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Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)	
Beidou-2 Compass G1 [CZ-3C]	2010 01 A [36287] XI	2010 Jan 16.675 > million years			2010 Jan 16.47 2010 Jan 23.96	20.46 1.83	627.75 1436.08	24286 42164	196 35599	35620 35972	0.729 0.004	180 230	
CZ-3C 3 rd stage (H-18)	2010 01 B [36288]	2010 Jan 16.675	Cylinder 3060	12.375 long 3.0 dia	2010 Jan 16.47 2010 Jan 29.05	20.44 20.40	627.73 626.75	24286 24260	194 296	35621 35467	0.729 0.725	180 188	
Raduga 1M2 (Globus) [Proton-M/Breeze-M]	2010 02 A [36358] BAI	2010 Jan 28.013 > million years			2010 Jan 28.16 2010 Jan 28.60 2010 Jan 29.78 2010 Feb 20.96	46.48 0.07 0.06 0.02	632.88 1435.98 1420.50 1436.10	24418 42163 41957 42165	408 35772 35566 35784	35671 35797 35591 35788	0.722 0.0003 0.0003 0.00005	0 31 39 147	
Breeze-M stage	2010 02 B [36359]	2010 Jan 28.013	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Jan 31.38	0.25	1384.22	41143	34076	35453	0.017	330	
Breeze-M tank	2010 02 C [36360]	2010 Jan 28.013	Torus 1290	2.1 long 4.1 dia 0.8 cross	2010 Jan 28.63	46.47	630.88	24367	408	35568	0.721	0	
D Progress-M 04M # [Soyuz-U]	2010 03 A [36361] BAI	2010 Feb 3.156 148 days 2010 Jul 1	Cyl+2 solar panels+beehive +spheroid 7250?	7.9 long 2.72 maxdia	2010 Feb 3.24 2010 Feb 3.46 2010 Feb 5.59 2010 Jul 1.29	51.64 51.64 51.64 51.65	88.52 89.28 91.38 91.52	6580 6618 6721 6728	186 222 335 346	216 256 349 353	0.002 0.003 0.001 0.0005	68 330 287 42	
D Soyuz-U 3 rd stage (Blok I)	2010 03 B [36362]	2010 Feb 3.156 2 days 2010 Feb 5	Cylinder 2400?	8.1 long 2.66 dia	2010 Feb 3.46 2010 Feb 5.47	51.63 51.61	88.43 87.38	6575 6523	185 142	208 147	0.002 0.116	63 12	
D STS-130 Endeavour \$ 6M [Shuttle] R	2010 04 A [36394] CC-39A	2010 Feb 8.385 13.755 days 2010 Feb 22.140	Deltawing	37.5 long 5.5 dia 23.8 span	2010 Feb 8.42 2010 Feb 8.52 2010 Feb 9.58 2010 Feb 11.56 2010 Feb 19.68 2010 Feb 20.43 2010 Feb 21.94	51.63 51.70 51.64 51.64 51.65 51.65 51.65	88.82 90.00 91.02 91.37 91.40 91.35 91.35	6594 6653 6703 6720 6721 6720 6719	200 210 301 334 334 333 334	231 339 348 349 351 348 348	0.002 0.010 0.003 0.001 0.001 0.001 0.001	327 18 320 317 356 345 355	

Progress-M 04M docked 2010 Feb 5.185 with ISS (Zvezda aft port).

