9410	223.7305	
L2 . 22	68081D	LES 6						
	28-DEC-10	1040	90.7	210.9	301.6	52	914	
	22276.874745	42184.19924	0.0009701	9.4757	328.0104	289.3507	275.8200	
L2 . 23	87100A	Raduga 21						
	29-DEC-10	1099	105.9	203.8	309.8	52	1053	
	22277.109572	42140.14241	0.0003628	14.0598	19.8677	344.8616	242.9650	
L2 . 24	65028A	Intelsat I F-1						
	26-DEC-10	1124	111.2	201.4	312.6	33	353	
	22274.855752	42190.93137	0.0004316	5.0654	295.9554	113.6287	252.8671	
L2 . 25	97086A	HGS-1						
	28-DEC-10	1286	135.6	190.7	326.3	52	617	
	22276.438877	42151.27153	0.0046507	2.9548	96.2121	233.9811	200.6081	
L2 . 26	84078A	Gorizont 10						
	28-DEC-10	1306	137.7	189.8	327.6	48	928	
	22276.919745	42185.66463	0.0002839	14.1653	7.1008	308.1692	298.7124	
L2 . 27	90016A	Raduga 25						
	25-DEC-10	1323	139.5	189.1	328.6	49	1004	
	22273.906782	42167.99779	0.0003965	13.1411	28.3473	3.6086	327.6335	
L2 . 28	67094A	Intelsat II F-4						
	28-DEC-10	1326	139.8	189.0	328.8	52	674	
	22276.072743	42164.50392	0.0013915	7.8117	311.4647	183.7208	188.9257	

L2 . 29	82103A	Gorizont 6					
	29-DEC-10	1339	141.1	188.5	329.5	52	885
	22277.151933	42182.85858	0.0001793	14.4111	358.1923	21.6376	206.0143
L2 . 30	85070A	Raduga 16					
	30-DEC-10	1350	142.1	188.1	330.2	52	881
	22278.214363	42175.59444	0.0002274	14.0625	10.1626	315.0356	194.4362
L2 . 31	80081A	Raduga 7					
	26-DEC-10	1454	150.1	185.0	335.2	48	867
	22274.779815	42166.70748	0.0002165	14.4975	350.1449	174.7526	334.2630
L2 . 32	94038A	Cosmos 2282					
	29-DEC-10	1488	152.2	184.3	336.5	52	834
	22277.117674	42133.73888	0.0010578	10.7634	46.0911	318.1022	266.1633
L2 . 33	85016A	Cosmos 1629					
	26-DEC-10	1498	152.8	184.1	336.9	52	888
	22274.860498	42152.46121	0.0004259	14.1773	8.3451	37.0258	323.3751
L2 . 34	92059A	Cosmos 2209					
	28-DEC-10	1498	152.8	184.1	336.9	52	888
	22276.325880	42167.16981	0.0001301	12.5132	37.6373	232.7820	183.6263
L2 . 35	87091A	Cosmos 1894					
	30-DEC-10	1509	153.4	183.9	337.3	52	997
	22278.172940	42139.41126	0.0003467	13.6597	18.3686	271.7303	217.5733
L2 . 36	80004A	OPS 6393 (FLTSATCOM F3)					
	29-DEC-10	1546	155.3	183.3	338.6	52	965
	22277.133715	42142.21009	0.0024003	13.2360	355.8631	92.7326	210.5302
L2 . 37	89101A	Cosmos 2054					
	23-DEC-10	1665	159.9	182.1	342.0	46	980
	22271.886863	42169.60675	0.0004405	13.1617	27.8586	314.6940	336.2982
L2 . 38	94082A	Luch 1					
	28-DEC-10	1970	165.2	181.2	346.4	52	804
	22276.371123	42162.80519	0.0003779	10.9541	51.1466	3.0232	180.7962
L2 . 39	94060A	Cosmos 2291					
	27-DEC-10	2085	166.0	181.1	347.1	46	807
	22275.893461	42164.83556	0.0009246	11.5349	44.7674	336.6101	346.8097

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, the following data are given:

L3.nn	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{ly}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

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.

The longitude history of these objects is plotted in Figures 1 to 5.

L3 . 1	82044F	Proton-K fourth stage (Block DM)					
	23-DEC-10	2936	334.9	174.6	149.5	51	817
	22271.830104	42152.87694	0.0017836	15.5243	358.5590	28.7399	327.6049
L3 . 2	71095B	OPS 9432 (DSCS II F-2)					
	26-DEC-10	2936	335.2	174.5	149.7	52	877
	22274.583125	42187.47739	0.0006137	12.3077	331.6840	332.4070	26.7859
L3 . 3	97083A	Intelsat 804					
	28-DEC-10	2937	334.3	174.9	149.2	51	650
	22276.947928	42173.63234	0.0006825	5.4532	66.1453	247.2421	347.3759
L3 . 4	91054D	IUS stage 2					
	28-DEC-10	2937	334.2	175.0	149.2	43	746
	22276.720012	42138.35713	0.0034509	14.4019	31.5771	203.4453	35.1519
L3 . 5	91064A	Cosmos 2155					
	28-DEC-10	2940	333.2	175.5	148.7	52	947
	22276.296505	42149.86991	0.0004137	12.8417	33.8312	279.5881	190.3932
L3 . 6	90094A	Gorizont 21					
	26-DEC-10	3078	326.7	178.8	145.5	49	999
	22274.871146	42170.86811	0.0001905	13.0408	30.9945	127.1461	342.1659
L3 . 7	00029A	Gorizont 33					
	30-DEC-10	3094	326.4	179.0	145.4	50	533
	22278.024363	42184.44454	0.0002483	7.9833	58.7055	302.8027	311.4722
L3 . 8	97041A	Cosmos 2345					
	28-DEC-10	3109	326.1	179.1	145.2	51	656
	22276.714653	42199.42012	0.0161245	10.0837	52.5992	149.1109	59.1739
L3 . 9	94067D	Proton-K fourth stage (Block DM-2M)					
	23-DEC-10	3501	323.2	180.6	143.8	49	713
	22271.910486	42159.20899	0.0009217	12.2637	40.2235	327.6630	340.0868
L3 . 10	85007A	Gorizont 11					
	23-DEC-10	3575	323.0	180.7	143.8	51	904
	22271.876875	42149.45566	0.0004425	14.0602	8.9103	346.4706	320.9535

L3. 11	91079A	Cosmos 2172						
	27-DEC-10	3636	322.9	180.8	143.7	47	906	
	22275.868727	42162.13332	0.0006579	12.7193	34.9543	264.0040	345.9191	
L3. 12	94030A	Gorizont 30						
	27-DEC-10	3724	322.7	180.9	143.6	49	846	
	22275.861551	42159.62152	0.0000844	11.7619	43.3098	183.8095	356.9279	
L3. 13	87084A	Cosmos 1888						
	17-DEC-10	3775	322.7	180.9	143.6	47	1020	
	22265.849595	42163.57521	0.0002436	13.5906	18.9054	15.0568	346.7097	
L3. 14	95045A	Cosmos 2319						
	16-DEC-10	3802	322.6	180.9	143.6	49	769	
	22264.972303	42155.77551	0.0001456	11.0345	48.1793	174.9748	332.6137	
L3. 15	86027A	Cosmos 1738						
	23-DEC-10	3887	322.6	181.0	143.5	44	942	
	22271.818414	42163.11045	0.0016882	14.4687	13.2275	332.1174	346.3018	

Figure 1: Longitude history of the objects librating around the two stable points

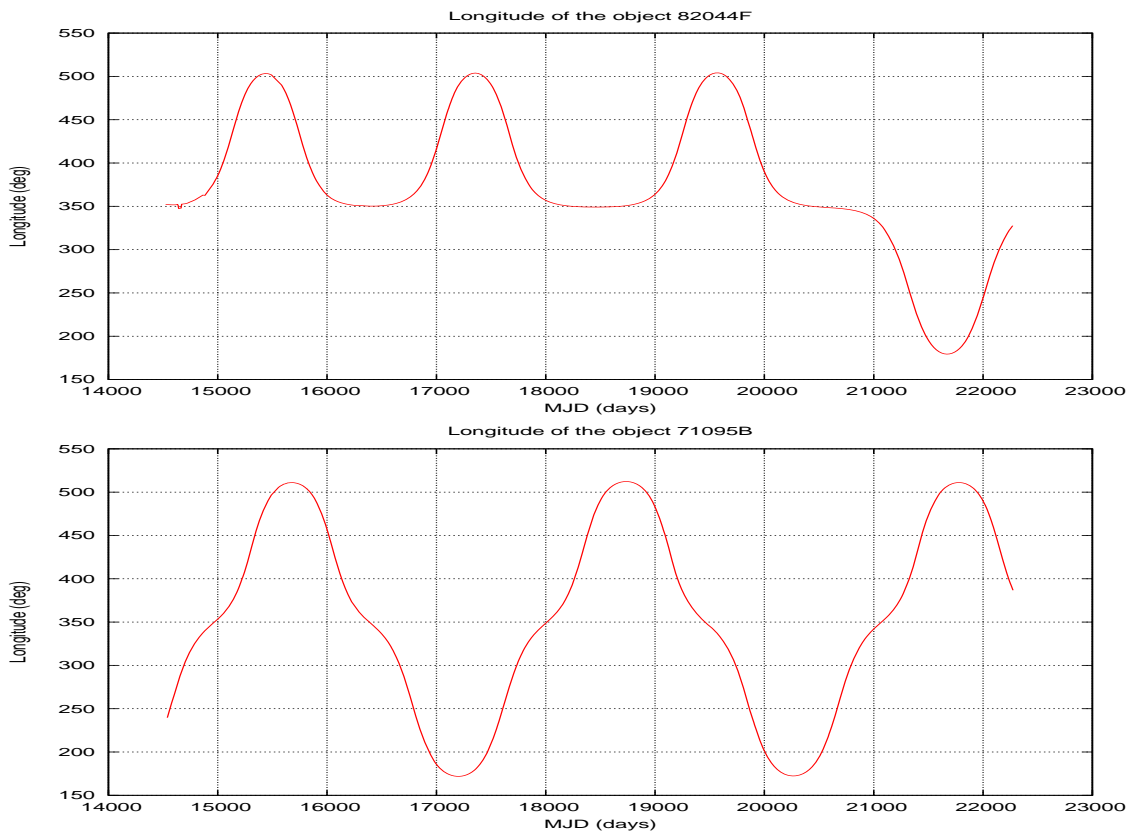


Figure 2: Longitude history of the objects librating around the two stable points

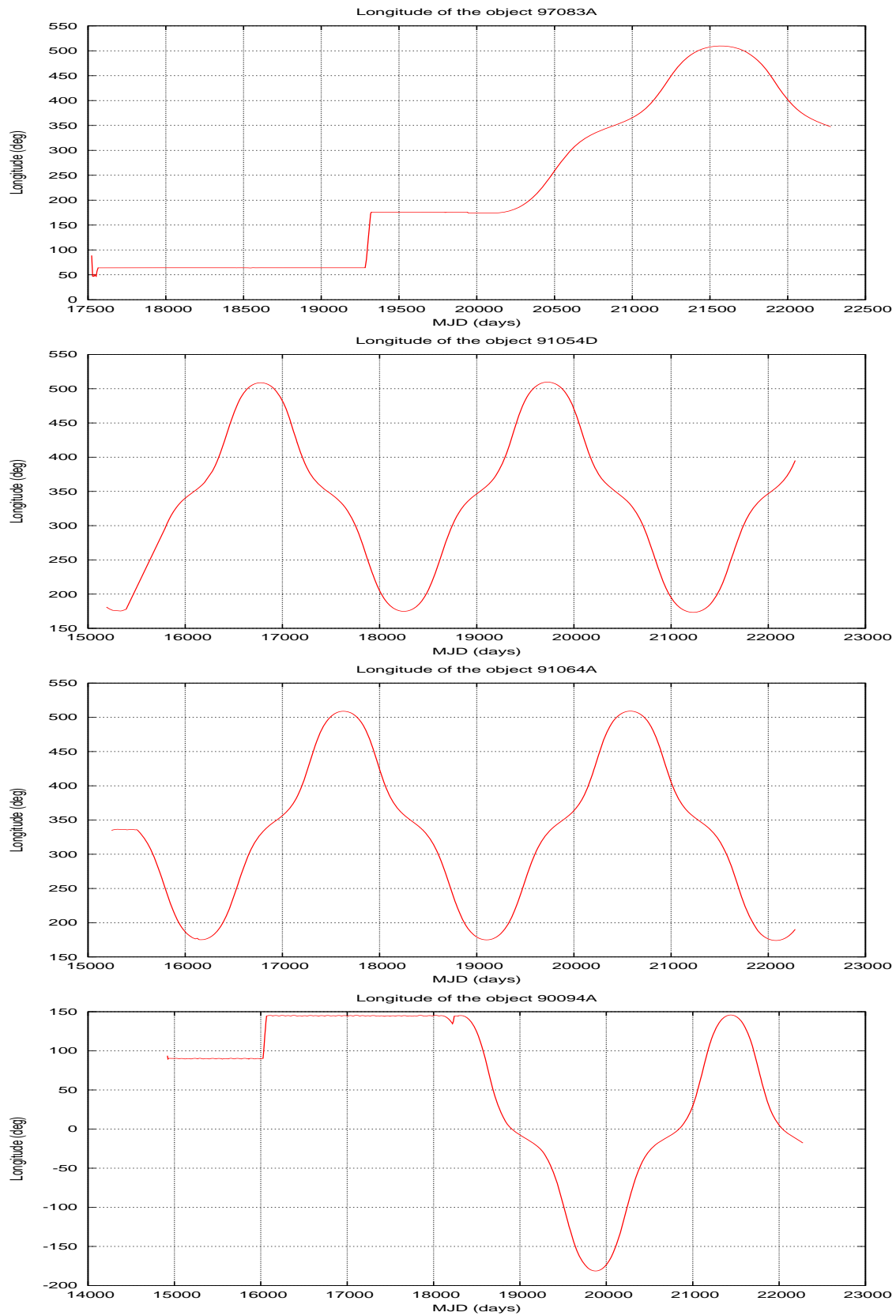


Figure 3: Longitude history of the objects librating around the two stable points