\$ STS-130 docked 2010 Feb 10.213 with ISS (PMA-2/Harmony port) with 6 astronauts (Zamka, Virts, Robinson, Hire, Behnken and Patrick). Undocked 2010 Feb 20.038

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SDO # [Atlas-5] (AV-021)	2010 05 A [36395] CC	2010 Feb 11.641	Box + 2 panels 3000 1600 dry	4.5 long 2.22 side 6.25 span	2010 Feb 11.71 2010 Feb 16.79 2010 Feb 19.80 2010 Feb 19.97 2010 Feb 26.90 2010 Mar 1.33 2010 Mar 5.68 2010 Mar 8.81 2010 Mar 9.38 2010 Mar 12.28 2010 Mar 17.30 2010 Mar 19.11	28.57 28.54 28.44 28.41 28.28 28.25 28.24 28.18 28.07 28.08 28.12 28.05	667.60 668.60 718.98 782.63 828.07 931.45 1049.47 1150.57 1394.75 1420.93 1436.55 1436.02	25303 25328 26585 28132 29211 31594 34209 36372 41352 41868 42174 42163	2480 2600 5099 8216 10320 15054 20128 24644 34574 35362 35781 35780	35369 35300 35314 35291 35344 35376 35533 35343 35372 35616 35809 35789	0.650 0.646 0.568 0.481 0.428 0.322 0.225 0.147 0.010 0.003 0.0003 0.0001	40 42 43 43 44 43 44 43 36 324 265 276
Atlas-5 2 nd stage (Centaur)	2010 05 B [36396]	2010 Feb 11.641	Cylinder 2100?	12.68 long 3.05 dia	2010 Feb 11.77	28.37	629.67	24335	2397	33516	0.639	38
Intelsat 16 [Proton-M/Breeze-M]	2010 06 A [36397] BAI	2010 Feb 12.016	Box + 2 panels 2450		2010 Feb 12.63 2010 Feb 15.58 2010 Feb 17.65 2010 Feb 19.91 2010 Feb 22.67 2010 Feb 24.26 2010 Feb 27.14	0.12 0.14 0.14 0.13 0.09 0.09 0.07	1538.20 1491.23 1449.23 1439.45 1437.50 1435.72 1436.08	44141 43237 42422 42230 42192 42158 42165	37515 35912 35903 35796 35795 35764 35776	38009 37809 36183 35908 35832 35794 35796	0.006 0.022 0.003 0.001 0.0004 0.0004 0.0002	321 34 20 209 213 37 10
Breeze-M stage *	2010 06 B [36398]	2010 Feb 12.016	Stubby Cyl 1220	2.62 long ~2.4 dia	2011 Apr 3.68	0.81	1656.23	46370	37920	42063	0.045	310
Breeze-M tank	2010 06 C [36399]	2010 Feb 12.016	Torus 1290	2.1 long 4.1 dia 0.8 cross	2010 Feb 12.18	46.15	676.47	25527	509	37786	0.730	0

Solar Dynamics Observatory

* First TLE issued 2011 Apr 03.

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Cosmos 2459 * [Proton-M / Block DM-2]	2010 07 A [36400] BAI-IC81/24	2010 Mar 1.888	Cyl+ 2 panels+ 2.4 dia	2010 Mar 2.02	64.99	677.72	25558	19129	19229	0.002	35	
			magnometerboom 3.7 height	2010 Mar 2.49	64.77	675.62	25505	19122	19131	0.0002	208	
			1370	2010 Mar 2.70	64.76	675.83	25511	19119	19146	0.0005	95	
Cosmos 2461 * [36401]	2010 07 B	2010 Mar 1.888	Cyl+ 2 panels+ 2.4 dia	2010 Mar 2.02	64.75	677.78	25560	19130	19232	0.002	113	
			magnometerboom 3.7 height	2010 Mar 2.16	64.77	676.28	25522	19131	19157	0.0005	116	
			1370	2010 Mar 2.49	64.77	675.80	25510	19128	19135	0.0001	114	
Cosmos 2460 * [36402]	2010 07 C	2010 Mar 1.888	Cyl+ 2 panels+ 2.4 dia	2010 Mar 2.02	64.77	676.28	25522	19131	19157	0.0005	116	
			magnometerboom 3.7 height	2010 Mar 2.49	64.77	675.80	25510	19131	19132	0.00002	119	
Proton-M 4th stage (Block DM-2)	2010 07 D [36403]	2010 Mar 1.888	Cylinder 2350?	6.22 long 3.7 maxdia	2010 Mar 2.02	64.77	675.20	25495	19096	19137	0.0008	177
D Proton-M 3rd stage (8S812)	2010 07 E [36404]	2010 Mar 1.888	Cylinder	4 long	2010 Mar 2.07	64.79	88.03	6556	151	204	0.004	342
			4185	4.1 dia	2010 Mar 2.67	64.79	87.43	6526	137	157	0.001	267
D Proton-M 4th stage Casing	2010 07 F [36405]	2010 Mar 1.888	Hollow cyl	4.0 long	2010 Mar 2.07	64.79	87.85	6547	166	171	0.0004	359
			800?	3.7 dia	2010 Mar 2.25	64.79	87.47	6528	130	168	0.003	171
Proton-M Ullage motor	2010 07 G [36406]	2010 Mar 1.888	Cylinder 55	0.90 long 0.68 dia	2010 Mar 2.24	64.53	339.78	16130	378	19125	0.581	193
Proton-M Ullage motor	2010 07 H [36407]	2010 Mar 1.888	Cylinder 55	0.90 long 0.68 dia	2010 Mar 2.24	64.31	339.82	16131	392	19113	0.580	193
Fragment	2010 07 J [36408]				2010 Mar 3.40	64.79	90.97	6700	170	474	0.023	88
	2010 07 K [36409]				2010 Mar 4.34	64.65	90.23	6664	169	403	0.018	67
	2010 07 L [36410]				2010 Mar 4.79	64.93	90.15	6661	168	396	0.017	66

* Glonass-M satellites

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GOES 15 [Delta-4]	2010 08 A [36411] CC-LC37B	2010 Mar 4.998 > million years	Box + 1 panel 3215 4806 bol	8.2 long 2.25x3.37	2010 Mar 5.00	26.82	609.48	23813	274	34594	0.721	182
					2010 Mar 5.25	12.01	749.67	27336	6664	35251	0.523	179
					2010 Mar 8.10	6.97	873.80	30277	12613	35182	0.373	181
					2010 Mar 10.39	1.79	1196.98	37344	26736	35195	0.113	189
					2010 Mar 13.66	0.56	1379.25	41045	34134	35198	0.013	210
					2010 Mar 17.14	0.81	1406.17	41577	34172	36224	0.025	287
					2010 Mar 17.67	0.48	1436.00	42163	35778	35790	0.0001	276
					2010 Mar 24.25	0.44	1436.10	42165	35784	35788	0.00005	341
Delta-4 2 nd stage	2010 08 B [33491]	2010 Mar 4.998	Cylinder 3490	12 long 2.44 dia	2010 Mar 5.25	13.23	747.48	27283	6644	35166	0.523	180
Yaogan 9A [CZ-4C]	2010 09 A [36413] JIUQ	2010 Mar 5.205			2010 Mar 5.26	63.41	107.07	7470	1083	1100	0.001	318
					2010 Mar 5.93	63.41	107.05	7469	1082	1098	0.001	322
Yaogan 9B	2010 09 B [36414]	2010 Mar 5.205			2010 Mar 5.26	63.41	107.10	7471	1085	1100	0.001	334
					2010 Mar 5.93	63.41	107.08	7470	1084	1098	0.001	321
Yaogan 9C	2010 09 C [36415]	2010 Mar 5.205			2010 Mar 5.33	63.41	107.03	7468	1081	1097	0.001	303
					2010 Mar 5.51	63.41	107.10	7471	1085	1099	0.0009	309
CZ-4C 3 rd stage	2010 09 D [36416]	2010 Mar 5.205	Cylinder 1730?	4.93 long 2.9 dia	2010 Mar 5.33	63.46	105.17	7380	908	1096	0.013	18
Fragment	2010 09 E 2010 09 F	[36417] [36418]			2010 Mar 5.33	63.41	107.02	7467	1078	1099	0.001	295
					2010 Mar 5.40	63.39	107.52	7490	1094	1129	0.002	49
Echostar 14 [Proton-M/Breeze-M]	2010 10 A [36499] BAI	2010 Mar 20.769 > million years	Box + 2 panels 6379		2010 Mar 20.92	49.18	635.50	24486	414	35800	0.723	0
					2010 Mar 21.38	26.72	687.42	25801	3061	35784	0.634	0
					2010 Mar 22.81	15.52	781.47	28104	7654	35797	0.501	0
					2010 Mar 24.70	5.82	1012.20	33394	18244	35788	0.263	1
					2010 Mar 25.44	2.82	1172.18	36826	25109	35786	0.145	1
					2010 Mar 27.77	0.07	1435.42	42152	35760	35786	0.0003	331
					2010 Apr 3.21	0.05	1436.10	42165	35784	35788	0.00005	126
Breeze-M stage	2010 10 B [36500]	2010 Mar 20.769	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Mar 21.38	26.46	640.88	24623	2550	33939	0.637	4
Breeze-M tank	2010 10 C [36501]	2010 Mar 20.769	Torus 1290	2.1 long 4.1 dia 0.8 cross	2010 Mar 20.92	49.66	256.45	13371	324	13661	0.499	352