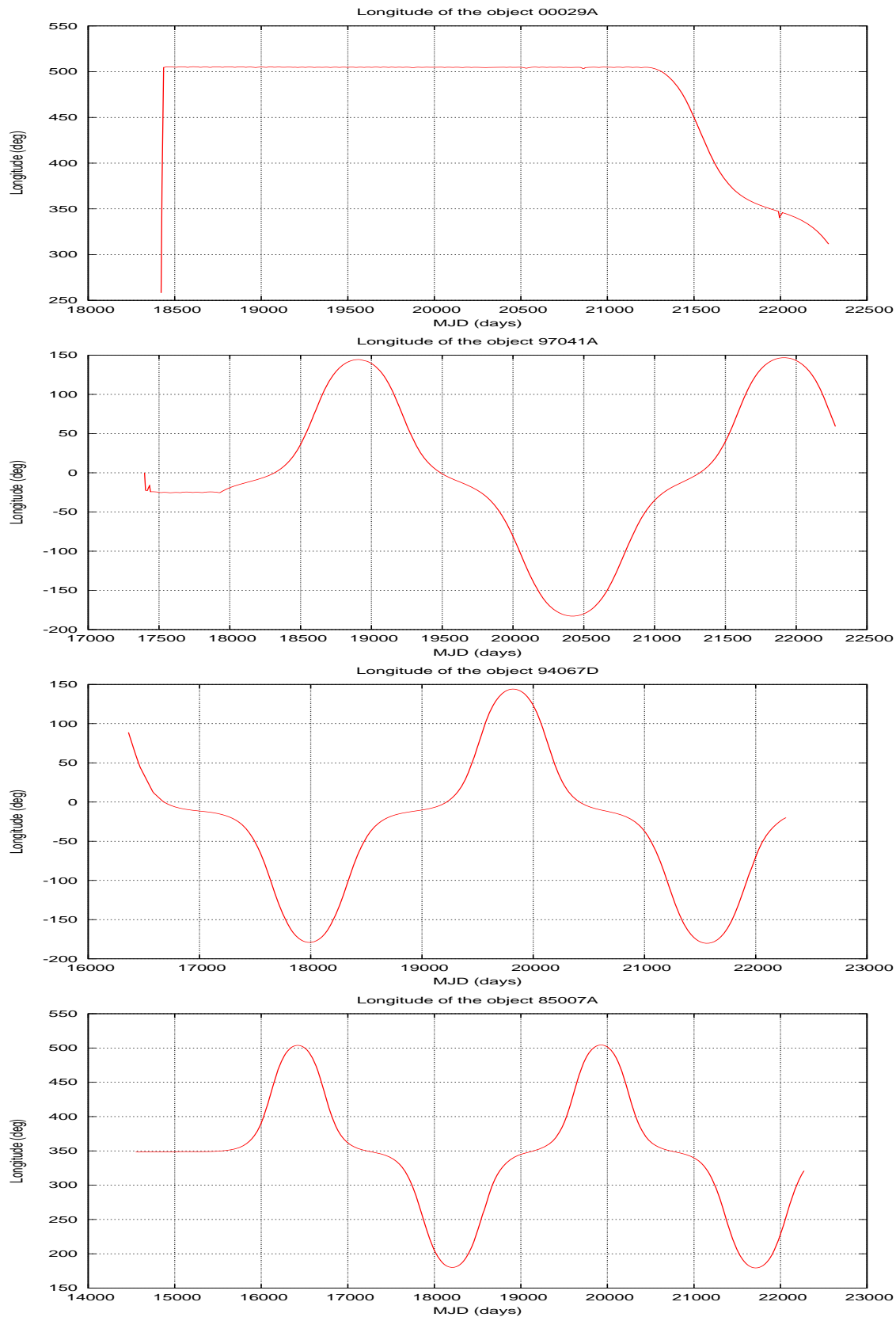


Figure 4: Longitude history of the objects librating around the two stable points

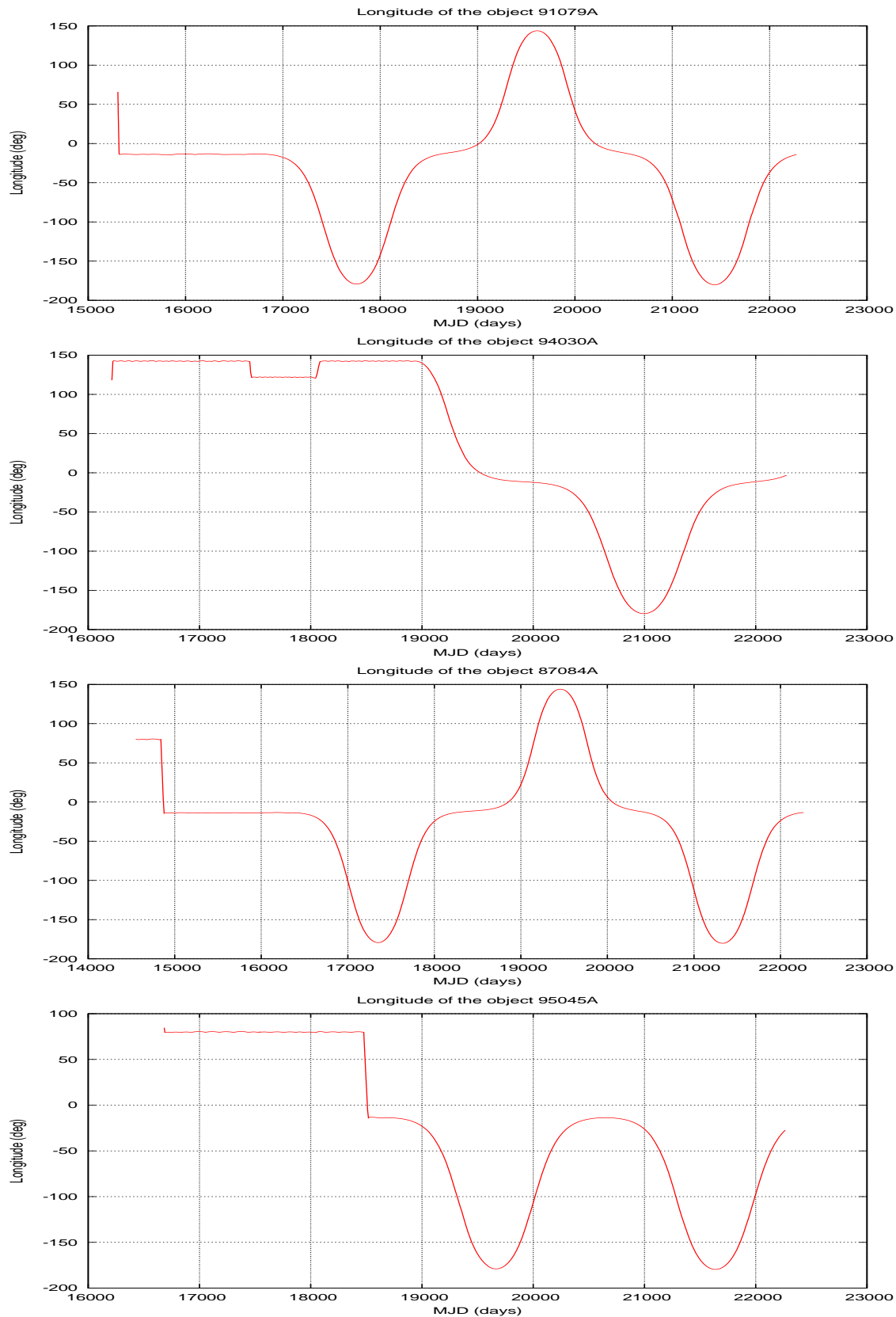
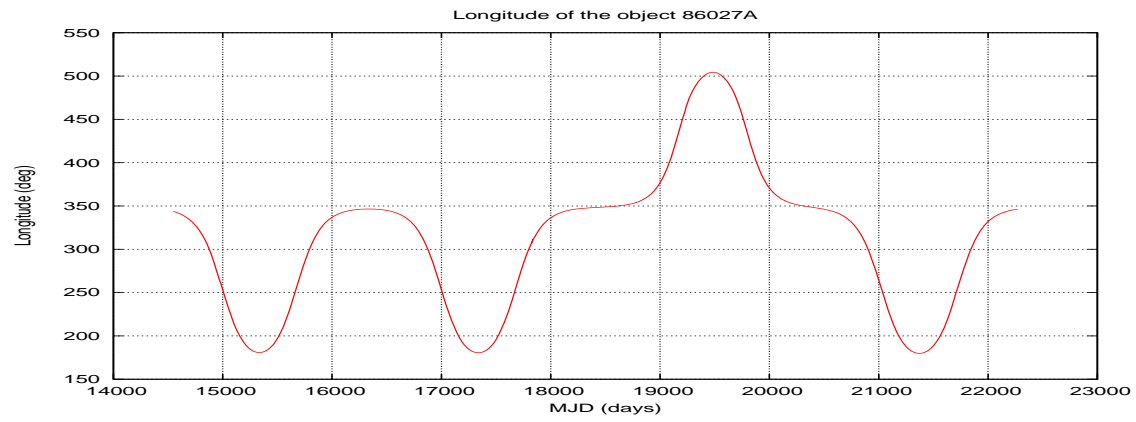


Figure 5: Longitude history of the objects librating around the two stable points



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 UI (unidentified objects), then according to their UI number.
9. Status U (uncontrolled objects), then according to the COSPAR identifier.
10. Status UU (uncontrolled uncatalogued objects), then according to the COSPAR identifier.

The objects listed in chapter 4.1, 4.2 and 4.4 to 4.8 were observed repeatedly by ground based telescopes. They were listed in the previous issues as 'Unidentified objects'. During the year 2010 most of them were correlated to a launch thanks to the excellent work of satellite analysts and amateur observers. But for the objects in chapter 4.8 their origin is not yet determined with the required reliability.

Orbits were established by processing of optical measurements and propagation to Jan 1, 2011 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 2010. 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:
 - Crimean Astrophysical Observatory (Nauchny and Simeiz facilities, Ukraine),
 - Ussuriysk Astrophysical Observatory of the Far East branch of the RAS (Gornotayozhnoye, Russia),
 - Terskol observatory of the Institute for Astronomy of the RAS (INASAN) (North Caucasus, Russia),

- Ulugbek Astronomical Observatory (Kitab facility, Uzbekistan),
- Observation facilities operated by "NPP "Proekt-tekhnika", JSC:
 - * Blagoveshchensk (Amur region, Russia),
 - * Milkovo (Kamchatka peninsula, Russia),
 - * Artem (Primorsky region, Russia),
- Andrushivka Observatory (Ukraine),
- National Astronomical Observatory (Abastumani, Georgia),
- National observatory of Bolivia (Tarija),
- Observation facility of the PGU (Tiraspol),
- Observatory of the Institute for Astrophysics of Tajikistan (Gissar),
- Odessa State University Astronomical Observatory (Mayaki, Ukraine),
- Central (Pulkovo) Astronomical Observatory of the RAS (St.Petersburg, Russia),
- Astronomical Institute of the University of Bern, partner of ISON, operating the Zimmerwald observatory (Switzerland) and, for space debris observation, the ESA 1 m telescope at the optical ground station (OGS), Izaña, Tenerife, Spain.
- Joint Italian-Russian telescope FIRST at Colleparado observation facility (Italy)

The following data are given:

TYPE	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

where:

- 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
- COSPAR - the COSPAR identification
- NAME - the object's common name
- UInnn - number of object (used by KIAM before identification)
- YYYYMMDD HHMMSS.SS - date and time of ascending node crossing, UTC
- Tosc - osculating period, min
- Hp - perigee height, km
- Ha - apogee height, km

- Longit - geodetic longitude at given ascending node, degrees East
- Incln - inclination, degrees
- RAAN - right ascension of ascending node, degrees
- AoP - argument of perigee, degrees
- SemiAxis - semimajor axis, km
- Eccentr - eccentricity
- M - mean anomaly, 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, the following data are given:

C1.nm	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

C1. 1	09047A	USA 207 (PAN)				
UI158	20110101	00:00:00.0	1436.0914	35775.8	35797.2	049.008
	00.0300	037.4363	246.8650	42164.624	0.0002531	224.8359
C1. 2	09017A	USA 204 (WGS F2)				
UI156	20110101	00:00:00.0	1436.0490	35782.6	35788.7	060.127
	00.0668	086.7371	275.5317	42163.794	0.0000726	158.0086
C1. 3	00001A	USA 148 (DSCS III B-08)(DSCS III F11)				
UI104	20110101	00:00:00.0	1436.2607	35784.1	35795.5	103.659
	02.1315	074.8413	205.6626	42167.937	0.0001346	283.2894
C1. 4	07046A	USA 195 (WGS F1)				
UI152	20110101	00:00:00.0	1436.1714	35785.6	35790.5	175.012
	00.0749	086.5918	244.3335	42166.191	0.0000579	304.2248
C1. 5	03008A	USA 167 (DSCS III A-3)(DSCS III F13)				
UI106	20110101	00:00:00.0	1435.8065	35766.4	35795.4	225.126
	00.0634	077.4480	104.1826	42159.047	0.0003438	143.7365
C1. 6	03040A	USA 170 (DSCS III B-6)(DSCS III F14)				
UI107	20110101	00:00:00.0	1436.5312	35753.3	35836.9	307.567
	00.1020	079.5012	006.9500	42173.233	0.0009914	321.1819
C1. 7	09068A	USA 211 (WGS F3)				
UI159	20110101	00:00:00.0	1436.1689	35783.7	35792.3	347.731
	00.0662	086.9242	330.1379	42166.141	0.0001030	030.8206
C1. 8	00065A	USA 153 (DSCS III B-11)(DSCS III F12)				
UI105	20110101	00:00:00.0	1436.2197	35782.5	35795.5	348.181
	01.4566	075.9393	254.5961	42167.135	0.0001549	117.7852

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

In the case where the satellite is only under longitude control, the following data are given:

Cn.nn	COSPAR	NAME				
UIInn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

C2. 1	84009A	OPS 0441 (VORTEX 4)				
UI026	20110101	00:00:00.0	1436.1577	31295.1	40280.5	001.233
	07.7950	357.0285	297.0499	42165.922	0.1065479	156.8306
C2. 2	96026A	USA 118 (MERCURY 2)				
UI073	20110101	00:00:00.0	1436.4698	33603.7	37984.1	010.898
	08.4056	014.1709	191.8158	42172.031	0.0519347	263.7759
C2. 3	97008A	USA 130 (DSP F18)				
UI125	20110101	00:00:00.0	1436.2414	35783.6	35795.3	020.462
	09.0996	057.3635	294.2601	42167.561	0.0001390	128.9743
C2. 4	93056A	USA 95 (UFO F2)				
UI069	20110101	00:00:00.0	1436.1991	35775.9	35801.3	029.243
	07.6627	043.4643	285.3593	42166.732	0.0003004	160.5366
C2. 5	02001A	USA 164 (Milstar-2 F3)				
UI063	20110101	00:00:00.0	1436.0867	35780.5	35792.3	029.985
	03.8717	048.3076	278.8685	42164.533	0.0001402	162.9496
C2. 6	89035A	USA 37 (VORTEX 6)				
UI018	20110101	00:00:00.0	1436.3585	31682.6	39900.8	043.843
	06.5301	014.4942	229.7210	42169.853	0.0974410	250.8292
C2. 7	09001A	USA 202				
UI155	20110101	00:00:00.0	1436.0968	35761.0	35812.2	044.045
	02.8315	000.4742	040.8677	42164.730	0.0006074	102.9043
C2. 8	93074A	USA 97 (DSCS III B-10)(DSCS III F8)				
UI066	20110101	00:00:00.0	1436.1209	35783.2	35790.9	056.773
	06.5357	063.9250	274.6140	42165.201	0.0000906	178.3787
C4. 9	06024A	USA 187 (MITE_x OSC satellite)				
UI149	20110101	00:00:00.0	1433.3743	35731.2	35735.4	065.041
	00.6604	246.8156	226.6008	42111.423	0.0000495	052.3021
C2. 10	01033A	USA 159 (DSP F21)				
UI001	20110101	00:00:00.0	1436.1490	35783.8	35791.5	069.488
	05.6051	061.6639	316.8395	42165.751	0.0000913	151.1290
C2. 11	03057A	USA 174 (UFO F11)				
UI117	20110101	00:00:00.0	1436.1309	35750.1	35824.4	071.529
	02.3852	015.0121	307.5465	42165.397	0.0008812	209.0420
C2. 12	99063A	USA 146 (UFO F10)				
UI065	20110101	00:00:00.0	1436.0710	35772.4	35799.8	072.546
	03.3814	045.4637	261.9478	42164.224	0.0003246	225.2552
C2. 13	85010B	USA 8 (MAGNUM 1)				
UI097	20110101	00:00:00.0	1436.0565	35567.7	36003.9	073.797
	16.9278	016.3363	263.8999	42163.941	0.0051721	253.1308

C2. 14	90097B	USA 67 (SDS 2 F2)(QUASAR 2)				
UI092	20110101	00:00:00.0	1436.0765	35267.9	36304.5	074.809
	14.6760	030.5292	158.0004	42164.333	0.0122920	346.9688
C2. 15	89090B	USA 48 (MAGNUM 2)				
UI136	20110101	00:00:00.0	1436.0448	34638.5	36932.6	089.352
	15.2375	046.0083	305.3649	42163.712	0.0272046	195.6264
C2. 16	03041A	USA 171 (Advanced ORION 3)				
UI118	20110101	00:00:00.0	1436.1618	35620.2	35955.5	093.581
	04.5518	113.1939	180.9892	42166.002	0.0039765	259.5425
C2. 17	86096A	USA 20 (FLTSATCOM F7)				
UI134	20110101	00:00:00.0	1436.1391	35673.6	35901.2	099.496
	12.7320	031.8200	060.7328	42165.558	0.0026992	107.3621
C2. 18	01020A	USA 158 (GeoLITE)				
UI114	20110101	00:00:00.0	1436.1606	35648.1	35927.6	100.052
	03.5342	034.5458	183.6230	42165.979	0.0033134	342.0065
C2. 19	10063A	USA 223 (NROL-32)				
UI160	20110101	00:00:00.0	1436.2417	35602.8	35976.1	100.909
	06.9033	267.0432	345.5370	42167.567	0.0044259	308.3246
C2. 20	04004A	USA 176 (DSP F22)				
UI108	20110101	00:00:00.0	1436.4650	35787.3	35800.3	102.281
	03.4172	065.0834	000.8921	42171.937	0.0001541	136.4262
C2. 21	95022A	USA 110 (Advanced ORION 1)				
UI128	20110101	00:00:00.0	1436.2364	35289.1	36289.5	125.997
	09.6079	071.7691	009.4872	42167.462	0.0118625	145.1027
C2. 22	95038A	USA 113 (DSCS III B-07)(DSCS III F9)				
UI115	20110101	00:00:00.0	1436.2618	35777.9	35801.7	149.804
	06.1961	064.5530	243.7938	42167.960	0.0002823	301.5614
C2. 23	01009A	USA 157 (Milstar-2 F2)				
UI112	20110101	00:00:00.0	1436.2447	35780.7	35798.3	152.144
	04.4841	051.4179	229.2543	42167.625	0.0002086	331.5868
C2. 24	92037A	USA 82 (DSCS III B-12)(DSCS III F6)				
UI123	20110101	00:00:00.0	1434.1870	35735.1	35763.3	161.466
	07.9057	060.3931	238.1262	42127.341	0.0003336	323.3366
C2. 25	98016A	USA 138 (UFO F8)				
UI111	20110101	00:00:00.0	1436.1616	35773.3	35802.5	171.327
	04.0755	050.0503	225.3546	42165.999	0.0003464	356.0378
C2. 26	95003A	USA 108 (UFO F4)				
UI121	20110101	00:00:00.0	1436.1821	35773.4	35803.1	182.447
	06.3148	045.4121	193.5451	42166.399	0.0003521	043.6200
C2. 27	00024A	USA 149 (DSP F20)				
UI004	20110101	00:00:00.0	1436.1516	35783.1	35792.3	194.436
	06.6211	059.5162	199.5323	42165.802	0.0001091	035.5277
C2. 28	95060A	USA 115 (Milstar DFS-2)				
UI124	20110101	00:00:00.0	1435.9888	35778.0	35790.9	209.894
	08.7710	056.5268	200.7467	42162.616	0.0001531	052.7865
C2. 29	89046A	USA 39 (DSP F14)				
UI150	20110101	00:00:00.0	1435.9895	35782.0	35787.0	215.375
	12.5185	032.2924	284.5259	42162.630	0.0000594	358.7235

C2. 30	01046A	USA 162 (SDS 3 F3)					
UI151	20110101	00:00:00.0	1435.7339	35763.0	35796.0	215.856	
	04.4951	089.6494	201.7214	42157.627	0.0003918	024.6788	
C2. 31	97065A	USA 134 (DSCS III B-13)(DSCS III F10)					
UI110	20110101	00:00:00.0	1435.9897	35781.8	35787.2	229.975	
	04.5731	067.9041	191.4169	42162.634	0.0000641	070.8244	
C2. 32	95057A	USA 114 (UFO F6)					
UI119	20110101	00:00:00.0	1436.1094	35782.0	35791.7	254.765	
	05.6498	045.5357	139.3046	42164.977	0.0001153	170.0821	
C2. 33	95027A	USA 111 (UFO F5)					
UI122	20110101	00:00:00.0	1436.2081	35784.2	35793.3	259.530	
	06.6836	045.5904	000.3012	42166.907	0.0001085	313.7659	
C2. 34	03012A	USA 169 (Milstar-2 F4)					
UI109	20110101	00:00:00.0	1436.2383	35783.2	35795.5	292.427	
	02.8097	077.9633	231.3132	42167.499	0.0001463	083.2586	
C2. 35	94084A	USA 107 (DSP F17)					
UI131	20110101	00:00:00.0	1436.1945	35771.9	35805.1	310.258	
	10.8999	049.9442	315.6599	42166.643	0.0003929	044.7806	
C2. 36	91080B	USA 75 (DSP F16)					
UI133	20110101	00:00:00.0	1436.7507	35792.1	35806.7	314.950	
	12.4914	039.7280	291.7531	42177.528	0.0001727	083.6015	
C2. 37	94009A	USA 99 (Milstar DFS-1)					
UI142	20110101	00:00:00.0	1436.4635	35785.1	35802.4	321.000	
	07.5058	109.0491	272.6868	42171.907	0.0002047	039.3127	
C2. 38	94054A	USA 105 (MERCURY 1)					
UI008	20110101	00:00:00.0	1436.2651	35604.2	35975.6	334.588	
	07.0790	059.3511	223.6790	42168.023	0.0044044	151.3644	
C2. 39	96042A	USA 127 (UFO F7)					
UI116	20110101	00:00:00.0	1436.2062	35779.3	35798.2	337.272	
	05.1863	045.6104	279.8532	42166.872	0.0002233	111.9383	
C2. 40	89077A	USA 46 (FLTSATCOM F8)					
UI130	20110101	00:00:00.0	1436.1699	35770.3	35805.7	344.624	
	10.3050	038.7760	308.2541	42166.160	0.0004197	097.7110	
C2. 41	98029A	USA 139 (Advanced ORION 2)					
UI074	20110101	00:00:00.0	1436.1838	35658.7	35917.9	345.386	
	08.3540	009.6603	253.1893	42166.432	0.0030733	182.3510	
C2. 42	00080A	USA 155 (SDS 3 F2)					
UI007	20110101	00:00:00.0	1436.2012	35780.8	35796.5	349.896	
	04.2513	049.4517	133.1772	42166.773	0.0001864	267.4363	

4.3 Objects in a drift orbit

In the case where the object is in a drift orbit, the following data are given:

Dn.nn	COSPAR	NAME				
UInnn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

D1. 1	92006C	IABS				
UI132	20110101	00:00:00.0	1299.8832	30515.5	35637.2	139.490
	10.2596	022.3191	278.8941	39454.488	0.0649073	313.9155
D1. 2	10063B	Delta 4 second stage				
UI161	20110101	00:00:00.0	1384.1936	33853.7	35675.1	266.217
	06.9389	266.7394	140.0241	41142.568	0.0221350	324.9962
D1. 3	06024C	USA 189 (NRL Upper Stage/Satellite)				
UI140	20110101	00:00:00.0	1384.4770	34761.1	34779.0	050.145
	03.7751	068.5483	003.7864	41148.183	0.0002164	081.0168
D1. 4	69036B	Atlas SLV-3A stage 2 (Agena D)				
UI012	20110101	00:00:00.0	1386.5530	30802.5	38819.8	305.256
	04.5898	109.2347	058.4836	41189.308	0.0973225	257.4183
D1. 5	77038C	Atlas SLV-3A stage 2 (Agena D)				
UI082	20110101	00:00:00.0	1407.1788	29045.0	41392.3	045.455
	10.6583	006.4725	036.7312	41596.779	0.1484158	114.5834
D1. 6	72101B	Atlas SLV-3A stage 2 (Agena D)				
UI059	20110101	00:00:00.0	1407.4069	29882.8	40563.5	161.413
	19.1822	330.3071	336.9879	41601.275	0.1283707	314.9323
D1. 7	93046C	IABS				
UI028	20110101	00:00:00.0	1410.0986	34917.4	35635.0	148.993
	12.5648	033.5248	337.6664	41654.300	0.0086139	241.5585
D1. 8	75055B	Atlas SLV-3A stage 2 (Agena D)				
UI103	20110101	00:00:00.0	1410.5077	29765.2	40803.2	050.566
	20.1425	335.6709	304.2404	41662.356	0.1324696	222.1284
D1. 9	68063B	Atlas SLV-3A stage 2 (Agena D)				
UI055	20110101	00:00:00.0	1414.9825	30799.0	39945.6	339.870
	14.4026	342.9116	087.1598	41750.425	0.1095383	023.8644
D1. 10	70069B	Atlas SLV-3A stage 2 (Agena D)				
UI145	20110101	00:00:00.0	1415.9470	30063.5	40719.0	171.640
	16.1712	282.3625	318.3136	41769.394	0.1275519	027.0311
D1. 11	92037C	IABS				
UI085	20110101	00:00:00.0	1416.7253	35303.9	35509.2	194.596
	12.8851	029.4981	287.4685	41784.699	0.0024558	341.1406
D1. 12	81025C	Titan IIIC stage 3 (Transtage)				
UI040	20110101	00:00:00.0	1421.1560	35287.5	35699.8	341.718
	14.0357	356.5630	160.4723	41871.773	0.0049235	285.9248
D1. 13	89046D	IUS stage 2				
UI080	20110101	00:00:00.0	1421.6480	35313.8	35692.8	146.341
	12.2886	031.8018	221.7938	41881.437	0.0045258	354.7343