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D Soyuz-TMA 18 \$ 3M [Soyuz-FG] R	2010 11 A [36505] BAI	2010 Apr 2.170 176.054 days 2010 Sep 25.224	Cyl+beehive+ +spheroid+ 2 panels 7250?	7.5 long 2.72 maxdia 2.3 dia	2010 Apr 2.17 2010 Apr 2.36 2010 Apr 4.53 2010 Sep 24.90	51.65 51.65 51.65 51.64	88.51 89.37 91.47 91.63	6596 6622 6725 6733	193 222 342 350	242 264 350 359	0.004 0.003 0.0006 0.0007	70 155 135 30
D Soyuz-FG 3 rd stage (Blok I)	2010 11 B [36506]	2010 Apr 2.170 3 days 2010 Apr 5	Cylinder 2400?	8.1 long 2.66 dia	2010 Apr 2.41 2010 Apr 5.41	51.64 51.63	88.75 87.02	6591 6505	195 125	230 127	0.003 0.0001	64 15
D STS-131 Discovery # 7M [Shuttle] R	2010 12 A [36507] CC-39A	2010 Apr 5.431 15.116 days 2010 Apr 20.547	Deltawing	37.5 long 5.5 dia 23.8 span	2010 Apr 5.47 2010 Apr 5.60 2010 Apr 6.26 2010 Apr 7.09 2010 Apr 7.51 2010 Apr 17.62 2010 Apr 19.01 2010 Apr 20.34	51.65 51.65 51.65 51.65 51.65 51.65 51.65 51.64	89.37 90.42 91.07 91.10 91.45 91.40 91.15 91.20	6622 6673 6705 6707 6724 6721 6711 6712	227 252 312 315 342 348 344 345	259 337 342 343 350 348 344 345	0.002 0.006 0.002 0.002 0.0006 0.0007 0.002 0.002	198 313 277 286 147 189 135 141
CryoSat 2 & [Dnepr]	2010 13 A [36508] BAI	2010 Apr 8.581	Box + roof & 720 683 dry	4.6 long 2.4 wide 2.2 high	2010 Apr 8.63 2010 Apr 8.77	92.02 92.02	98.97 99.15	7088 7097	694 710	725 726	0.002 0.001	258 283
Dnepr 3 rd stage	2010 13 B [36509]	2010 Apr 8.581	Cylinder		2010 Apr 8.63	91.92	103.35	7296	716	1119	0.028	195
Trust Protection Shroud %	2010 13 C [36510]	2010 Apr 8.581	Hollow Cyl		2010 Apr 8.70	92.03	98.82	7080	682	722	0.003	347

\$ Soyuz-TMA 18 docked 2010 Apr 4.226 with cosmonauts Skvortsov and Kornienko and astronaut Caldwell-Dyson with ISS (Poisk port). Undocked 2010 Sep 25.085.