D1. 14	91080D	IUS stage 2				
UI078	20110101	00:00:00.0	1421.8431	35423.6	35590.7	286.009
	12.3319	039.2113	206.3107	41885.269	0.0019953	144.0144
D1. 15	82019B	Titan IIIC stage 3 (Transtage)				
UI039	20110101	00:00:00.0	1422.0979	35442.7	35581.6	039.591
	14.3724	359.9474	347.9084	41890.271	0.0016573	153.2272
D1. 16	95038C	IABS				
UI022	20110101	00:00:00.0	1422.1275	35455.5	35569.9	333.479
	12.0065	041.8906	166.8966	41890.853	0.0013662	225.1963
D1. 17	89069D	Titan 34D stage 3 (Transtage)				
UI088	20110101	00:00:00.0	1422.3952	35241.9	35794.0	311.443
	13.3772	021.9928	194.6680	41896.110	0.0065889	195.0327
D1. 18	87097B	Titan 34D stage 3 (Transtage)				
UI029	20110101	00:00:00.0	1422.4195	35498.1	35538.7	108.165
	12.2717	024.1232	087.3551	41896.586	0.0004845	098.6672
D1. 19	94084D	IUS stage 2				
UI019	20110101	00:00:00.0	1423.2808	35510.6	35560.1	011.355
	10.7823	049.5907	336.2219	41913.497	0.0005905	086.2296
D1. 20	00065C	IABS				
UI011	20110101	00:00:00.0	1423.2908	35313.3	35757.8	179.562
	09.0289	056.2182	127.6448	41913.695	0.0053025	098.3462
D1. 21	00001C	IABS				
UI015	20110101	00:00:00.0	1423.2962	35466.4	35604.9	000.497
	09.5242	054.9782	205.8149	41913.801	0.0016526	200.1890
D1. 22	84129B	Titan 34D stage 3 (Transtage)				
UI032	20110101	00:00:00.0	1423.4820	35515.9	35562.7	046.822
	14.6165	013.7610	071.7686	41917.449	0.0005590	062.6894
D1. 23	84037B	Titan 34D stage 3 (Transtage)				
UI095	20110101	00:00:00.0	1423.5748	35424.2	35658.1	335.491
	14.2198	007.1950	166.1519	41919.269	0.0027893	262.9799
D1. 24	03008C	IABS				
UI006	20110101	00:00:00.0	1424.0613	35545.8	35555.6	286.639
	07.0493	062.2537	354.0647	41928.820	0.0001168	333.2139
D1. 25	85092E	IUS stage 2				
UI033	20110101	00:00:00.0	1424.6525	35311.1	35813.5	317.937
	14.6144	012.4073	023.7183	41940.423	0.0059900	022.6108
D1. 26	03041B	Titan IVB stage 3 (Centaur)				
UI072	20110101	00:00:00.0	1427.7832	35460.4	35787.0	272.207
	04.8289	131.2376	282.2699	42001.845	0.0038881	319.8213
D1. 27	85010D	IUS stage 2				
UI047	20110101	00:00:00.0	1428.4975	35538.9	35736.6	325.418
	16.9860	017.2749	131.9493	42015.852	0.0023527	276.8087
D1. 28	03040C	IABS				
UI002	20110101	00:00:00.0	1429.3730	35573.6	35736.2	106.943
	06.6278	062.9737	161.1209	42033.016	0.0019342	343.7537
D1. 29	72010B	Titan IIIC stage 3 (Transtage)				
UI038	20110101	00:00:00.0	1430.2861	35401.1	35944.4	056.509
	10.3105	324.1721	358.8813	42050.916	0.0064596	194.3770

D1. 30	03012B	Titan IVB stage 3 (Centaur)				
UI064	20110101	00:00:00.0	1431.4534	35613.1	35778.2	064.233
	03.6282	050.0054	157.3317	42073.792	0.0019612	317.5088
D1. 31	94009B	Titan IVA stage 3 (Centaur)				
UI014	20110101	00:00:00.0	1431.6499	35658.8	35740.2	194.572
	07.4133	097.6394	067.9433	42077.643	0.0009665	129.8581
D1. 32	95060B	Titan IVA stage 3 (Centaur)				
UI016	20110101	00:00:00.0	1431.7452	35566.9	35835.8	181.322
	09.9184	054.1828	059.4769	42079.510	0.0031953	168.8216
D1. 33	95022B	Titan IVA stage 3 (Centaur)				
UI021	20110101	00:00:00.0	1431.8913	35658.6	35749.9	075.195
	11.4375	075.8029	208.9846	42082.372	0.0010842	250.7955
D1. 34	77007D	OPS 3151 debris (Telescope aperture suncover)				
UI100	20110101	00:00:00.0	1432.0028	34492.2	36920.7	008.923
	13.5143	335.6470	337.7462	42084.557	0.0288527	154.8394
D1. 35	75118C	Titan IIIC stage 3 (Transtage)				
UI050	20110101	00:00:00.0	1432.0155	35641.2	35772.2	076.914
	12.8311	333.9613	034.2290	42084.806	0.0015565	169.5570
D1. 36	76059C	Titan IIIC stage 3 (Transtage)				
UI054	20110101	00:00:00.0	1432.2981	35659.1	35765.3	172.828
	13.1635	335.5061	072.1542	42090.342	0.0012617	226.2464
D1. 37	75118A	OPS 3165 (DSP F5)				
UI052	20110101	00:00:00.0	1433.0277	35623.8	35829.2	276.319
	12.8685	333.8999	215.7834	42104.636	0.0024381	186.7203
D1. 38	01009B	Titan IVB stage 3 (Centaur)				
UI003	20110101	00:00:00.0	1433.1983	35660.6	35799.1	227.220
	06.3003	056.4215	346.6679	42107.977	0.0016452	284.7880
D1. 39	78038A	OPS 8790 (AQUACADE 4)				
UI091	20110101	00:00:00.0	1433.4069	35683.0	35784.9	144.365
	10.8599	347.3769	170.1043	42112.061	0.0012099	087.5432
D1. 40	69036A	OPS 3148 (CANYON 2)				
UI070	20110101	00:00:00.0	1433.9466	31772.4	39716.6	086.927
	02.4290	134.4000	350.4994	42122.632	0.0942989	060.5972
D1. 41	71039B	Titan IIIC stage 3 (Transtage)				
UI093	20110101	00:00:00.0	1434.0184	35596.9	35894.9	022.502
	09.7194	321.2088	328.7960	42124.039	0.0035367	192.6763
D1. 42	80060G	EKRAN 5 debris				
UI137	20110101	00:00:00.0	1435.1177	35713.5	35821.4	189.822
	14.3932	347.1364	184.6997	42145.564	0.0012803	118.3324
D1. 43	79086A	OPS 1948 (VORTEX 2) (CHALET 2)				
UI023	20110101	00:00:00.0	1437.7211	30659.8	40977.0	106.712
	06.7425	355.4048	344.5857	42196.517	0.1222518	223.2187
D1. 44	02001B	Titan IVB stage 3 (Centaur)				
UI013	20110101	00:00:00.0	1437.9198	35591.2	36053.4	057.053
	02.4814	029.2811	029.9973	42200.405	0.0054765	098.0810
D1. 45	78058A	OPS 9454 (VORTEX 1) (CHALET 1)				
UI009	20110101	00:00:00.0	1438.1637	29877.6	41776.4	159.753
	04.4433	037.0569	296.2605	42205.177	0.1409638	272.4701

D1. 46	90095D	IUS stage 2					
UI081	20110101	00:00:00.0	1441.0431	35580.4	36186.3	350.268	
	12.8825	037.2608	300.8173	42261.493	0.0071676	111.4611	
D1. 47	01033D	IUS stage 2					
UI061	20110101	00:00:00.0	1441.5942	35865.3	35923.0	300.603	
	05.6354	061.7045	249.4909	42272.266	0.0006821	088.1928	
D1. 48	73040A	OPS 6157 (DSP F4)					
UI048	20110101	00:00:00.0	1442.5480	35896.6	35929.0	179.157	
	11.9247	327.2671	279.7588	42290.909	0.0003834	030.8441	
D1. 49	04004D	IUS stage 2					
UI062	20110101	00:00:00.0	1442.5562	35891.5	35934.3	155.698	
	03.4445	065.4858	257.3398	42291.070	0.0005059	292.1181	
D1. 50	72010A	OPS 1570 (DSP F3)					
UI144	20110101	00:00:00.0	1443.2166	35901.3	35950.4	184.175	
	10.8039	325.6602	250.3878	42303.977	0.0005810	066.6440	
D1. 51	00024E	DSP F20 Aperture Cover					
UI005	20110101	00:00:00.0	1444.2245	34929.9	36961.1	330.063	
	06.9422	059.4678	218.1017	42323.669	0.0239961	150.8700	
D1. 52	00024D	IUS stage 2					
UI067	20110101	00:00:00.0	1444.3162	35911.3	35983.3	292.862	
	06.6780	059.6636	009.0188	42325.461	0.0008500	322.4489	
D1. 53	79086C	Titan IIIC stage 3 (Transtage)					
UI024	20110101	00:00:00.0	1444.6299	30436.9	41470.0	180.562	
	07.0010	353.3866	041.3752	42331.589	0.1303184	253.4351	
D1. 54	78058B	Titan IIIC stage 3 (Transtage)					
UI010	20110101	00:00:00.0	1445.3496	29687.0	42248.0	014.583	
	04.1589	029.9018	016.8707	42345.648	0.1483155	071.8738	
D1. 55	81107C	Titan IIIC stage 3 (Transtage)					
UI076	20110101	00:00:00.0	1445.8221	31883.7	40069.8	253.374	
	07.7168	352.0136	027.5815	42354.877	0.0966366	336.3115	
D1. 56	94054B	Titan IVA stage 3 (Centaur)					
UI017	20110101	00:00:00.0	1446.0383	35468.1	36493.9	028.291	
	09.6980	038.4928	210.2149	42359.099	0.0121082	238.4171	
D1. 57	96026B	Titan IVA stage 3 (Centaur)					
UI075	20110101	00:00:00.0	1446.3184	33989.9	37983.0	059.568	
	08.9455	005.5835	274.9334	42364.569	0.0471281	232.7544	
D1. 58	73040B	Titan IIIC stage 3 (Transtage)					
UI049	20110101	00:00:00.0	1446.4105	35867.3	36109.1	242.394	
	12.1010	327.8009	268.6692	42366.368	0.0028538	105.6500	
D1. 59	97008E	USA 130 debris (Telescope aperture suncover)					
UI164	20110101	00:00:00.0	1446.9346	33556.2	38440.8	351.007	
	09.1567	056.4483	281.5678	42376.600	0.0576332	106.4772	
D1. 60	89090D	IUS stage 2					
UI090	20110101	00:00:00.0	1447.0030	34629.6	37370.0	140.252	
	15.3352	046.3941	301.9358	42377.935	0.0323332	247.5097	
D1. 61	97008D	IUS stage 2					
UI071	20110101	00:00:00.0	1447.2907	35900.1	36110.7	252.129	
	09.1968	057.6235	030.7013	42383.552	0.0024836	261.8220	

D1. 62	76059A	OPS 2112 (DSP F6)					
UI056	20110101	00:00:00.0	1447.6238	35978.6	36045.2	012.009	
	13.6714	337.3388	043.8993	42390.055	0.0007848	089.9149	
D1. 63	84009C	Titan 34D stage 3 (Transtage)					
UI025	20110101	00:00:00.0	1448.0295	31888.6	40151.1	074.332	
	07.9119	358.9323	000.8789	42397.975	0.0974396	173.3886	
D1. 64	79053C	Titan IIIC stage 3 (Transtage)					
UI051	20110101	00:00:00.0	1448.1018	35783.1	36259.4	094.064	
	14.9243	353.3708	139.7005	42399.386	0.0056164	059.8988	
D1. 65	89035C	Titan 34D stage 3 (Transtage)					
UI020	20110101	00:00:00.0	1448.3002	31694.8	40355.4	240.005	
	06.8834	014.2279	296.8172	42403.259	0.1021216	016.2851	
D1. 66	85092C	USA 12 (DSCS III B-05)					
UI077	20110101	00:00:00.0	1449.8493	36037.8	36072.9	298.357	
	12.3397	041.9077	336.2676	42433.490	0.0004138	016.9307	
D1. 67	90095E	USA 65 debris (Telescope aperture suncover					
UI143	20110101	00:00:00.0	1450.3593	35816.5	36314.1	293.737	
	13.0906	036.1276	142.4649	42443.440	0.0058625	212.1876	
D1. 68	93074B	IABS					
UI084	20110101	00:00:00.0	1450.8450	36040.0	36109.6	359.369	
	13.0241	036.2379	281.8683	42452.917	0.0008193	140.6847	
D1. 69	68063A	OPS 2222 (CANYON 1)					
UI102	20110101	00:00:00.0	1451.0082	32132.9	40023.0	167.349	
	15.2865	347.8402	069.8661	42456.100	0.0929208	216.6716	
D1. 70	89069B	USA 44 (DSCS III A-02)					
UI126	20110101	00:00:00.0	1452.8113	36084.4	36141.8	013.348	
	09.2763	057.2118	252.6224	42491.264	0.0006760	162.9496	
D1. 71	92006A	USA 78 (DSCS III B-14)					
UI127	20110101	00:00:00.0	1453.9734	36112.9	36158.7	249.150	
	09.6330	056.1335	220.0249	42513.921	0.0005382	069.4994	
D2. 72	93046A	USA 93 (DSCS III B-09)(DSCS III F7)					
UI120	20110101	00:00:00.0	1454.4041	36122.8	36165.5	183.698	
	06.7618	063.5462	287.9753	42522.315	0.0005024	289.5024	
D1. 73	78016A	OPS 6391 (FLTSATCOM F1)					
UI101	20110101	00:00:00.0	1454.5354	36131.8	36161.7	340.341	
	15.4498	352.3673	122.0225	42524.874	0.0003516	325.0241	
D1. 74	85092B	USA 11 (DSCS III B-04)					
UI079	20110101	00:00:00.0	1454.7553	36121.7	36180.3	297.568	
	12.5634	040.1438	313.9339	42529.162	0.0006887	038.9983	
D1. 75	80087A	OPS 6394 (FLTSATCOM F4)					
UI096	20110101	00:00:00.0	1455.2678	36137.3	36184.7	084.396	
	14.8789	359.3124	323.6537	42539.148	0.0005567	219.1061	
D1. 76	06024B	USA 188 (MITEx Lockheed satellite)					
UI148	20110101	00:00:00.0	1455.8287	36112.0	36231.8	317.502	
	01.1577	076.4825	106.2318	42550.078	0.0014077	230.4699	
D1. 77	84129A	USA 7 (DSP F12)					
UI034	20110101	00:00:00.0	1456.7109	36173.7	36204.6	352.319	
	15.1718	016.0776	353.8934	42567.266	0.0003627	081.4186	

D1. 78	81025A	OPS 7350 (DSP F9)					
UI045	20110101	00:00:00.0	1457.0701	36132.9	36259.3	054.651	
	14.9228	359.6583	121.2707	42574.264	0.0014843	031.7888	
D1. 79	79053A	OPS 7484 (DSP F8)					
UI053	20110101	00:00:00.0	1458.2832	36193.2	36246.3	214.328	
	15.1162	354.2328	123.6574	42597.891	0.0006243	191.7765	
D1. 80	84037A	OPS 7641 (DSP F11)					
UI037	20110101	00:00:00.0	1459.2933	36214.8	36264.0	339.822	
	15.0532	009.8192	091.9808	42617.559	0.0005777	337.1298	
D1. 81	89069A	USA 43 (DSCS II F-15)					
UI087	20110101	00:00:00.0	1460.3371	36205.3	36314.2	148.685	
	13.5718	028.4487	108.4104	42637.879	0.0012770	108.4601	
D1. 82	90095A	USA 65 (DSP F15)					
UI083	20110101	00:00:00.0	1463.5008	36284.8	36357.8	265.425	
	12.9123	036.4635	302.3494	42699.438	0.0008557	020.5182	
D1. 83	87097A	USA 28 (DSP F13)					
UI030	20110101	00:00:00.0	1463.6726	36239.0	36410.3	316.247	
	12.7665	026.2513	124.5841	42702.779	0.0020057	265.1900	
D1. 84	82019A	OPS 8701 (DSP F10)					
UI046	20110101	00:00:00.0	1466.5935	36375.8	36387.0	261.860	
	15.3946	003.7540	033.6895	42759.572	0.0001310	317.1258	
D1. 85	98058A	USA 140 (UFO F9)					
UI113	20110101	00:00:00.0	1466.7523	36324.7	36444.3	025.226	
	04.4007	042.6872	275.1781	42762.659	0.0013983	165.6290	
D1. 86	71039A	OPS 3811 (DSP F2)					
UI042	20110101	00:00:00.0	1467.0838	36325.9	36456.0	166.695	
	10.9529	326.2140	250.2324	42769.101	0.0015206	043.8868	
D1. 87	82106B	DSCS III A-01					
UI135	20110101	00:00:00.0	1472.0219	36412.9	36560.9	093.944	
	13.8776	024.0322	041.0296	42865.020	0.0017267	125.0155	
D1. 88	77007A	OPS 3151 (DSP F7)					
UI057	20110101	00:00:00.0	1476.4836	36244.2	36902.7	359.885	
	14.4524	342.4250	250.8992	42951.592	0.0076648	222.6676	
D1. 89	09001B	Delta 4 second stage					
UI154	20110101	00:00:00.0	1499.1452	35941.2	38082.5	097.519	
	02.7915	359.6575	002.5002	43389.967	0.0246754	187.3082	
D1. 90	07054B	Delta 4 second stage					
UI147	20110101	00:00:00.0	1502.1220	35920.3	38218.2	106.355	
	01.3374	247.7625	203.7278	43447.385	0.0264450	099.7637	
D1. 91	08006C	Proton-M fourth stage (Briz-M)					
UI153	20110101	00:00:00.0	1513.9433	36160.9	38432.9	307.337	
	03.6328	045.6259	191.0820	43675.035	0.0260112	170.1067	
D1. 92	97040A	PAS 6					
UI094	20110101	00:00:00.0	1536.9075	34676.5	40798.4	314.272	
	13.5885	004.0938	117.4835	44115.581	0.0693850	296.7720	
D1. 93	10006B	Proton-M fourth stage (Briz-M)					
UI163	20110101	00:00:00.0	1656.2226	37943.9	42040.3	068.393	
	00.6267	081.0395	308.5765	46370.238	0.0441702	123.4267	

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), the following data are given:

L1.nn	COSPAR	NAME				
UIInn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

L1. 1	98029B	Titan IVB stage 3 (Centaur)				
UI027	20110101	00:00:00.0	1436.2187	35575.9	36002.0	002.963
	09.9124	010.4161	043.5883	42167.117	0.0050523	049.5048
L1. 2	72101A	OPS 9390 (CANYON 5)				
UI138	20110101	00:00:00.0	1436.8110	30195.9	41405.2	032.104
	20.0718	334.3703	283.2057	42178.709	0.1328793	220.1512
L1. 3	70046A	OPS 5346 (Rhyolite 1)				
UI035	20110101	00:00:00.0	1436.2988	35755.2	35825.9	067.253
	09.3588	318.4064	063.8913	42168.683	0.0008392	145.1666
L1. 4	73013A	OPS 6063 (Rhyolite 2)				
UI043	20110101	00:00:00.0	1436.1155	35696.3	35877.7	073.653
	11.3162	328.0679	109.9335	42165.096	0.0021511	096.0350
L1. 5	07054A	USA 197 (DSP F23)				
UI141	20110101	00:00:00.0	1437.7768	35812.1	35826.9	075.264
	01.0531	249.2929	055.7748	42197.607	0.0001754	230.0305
L1. 6	77038A	OPS 9751 (CANYON 7)				
UI086	20110101	00:00:00.0	1435.9151	30603.9	40962.2	094.501
	11.1402	008.1249	348.5649	42161.174	0.1228420	195.4323
L1. 7	70032A	Intelsat III F-7				
UI036	20110101	00:00:00.0	1436.5078	35784.2	35805.1	140.129
	09.3752	317.1262	321.8304	42172.774	0.0002472	321.2262
L1. 8	75055A	OPS 4966 (CANYON 6)				
UI060	20110101	00:00:00.0	1436.6922	30321.7	41274.8	147.442
	20.9154	339.6073	245.7494	42176.382	0.1298481	008.0317

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), the following data are given:

L2.nn	COSPAR	NAME				
UIinn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

L2. 1	77007C	Titan IIC stage 3 (Transtage)				
UI162	20110101	00:00:00.0	1436.4654	35744.5	35843.1	292.340
	13.5919	338.0030	244.0043	42171.945	0.0011688	170.3552
L2. 2	81107A	OPS 4029 (VORTEX 3)				
UI129	20110101	00:00:00.0	1435.4250	31819.7	39727.1	313.786
	07.5346	359.8768	278.5526	42151.580	0.0937973	125.0348
L2. 3	77114A	OPS 4258 (AQUACADE 3)				
UI146	20110101	00:00:00.0	1435.8245	35711.1	35851.5	333.742
	19.0200	351.9499	214.1936	42159.400	0.0016652	227.6632
L2. 4	70069A	OPS 7329 (CANYON 3)				
UI157	20110101	00:00:00.0	1436.5268	32161.2	39428.8	345.805
	17.7337	292.6346	244.6455	42173.147	0.0861646	259.4679
L2. 5	94035A	USA 104 (UFO F3)				
UI068	20110101	00:00:00.0	1436.1145	35773.2	35800.7	349.024
	07.4758	048.4572	278.6547	42165.077	0.0003265	122.0313

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, the following data are given:

L3.nn	COSPAR	NAME				
UIinn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

L3. 1	80060A	Ekran 5				
UI098	20110101	00:00:00.0	1436.0215	35707.5	35862.7	353.360
	14.4693	347.3346	035.9424	42163.256	0.0018409	070.3681

4.7 Unidentified 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) The following data are given:

UInnn	YYYYMMDD	HH:MM:SS.SS	Tosc	Hp	Ha	Longit
TYPE	Inclin	RAAN	AoP	SemiAxis	Eccentr	M

For explanation, see definition at the beginning of Chapter 4 on page 104.

UI031	20110101	00:00:00.0	1413.1061	34425.7	36245.0	349.158
D1	07.3209	318.7587	222.2196	41713.506	0.0218077	268.7591
UI041	20110101	00:00:00.0	1435.0064	35569.7	35960.8	083.998
L1	14.2530	356.6947	236.0179	42143.383	0.0046410	311.1404
UI044	20110101	00:00:00.0	1436.5342	35573.0	36017.3	051.909
L1	14.5370	356.5108	315.3136	42173.291	0.0052669	199.7693
UI058	20110101	00:00:00.0	1526.5400	37387.3	37690.3	026.091
D1	17.2593	357.3508	290.3111	43916.964	0.0034494	190.5773
UI089	20110101	00:00:00.0	1430.0766	34883.2	36454.2	168.685
D1	08.5422	326.5502	245.1152	42046.809	0.0186814	056.4903
UI139	20110101	00:00:00.0	1436.8479	35611.8	35990.8	268.098
L2	13.1520	031.7942	129.5148	42179.430	0.0044922	207.1626

4.8 Uncontrolled objects

In this list there are objects for which no orbital elements are available and which are no longer controlled according to information provided by KIAM. In this case, the following data are given:

U.nn	COSPAR	NAME	TYPE
U . 1	75118D	OPS 3165 debris (Telescope aperture suncover)	Debris
U . 2	76059D	OPS 2112 debris (Telescope aperture suncover)	Debris
U . 3	79053D	OPS 7484 debris (Telescope aperture suncover)	Debris
U . 4	89046E	USA 39 debris (Telescope aperture suncover)	Debris
U . 5	90097D	AKM ?	Rocket Body
U . 6	01033E	USA 159 debris (Telescope aperture suncover)	Debris

For the following objects several years old TLEs are available:

D	COSPAR	NAME					
	Date	$\bar{\lambda}$	$\bar{\Delta a}$	$\overline{\Delta r_p}$	$\overline{\Delta r_a}$	N_{Iy}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

D.	67003J	Titan IIIC stage 3 (Transtage)					
	19-JUL-95	28.86	-2107.470	-2225.921	-1989.020	0	3
	16635.000000	40057.05212	0.0029345	11.3730	343.9923	194.5544	69.2907

L1	COSPAR	NAME					
	Date	P_{lib}	$\Delta\lambda$	λ_{min}	λ_{max}	N_{Iy}	N_{tot}
	MJD	a	e	i	Ω	ω	λ

For explanation, see definition at the beginning of Chapter 3 on page 29.