STS-131 docked 2010 Apr 7.322 with 7 astronauts (Poindexter, Dutton, Mastracchio, Metcalff-Lindenberger, Anderson, Wilson and Yamazaki) with ISS (PMA-2/Harmony). Undocked 2010 Apr 17.536

& CryoSat 1 was lost in a launch failure in 2005. Cryosat has a "house-like" cross section; with 2 solar panels on its "roof".

% The Dnepr 3rd stage pulled the satellite into orbit rather than pushing it. The shroud protected the satellite from the engine exhausts.

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SES-1 [Proton-M/Breeze-M]	2010 16 A [36516] BAI-IC39	2010 Apr 24.472 > million years	Box+2 panels 3152		2010 Apr 26.60	0.07	1329.47	40051	33443	33902	0.006	86
					2010 Apr 27.69	0.7	1377.50	41010	33663	35600	0.024	11
					2010 Apr 28.70	0.39	1392.70	41311	34003	35862	0.023	105
					2010 May 3.38	0.07	1432.80	42100	35664	35780	0.001	315
					2010 May 8.73	0.06	1436.50	42173	35768	35820	0.0006	6
					2010 May 9.63	0.06	1436.13	42165	35784	35790	0.0001	162
					2010 May 27.24	0.02	1427.47	41996	35605	35629	0.0003	228
					2010 Jun 1.41	0.02	1436.07	42164	35779	35793	0.0002	337
					2010 Jun 7.40	0.02	1421.32	41875	35488	35505	0.0002	241
					2010 Jun 15.24	0.05	1436.10	42165	35780	35792	0.0001	261
Breeze-M stage	2010 16 B [36517]	2010 Apr 24.472	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 May 19.28	0.46	1195.52	37314	28198	33672	0.073	8
Breeze-M tank	2010 16 C [36518]	2010 Apr 24.472	Torus 1290	2.1 long 4.1 dia	2010 Apr 24.64	46.18	598.57	23527	518	33779	0.707	0
Cosmos 2463 [Kosmos-3M]	2010 17 A [36519] PLE-LC136	2010 Apr 27.045			2010 Apr 27.04	82.98	94.10	6854	146	803	0.048	84
					2010 Apr 27.10	82.97	104.92	7369	962	1019	0.004	278
					2010 Apr 27.18	82.96	105.00	7373	969	1020	0.003	283
Kosmos-3m 2 nd stage	2010 17 B [36520]	2010 Apr 27.045	Cylinder 1434	4.22 long 2.4 to 3.2 maxdia	2010 Apr 27.10	82.97	104.85	7366	965	1009	0.003	288
Progress-M 05M \$ [Soyuz-U]	2010 18 A [36521] BAI	2010 Apr 28.719	Cyl+2 solar panels+beehive +spheroid 7250?	7.9 long 2.72 maxdia	2010 Apr 28.74	51.64	88.70	6588	186	233	0.004	83
					2010 Apr 28.97	51.64	89.60	6633	247	252	0.001	230
					2010 May 1.02	51.64	89.65	6636	251	264	0.001	264
D Soyuz-U 3 rd stage (Blok I)	2010 18 B [36522]	2010 Apr 28.719 3 days 2010 May 1	Cylinder 2400?	8.1 long 2.66 dia	2010 Apr 28.74	51.64	88.62	6584	184	227	0.003	78
					2010 May 1.41	51.59	87.23	6516	136	139	0.003	62
D STS-132 Atlantis * 6M [Shuttle] R	2010 19 A [36572] CC-LC39A	2010 May 14.764 11.770 day 2010 May 26.534	Deltawing	37.5 long 5.5 dia 23.8 span	2010 May 14.81	51.64	88.37	6572	156	232	0.006	343
					2010 May 15.16	51.60	88.78	6593	166	263	0.007	8
					2010 May 15.77	51.64	88.87	6597	200	236	0.002	322
					2010 May 16.26	51.64	88.87	6597	201	236	0.002	323
					2010 May 17.51	51.65	91.47	6725	340	353	0.001	326
					2010 May 23.48	51.65	91.47	6725	340	353	0.001	349
					2010 May 23.87	51.65	91.42	6723	335	353	0.001	337
2010 May 26.09	51.65	91.48	6726	335	359	0.001	342					