L1.	68081C	OV5 4					
	19-JUL-95	1688	151.1	352.1	143.2	0	2
	16635.000000	42172.17641	0.0006806	13.5815	11.0544	79.3747	139.5031

4.9 Uncontrolled uncatalogued objects

In this list there are 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). The following data have been provided by KIAM for these objects:

UU.nn	COSPAR	NAME	TYPE
UU. 1	71039	OPS 3811 debris (Telescope aperture suncover)	Debris
UU. 2	72010	OPS 1570 debris (Telescope aperture suncover)	Debris
UU. 3	73040	OPS 6157 debris (Telescope aperture suncover)	Debris
UU. 4	75011	SMS 2 debris (VISSR cover)	Debris
UU. 5	75100	GOES 1 debris (VISSR cover)	Debris
UU. 6	76004	Hermes debris (CTS JBSA)	Debris
UU. 7	76004	Hermes debris (CTS JBSA)	Debris
UU. 8	77048	GOES 2 debris (VISSR cover)	Debris
UU. 9	77065	Himawari debris (VISSR cover)	Debris
UU. 10	77065	Star 27 (Himawari AKM)	Rocket Body
UU. 11	77108	Meteosat 1 debris (MVIRI cover)	Debris
UU. 12	77108	Meteosat 1 debris (MVIRI cooler cover)	Debris
UU. 13	78062	GOES 3 debris (VISSR cover)	Debris
UU. 14	80074	GOES 4 debris (VAS cover)	Debris
UU. 15	81025	OPS 7350 debris (Telescope aperture suncover)	Debris
UU. 16	81049	GOES 5 debris (VAS cover)	Debris
UU. 17	81057	Meteosat 2 debris (MVIRI cover)	Debris
UU. 18	81057	Meteosat 2 debris (MVIRI cooler cover)	Debris
UU. 19	81076	Himawari-2 debris (VISSR cover)	Debris
UU. 20	81076	Star 27 (Himawari-2 AKM)	Rocket Body
UU. 21	81114	Satcom IIR 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. 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	97049	Meteosat 7 debris (MVIRI cover)	Debris
UU. 62	97049	Meteosat 7 debris (MVIRI cooler cover)	Debris
UU. 63	02040	Meteosat 8 debris (cooler cover)	Debris
UU. 64	02040	Meteosat 8 debris (entry baffle cover)	Debris
UU. 65	04004	USA 176 debris (Telescope aperture suncover)	Debris
UU. 66	07054	USA 197 debris (Telescope aperture suncover)	Debris

5 Table 3: objects of indeterminate status

This table contains all the objects the status of which 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 objects are ordered according to their COSPAR designation. The following information is available:

Ind.nn	COSPAR	NAME					N_{Iy}	N_{tot}
	Date							
	MJD	a	e	i	Ω	ω	λ	
Ind. 1	96063B	MEASAT 2						
	30-DEC-10					50	712	
	22278.248785	42128.01806	0.0001529	2.9280	72.3402	252.6385	12.3289	
Ind. 2	01012A	XM Radio 2 (Rock)						
	30-DEC-10					52	498	
	22278.506493	42242.44365	0.0000193	0.0950	277.3805	41.4255	260.2531	
Ind. 3	07021A	Xinnuo 3						
	28-DEC-10					51	180	
	22276.800000	42270.29386	0.0005732	0.2200	259.2090	345.2640	161.3579	
Ind. 4	08033A	Cosmos-2440						
	29-DEC-10					51	134	
	22277.664028	42166.42880	0.0002459	0.5311	342.0183	7.0876	70.7834	
Ind. 5	10061A	SkyTerra 1						
	30-DEC-10					7	7	
	22278.485764	42164.72623	0.0003473	6.0196	320.0891	55.5186	258.6851	
Ind. 6	10064A	Zhongxing 20A						
	30-DEC-10					6	6	
	22278.690174	42164.22640	0.0002288	0.4825	270.2325	12.1408	129.9814	
Ind. 7	10065A	Intelsat IS-17						
	23-DEC-10					5	5	
	22271.845451	42164.44814	0.0003225	0.0331	269.8796	72.2723	61.4697	
Ind. 8	10065B	Hylas						
	29-DEC-10					6	6	
	22277.970475	42134.69702	0.0002070	0.0362	236.6664	33.7615	65.4338	
Ind. 9	10069A	KA-Sat						
	28-DEC-10					1	1	
	22276.498299	26112.01813	0.6138845	24.5555	71.5523	0.1949	155.8968	
Ind. 10	10070A	Hispasat 1E						
	29-DEC-10					1	1	
	22277.699005	24453.32824	0.7279684	3.0603	244.2783	179.8241	264.5525	
Ind. 11	10070B	Koreasat 6						
	30-DEC-10					1	1	
	22278.458322	24395.32693	0.7281999	3.0112	245.9001	178.3810	252.6555	

The longitude histories of the first four objects in this category are plotted in Figures 6 to 7.

Figure 6: Longitude history of the objects of indeterminate status

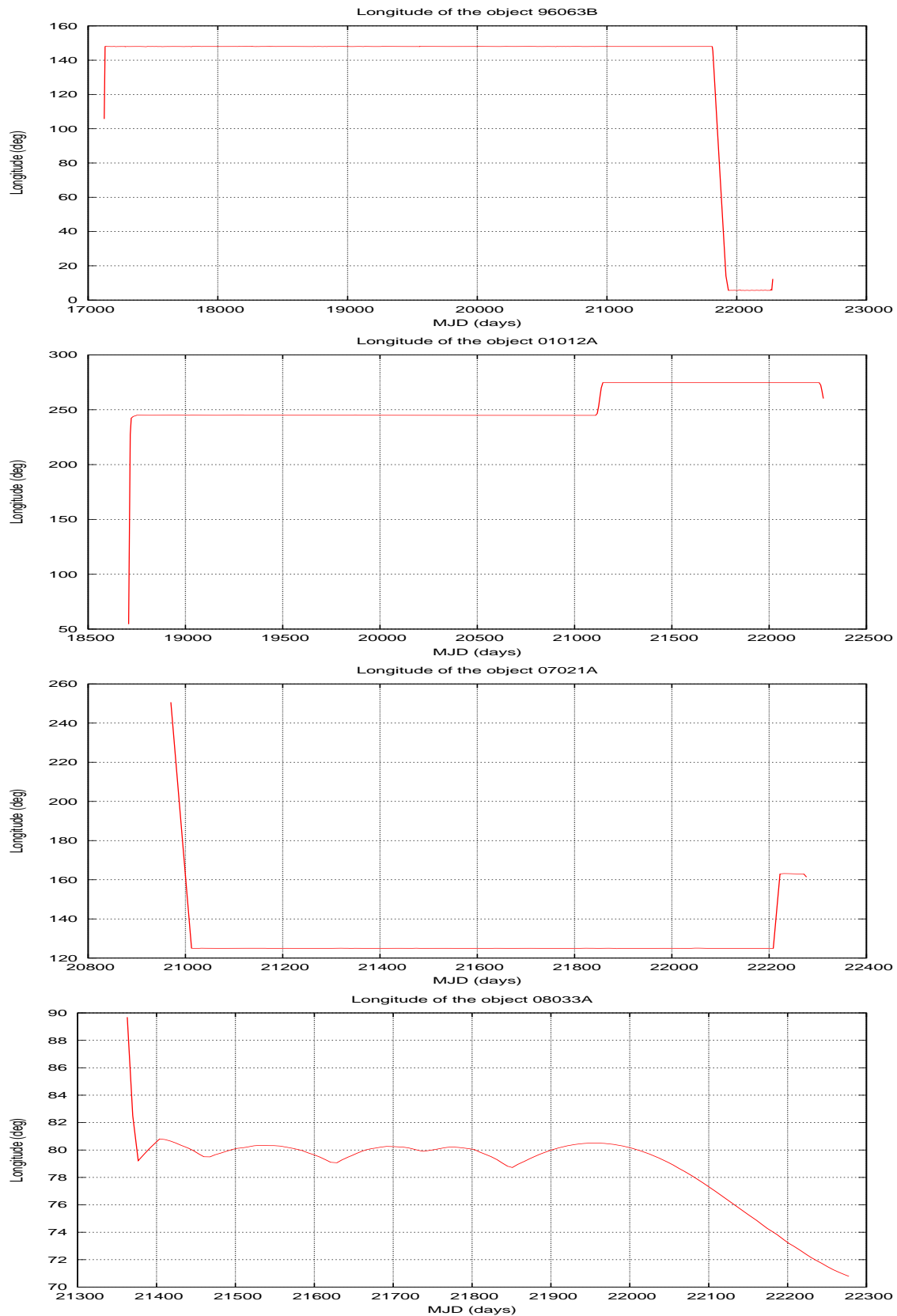


Figure 7: Longitude history of the objects of indeterminate status

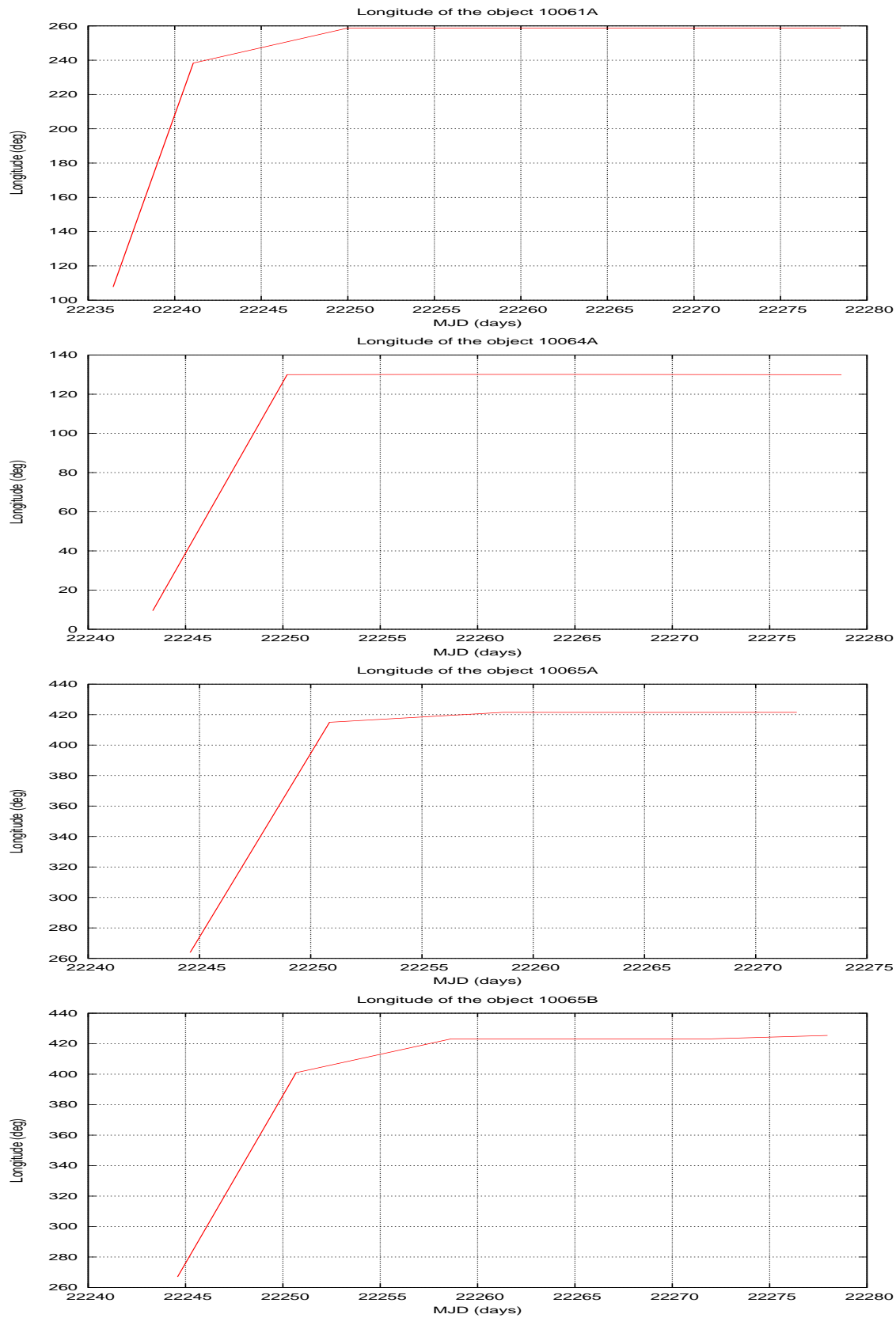
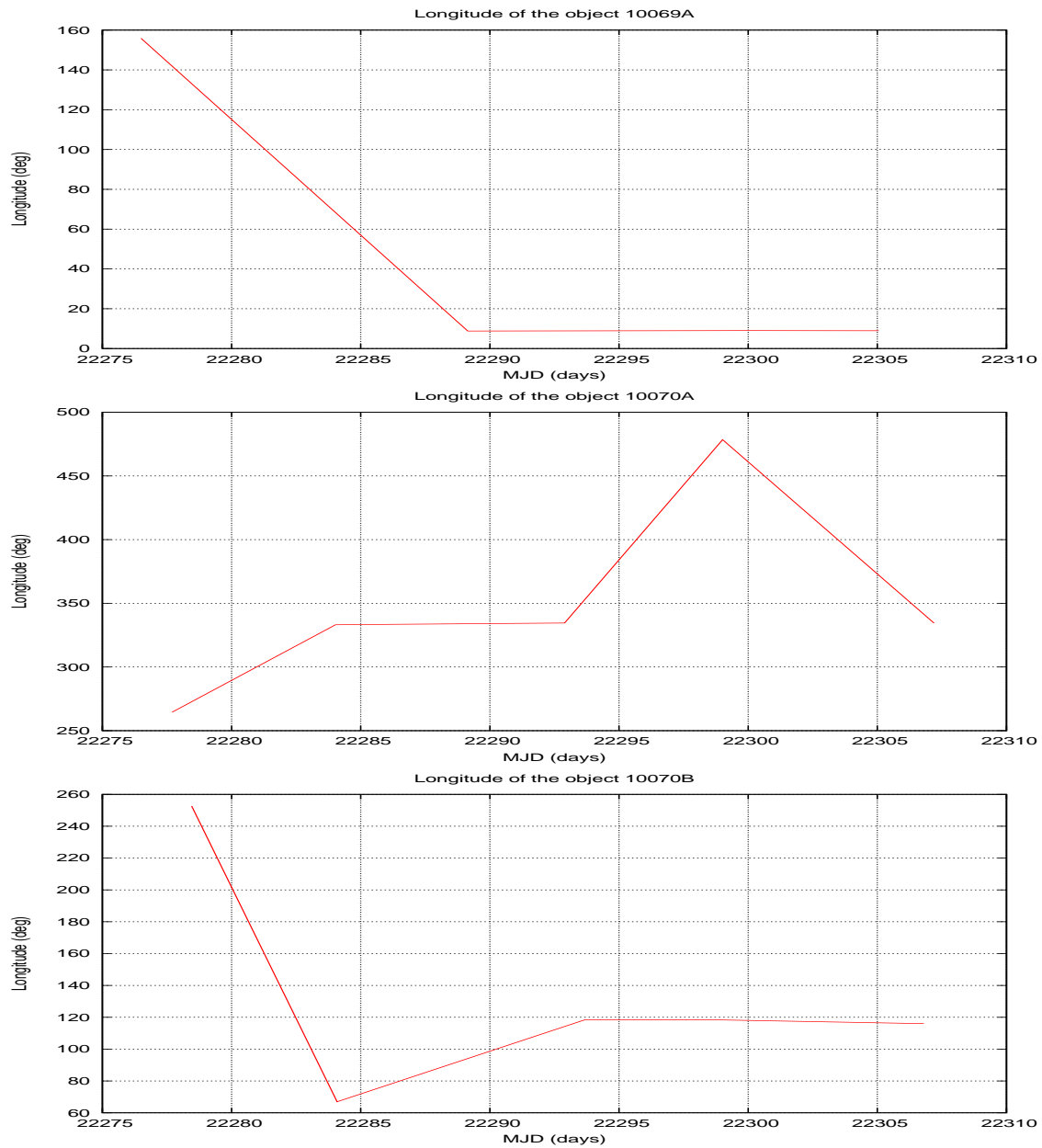