\$ Progress-M 05M docked 2010 May 1.729 to ISS (Pirs port).

* STS 132 with 6 astronauts (Ham, Antonelli, Reisman, Good, Bowen and Sellers) docked 2010 May 16.603 with ISS (PMA-2 / Harmony); delivered the russian MRM-1 module (Rassvet) to the Zarya module; undocked 2010 May 23.640

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D Hayato (K-sat) [H2A #17]	2010 20 A [36573] TAN	2010 May 20.915 38 days 2010 Jun 28	Cube 1.5	0.1 side	2010 May 20.99 2010 Jun 28.53	29.98 29.97	90.42 88.67	6674 6587	285 192	305 225	0.002 0.002	280 12
D Waseda-sat 2	2010 20 B [36574]	2010 May 20.915 53 days 2010 Jul 12	Cube+ 4 panels 1.2	0.1 side 0.1x0.1	2010 May 20.97 2010 Jul 11.72	29.98 29.97	90.47 88.08	6676 6558	290 177	305 182	0.001 0.0004	276 151
D NEGAI	2010 20 C [36575]	2010 May 20.915 37 days 2010 Jun 26	Cube 1	0.1 side	2010 May 20.97 2010 Jun 21.71	29.98 29.97	90.43 86.57	6675 6483	287 96	305 112	0.001 0.001	279 36
Akatsuki (Dawn / Planet C)	2010 20 D [36576]	2010 May 20.915	Box + 2 panels 500	1.04x1.45 x1.40	In solar orbit. *							
IKAROS \$	2010 20 E [36577]	2010 May 20.915	Cylinder 310 (launch) 290 dry + sail 13 2(4 tip mass)	1.6 dia 0.8 high 14 x 14 20 dia 0.0075 mm thick	In solar orbit.							
Unitec-1	2010 20 F [36578]	2010 May 20.915	Cube 21	0.4 side								
H2A stage	2010 20 G [36579]	2010 May 20.915	Cone+Cyl 3000?	10.6 long 4 dia								
H2A stage fragment	2010 20 H [36580]											

* On 2010 Dec 6.993 Akatsuki was supposed to fire its main thrusters to get captured by Venus gravity. Orbit analyses learned that the spacecraft was not in an orbit around Venus. It will return near Venus in about 6 years.

\$ Interplanetary Kite-craft Accelerated by Radiation Of the Sun.

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Astra 3B [Ariane-5 ECA] (V-194)	2010 21 A [36581] KOU-ELA3	2010 May 21.918 > million years	Box+ 2 panels 5471	4.5 x 3.2 x 2.8 39.8 span	2010 May 22.60 2010 May 31.81 2010 Jun 2.83 2010 Jun 5.65 2010 Jun 6.90 2010 Jun 11.00 2010 Jun 15.66	3.01 0.08 0.08 0.09 0.09 0.04 0.08	631.98 1434.13 1435.72 1436.05 1443.87 1439.78 1436.10	24395 42126 42157 42164 42317 42237 42165	260 35693 35702 35765 35882 35822 35767	35773 35803 35856 35806 35995 35894 35805	0.728 0.001 0.002 0.0005 0.001 0.0009 0.0004	178 139 125 119 247 169 322
COMSATBw-2 *	2010 21 B [36582]	2010 May 21.918 > million years	Box+ 2 panels 2440	2.8 x 1.8 x 2.9 17.2 span	2010 May 22.60 2010 May 31.92	3.00 0.08	632.37 1436.10	24405 42165	260 35780	35792 35793	0.728 0.0002	178 174
Ariane-5 2 nd stage (+VEB + 2 PA's)	2010 21 C [36583]	2010 May 21.918	Drum-cone 2600? (950+ 2x50)	4.71 long 5.46 dia (1.13 long)	2010 May 23.04	3.00	633.05	24423	259	35829	0.728	179
Sylda 5A upperpart	2010 21 D [36584]	2010 May 21.918	Barrel shaped 517	6.4 long 4.6 dia	2010 May 22.14	3.20	630.98	24369	260	35721	0.728	182
GPS 2F-1 (USA 213) [Delta-4 Medium+ 4,2]	2010 22 A [36585] CC-LC37B	2010 May 28.125 1 million years	Box+ 2 panels		2010 May 28.22 2010 May 28.24 2010 Jun 3.0 2010 Jun 25.60 2010 Sep 3.38	43.26 54.97 55.05 55.00 55.04	359.13 728.83 729.35 718.93 718.02	16737 26828 26840 26584 26562	252 20438 20442 20188 20170	20464 20461 20481 20223 20196	0.604 0.0004 0.0007 0.0007 0.0005	202 182 137 135 124
Delta-4M 2 nd stage	2010 22 B [36586]	2010 May 28.125	Cylinder 3490	12 long 2.44 dia	2010 May 28.24	54.69	754.10	27444	20457	21674	0.022	32
SERVIS 2 [Rockot]	2010 23 A [36588] PLE	2010 Jun 2.083	Box+ 2 panels 726	10.2 long 2.5 high	2010 Jun 2.14	100.45	109.37	7575	1183	1211	0.002	302
Breeze-KM stage	2010 23 B [36589]	2010 Jun 2.083	Cylindrical	2.52 dia	2010 Jun 2.14	100.57	109.98	7419	874	1206	0.022	263
Beidou-2 Compass G3 [CZ-3C]	2010 24 A [36590] XI	2010 Jun 2.662 > million years			2010 Jun 2.46 2010 Jun 8.78 2010 Jun 13.80	20.51 1.83 1.82	629.02 1436.03 1436.08	24319 42164 42165	213 35773 35778	35667 35797 35794	0.729 0.0003 0.0002	180 225 196
CZ-3C 3 rd stage (H-18)	2010 24 B [36591]	2010 Jun 2.662	Cylinder 3060	12.375 long 3.0 dia	2010 Jun 2.46	20.53	629.27	24325	215	35678	0.728	180

* COMMunication SATellite for the BundesWehr (German army).