Figure 8: Longitude history of the objects of indeterminate status



6 Figures

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

- Figure 9: Number of objects in each category
- Figure 10: Number of objects under control, in drift orbit or in libration orbit according to the launch year
- Figure 11: Distribution of the longitude of the satellites (with TLEs) under control
- Figure 12: Distribution and altitude range of the objects (with TLEs) in drift orbit
- Figure 13: Zoom in the distribution and altitude range of the objects (with TLEs) in drift orbit
- Figure 14: Distribution of the perigee mean deviation from the geostationary altitude for the objects (with TLEs) in drift orbit
- Figure 15: Number of objects (with TLEs) librating through a given longitude

Classification of geosynchronous objects

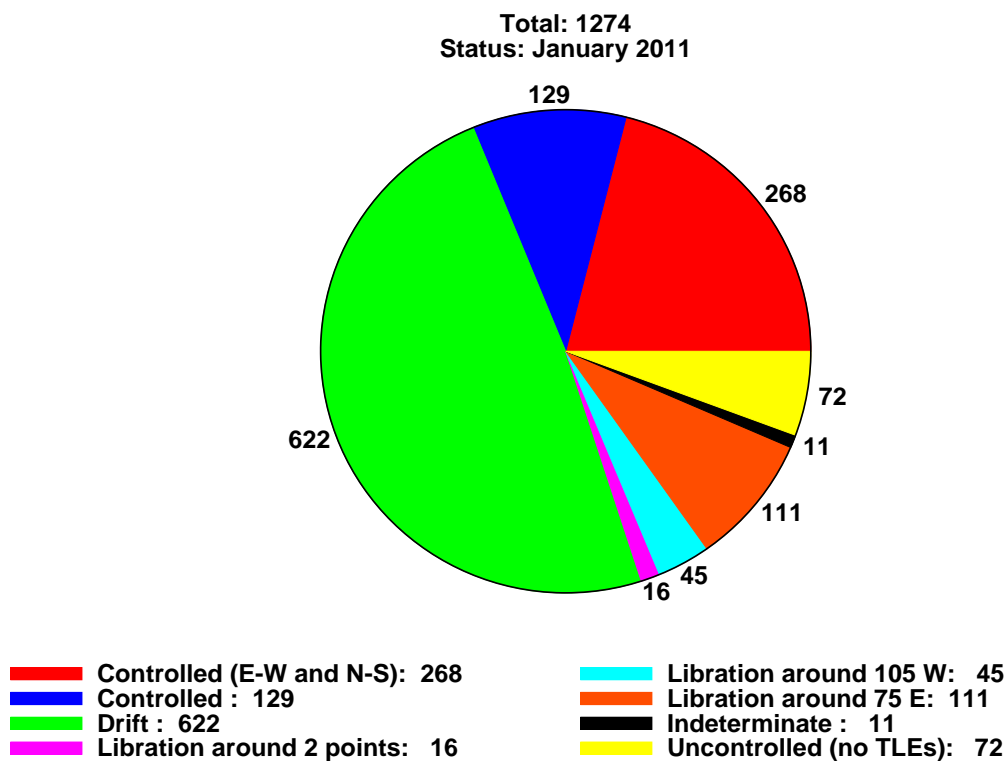


Figure 9: Number of objects in each category

Classification of geosynchronous objects

(Objects with recently updated TLEs)
Status: January 2011

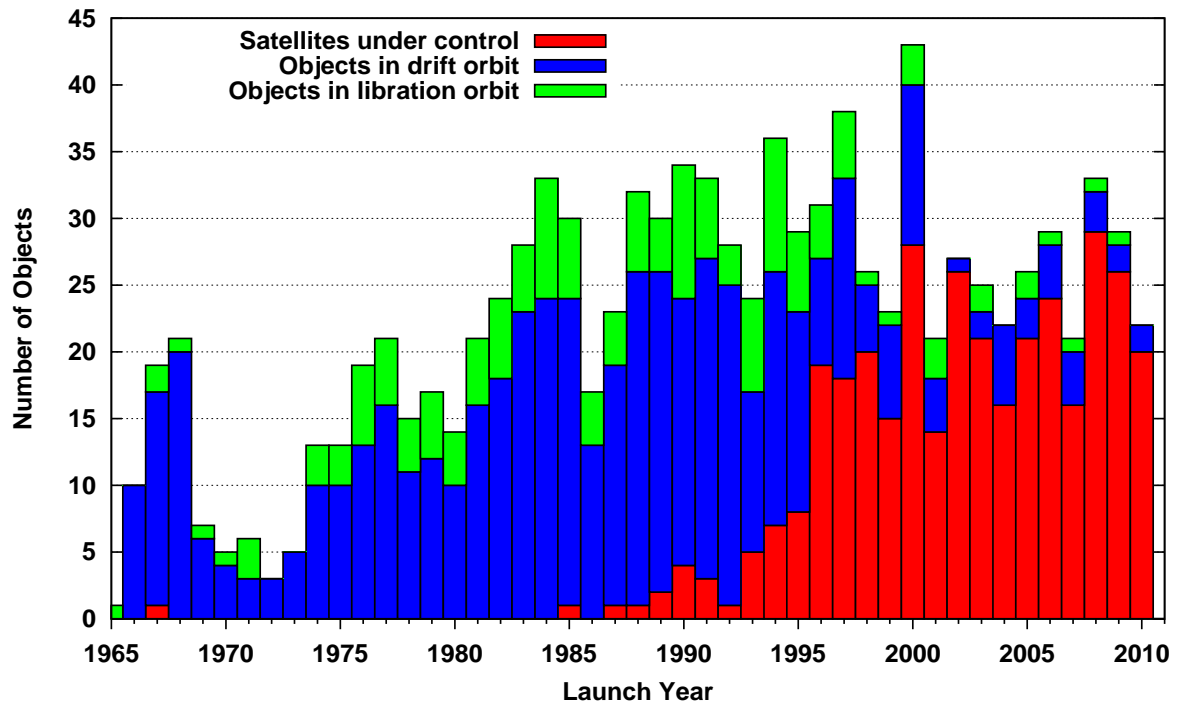


Figure 10: Number of objects in each category according to the launch year.

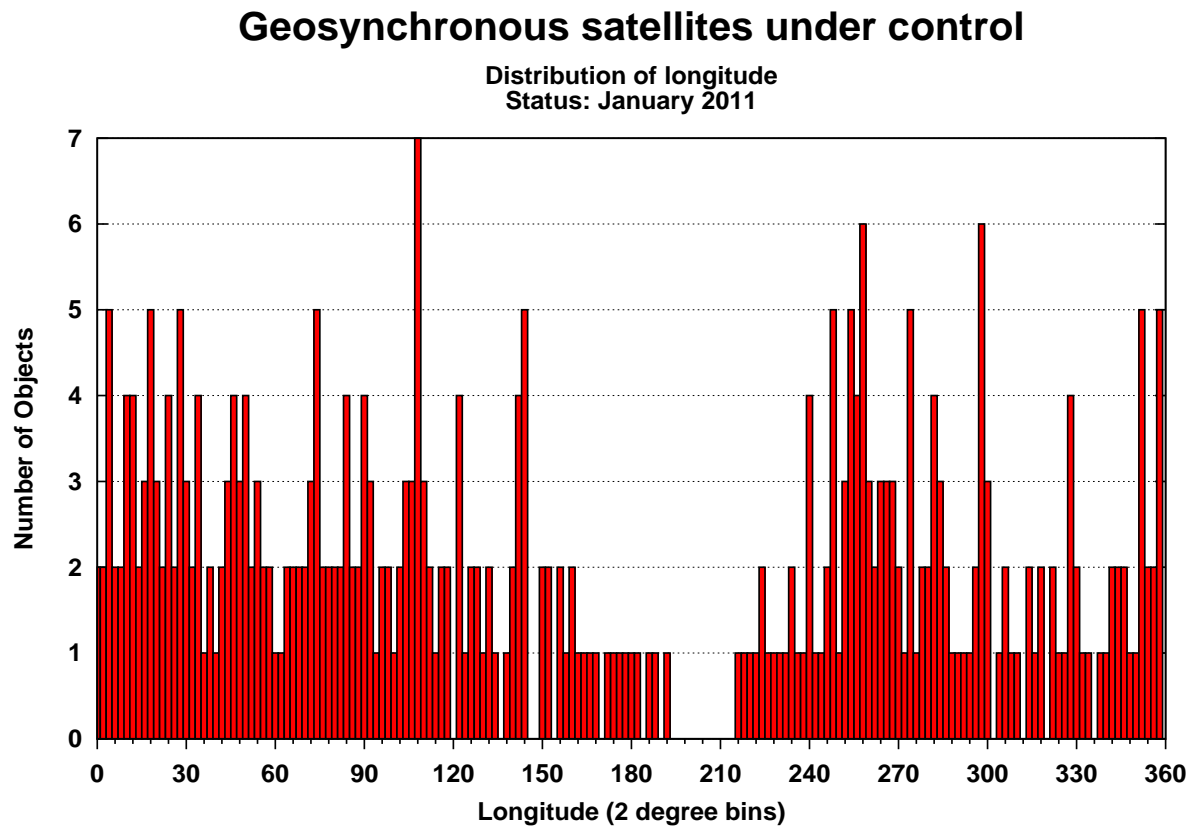


Figure 11: Distribution of the longitude of the 350 satellites under control (with updated TLEs).

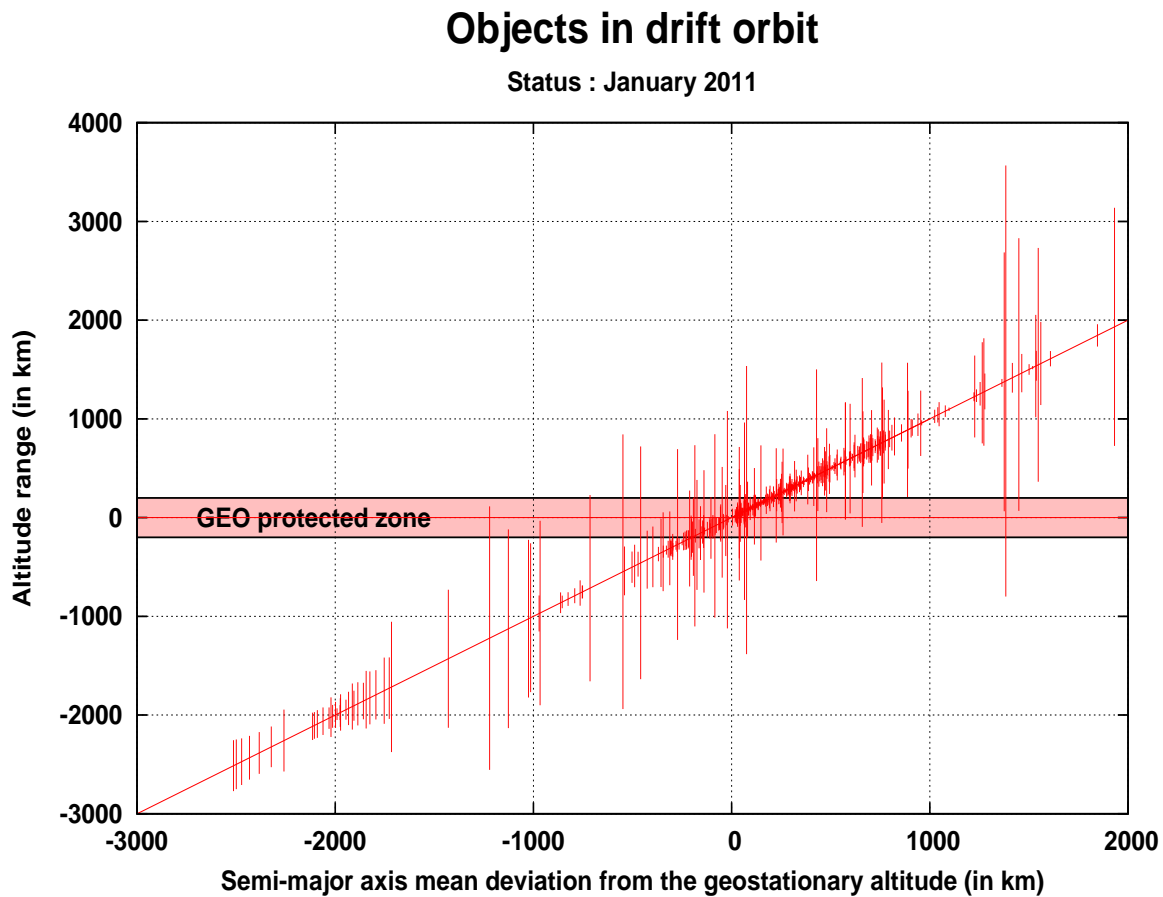


Figure 12: Distribution and altitude range of the objects in drift orbit.

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.

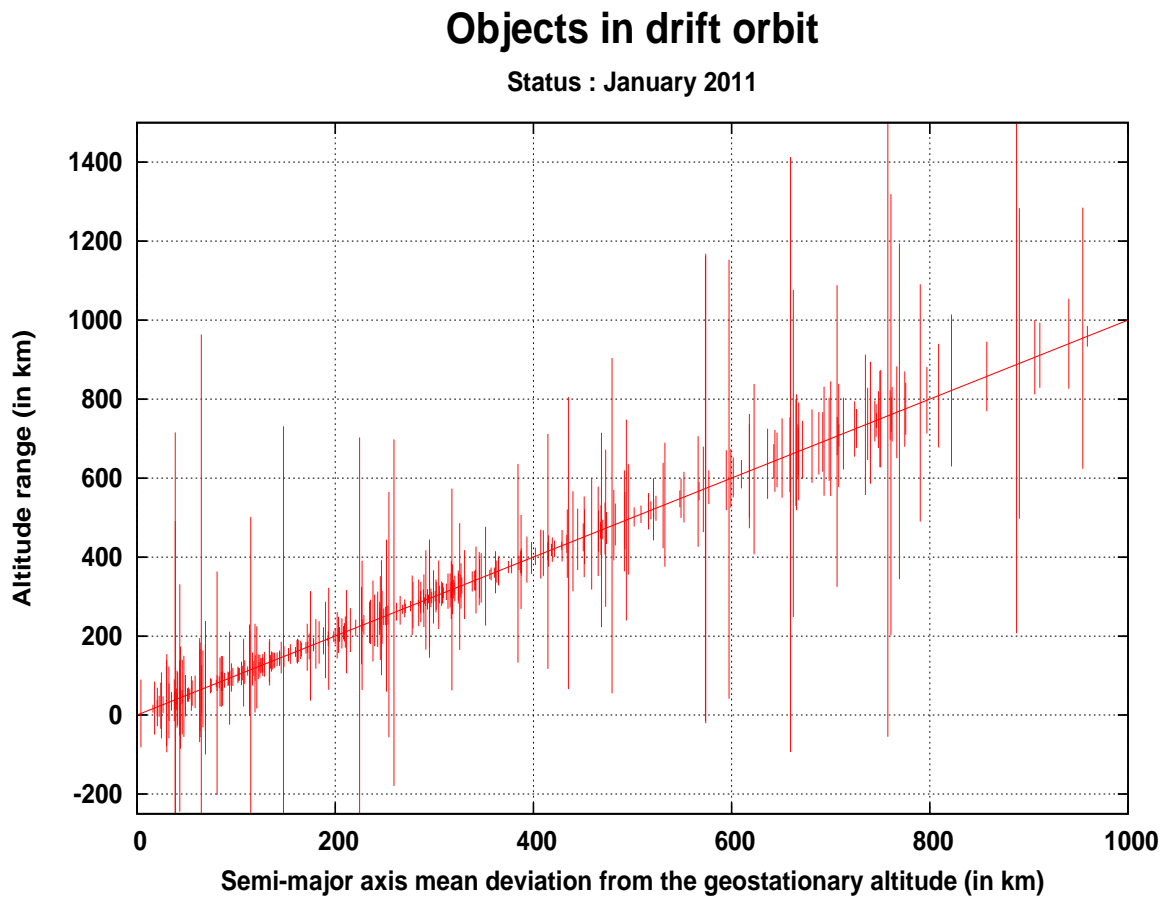


Figure 13: Zoom in the distribution and altitude range of the objects in drift orbit.

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.

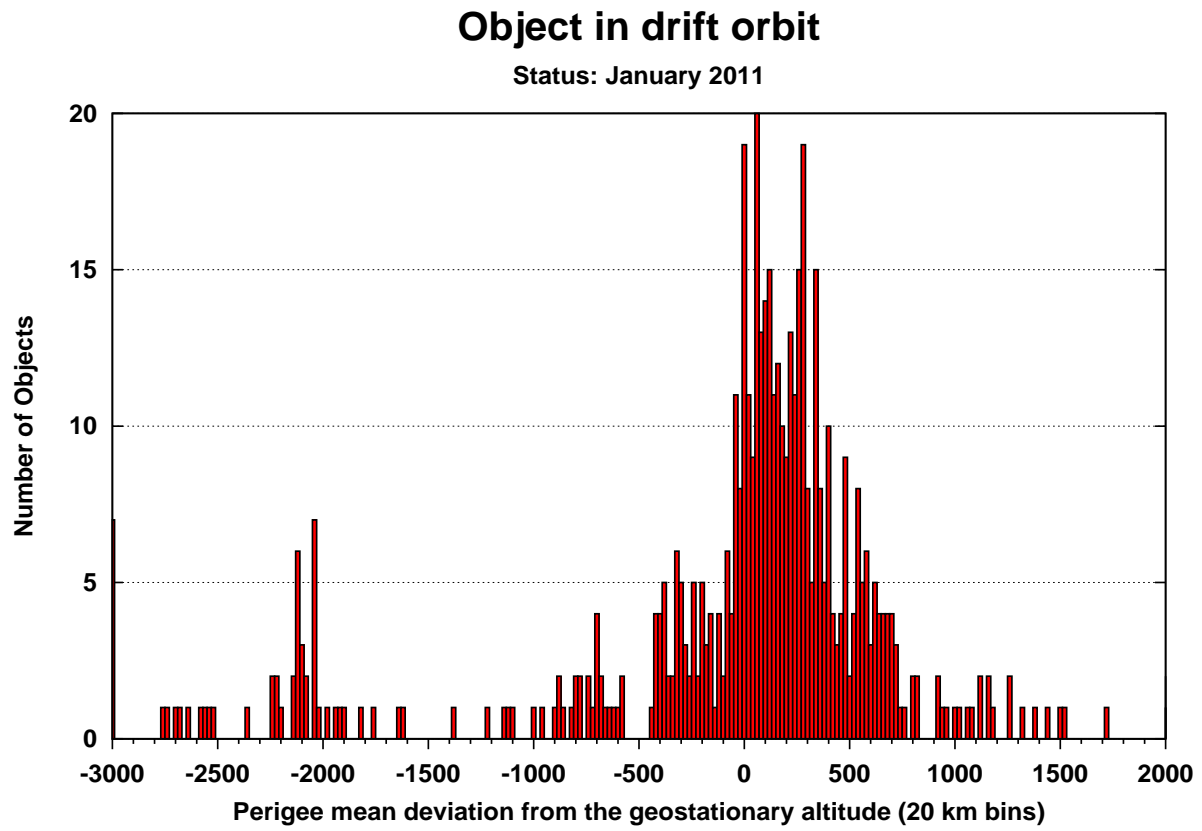


Figure 14: Distribution of the perigee mean deviation from the geostationary altitude.

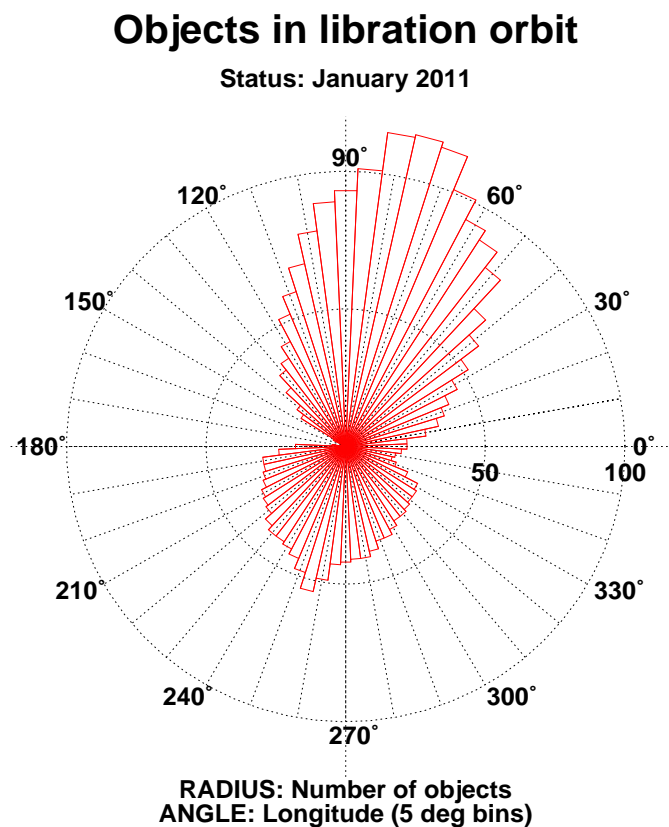


Figure 15: Distribution of the objects in libration orbit in 5-deg bins of geographic longitude (objects with updated TLEs only).

This figure illustrates the distribution of the objects in a libration orbit. 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.

7 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 sidereal day, corresponding to a semi-major axis between 42164 - 2500 km and 42164 + 3150 km.
- inclination lower than 30 degrees

1039 objects met these criteria as of 31 December 2010. 235 more objects are also known to be in this orbital region. For 163 of them KIAM provided orbital elements; 157 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 1274.

They can be classified as follows:

- 397 are controlled (268 under longitude and inclination control),
- 622 are in a drift orbit,
- 172 are in a libration orbit,
- 6 are uncontrolled with no recent orbital elements available,
- 66 are uncatalogued objects which can, however, be associated with a launch,
- 11 could not be classified.

Compared with the past issue of February 2010 the following changes can be observed: There were 32 new objects (28 payloads and 4 rocket bodies) launched into or near GEO in 2010, and also one payload launched in 2009 was added.

At least 16 spacecraft reached end of life as far as can be inferred from the orbital elements stored in DISCOS or declared by spacecraft operators. Only 11 were reorbited more than 250 km above GEO and complied with the IADC reorbiting guidelines:

- TDRS-1 (83026B, USA, 357 km x 515 km)
- Satcom C-3 (92060B, USA, 826 km x 1056 km)
- Thaicom 1 (93078B, Thailand, 302 km x 317 km)
- Brazilsat B1 (94049A, Brazil, 282 km x 298 km)
- PAS 4 (95040A, USA, 803 km x 1011 km)
- Nahuel 1A (97002B, Argentina, 241 km x 265 km)
- BSAT-1A (97016B, Japan, 309 km x 345 km)
- Intelsat VIII F-2 (97031A, Intelsat, 500 km x 738 km)
- Eutelsat W2 (98056A, Eutelsat, 281 km x 294 km)
- Insat 4CR (07037A, India, 275 km x 299 km)
- Rascom QAF 1 (07063A, Mauritius, 313 km x 372 km)

Nahuel 1A was reorbited so that it will marginally touch the 200-km protected zone around GEO in a long-term forecast.

Four spacecraft were reorbited too low:

- Thaicom 2 (94065B, Thailand, 192 km x 198 km)
- Galaxy 9 (96033A, USA, 178 km x 242 km)
- Insat 2E (99016A, India, 147 km x 205 km)
- Yamal-100 No.2 (99047B, Russia, 71 km x 95 km)

At least 1 spacecraft seems to be abandoned and has started librating around the libration point L1:

- Turksat 3 (96040B, Turkey)

The status of Cosmos-2240 (08033A, Russia) is indeterminate, as it is in an L1-type orbit, but it is not passive.

Currently, Beidou DW2 (Compass G2) (09018A, China) is in an L1-type orbit, but is unclear whether it has reached end-of-life.

Galaxy 15 suffered a malfunction and temporarily entered into a libration orbit around L2. By the end of 2010 the operators were able to bring the satellite under full control again.

This analysis has shown that in 2010, thirteen years after the IADC guidelines were established, there are still many satellites that were not or could not be properly reorbited.

One rocket body was left in a drift orbit violating the IADC guidelines (Delta 4 second stage, 10063B, USA) with the perigee 1932 km below and the apogee 111 km below GEO.

8 References

1. Samsom P., "Classification of Geostationary Objects", ESOC - MAS WP 420, 1999.
2. Jehn, R., and Hernández, "Reorbiting statistics of geostationary objects in the years 1997 - 2001", in: Proceedings of the Third European Conference on Space Debris, 19 - 21 March 2001, Darmstadt, Germany, edited by H. Sawaya-Lacoste, ESA SP-473, 2001.

9 Acknowledgements

The authors thank Nicholas Johnson (NASA) and Vladimir Agapov (KIAM) for their suggestions and valuable contributions.