Year of Launch 2010			RAE Table of Earth Satellites							(Compiled 2010)		Page 10	
Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)	
BADR 5 (Arabsat 5B) [Proton-M #357]	2010 25 A [36592] BAI	2010 Jun 3.917 > million years	Box+ 2 panels 5420	8.3 long 4.51 wide 39.4 span	2010 Jun 4.07 2010 Jun 4.55 2010 Jun 23.92 2010 Jul 5.02 2010 Jul 7.65 2010 Jul 23.03	49.06 18.97 0.09 0.07 0.06 0.02	636.02 741.75 1436.17 1436.08 1439.82 1436.08	24499 27144 42166 42165 42238 42165	434 5771 35778 35775 35844 35768	35807 35759 35798 35797 35874 35804	0.722 0.552 0.0002 0.0003 0.0003 0.0004	0 0 225 234 288 217	
Breeze-M stage	2010 25 B [36593]	2010 Jun 3.917	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Jun 4.07	18.39	697.07	26042	5021	34306	0.562	5	
Breeze-M tank	2010 25 C [36594]	2010 Jun 3.917	Torus 1290	2.1 long 4.1 dia 0.8 cross	2010 Jun 4.07	49.51	302.02	14912	330	16736	0.550	353	
D Dragon / Falcon 2nd stage	2010 26 A [36595]	2010 Jun 4.782 23 days 2010 Jun 26	Cyl-cone + 2 panels Cylinder	3.66 dia	2010 Jun 4.84 2010 Jun 26.96	34.50 34.48	89.53 87.27	6634 6517	235 138	276 140	0.003 0.0001	213 256	
Shijian-12 [CZ-2D]	2010 27 A [36596] JIUQ	2010 Jun 15.069			2010 Jun 15.11	97.70	96.40	6964	575	597	0.002	218	
CZ-2D 2 nd stage	2010 27 B [36597]	2010 Jun 15.069	Cylinder 3400?	10.41 long 3.35 dia	2010 Jun 15.11 2010 Jun 15.18	97.57 97.56	96.92 97.00	6990 6994	559 566	663 664	0.007 0.007	196 193	
Picard [Dnepr]	2010 28 A [36598] YAS	2010 Jun 15.613	Box+ panel 143	0.9 x 1.2 x 2.7	2010 Jun 15.66 2010 Jun 17.94	98.28 98.29	99.57 99.35	7116 7106	726 726	749 728	0.002 0.0001	198 220	
Prisma * (Mango)	2010 28 B [36599]	2010 Jun 15.613	Box+ 2 panels	0.75x0.75 x0.80 26.00 span	2010 Jun 15.73 2010 Jun 17.86	98.29 98.28	99.00 99.93	7089 7134	693 725	728 785	0.002 0.004	9 186	
BPA-1/Dnepr 3 rd stage	2010 28 C [36600]	2010 Jun 15.613	Drum 1910	~1 long ~3 dia	2010 Jun 15.66	98.24	104.92	7369	714	1267	0.038	194	
Prisma * (Tango)	2010 28 F [36827]	2010 Jun 15.613	Box + panel 40	0.57x0.74 x0.295	2010 Aug 12.23	98.28	99.93	7134	723	787	0.004	22	
Fragments	2010 28 D 2010 28 E	[36601] [36602]			2010 Jun 15.73 2010 Jun 15.73	98.29 98.28	99.33 99.93	7106 7134	726 725	728 785	0.0001 0.004	322 193	

* PRISMA consists of 2 satellites, launched attached to each other. Tango separated from Mango 2010 Aug 11.744 and will recede different distances to Mango up to 100 km. At the end of the operations Tango will approach Mango to within several meters.

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
D Soyuz-TMA 19 *	2010 29 A	2010 Jun 15.899	Cyl+beehive+	7.5 long	2010 Jun 15.92	51.60	88.85	6596	196	240	0.003	78
3M {Soyuz-FG}	[36603]	163.300 days	+spheroid+	2.72 maxdia	2010 Jun 16.22	51.64	89.48	6627	243	255	0.0009	241
R	BAI	2010 Nov 26.199	2 panels	2.3 dia	2010 Jun 17.77	51.65	91.60	6732	347	352	0.0009	337
				7250?	2010 Nov 23.58	51.64	91.53	6728	345	354	0.0007	235
D Soyuz-FG 3 rd stage	2010 29 B	2010 Jun 15.899	Cylinder	8.1 long	2010 Jun 15.92	51.61	88.77	6592	192	234	0.003	68
	[36604]	4 days	2400?	2.66 dia	2010 Jun 6.57	51.59	87.08	6509	126	134	0.0007	51
		2010 Jun 19										
TanDEM-X #	2010 30 A	2010 Jun 20.093	Hexagonal cyl	5 high	2010 Jun 20.20	97.45	94.68	6882	496	511	0.001	286
[Dnepr]	[36605]		+ SAR antenna	2.4 dia	2010 Jun 20.25	97.45	94.78	6887	507	509	0.0001	99
	YAS		+ 3.3 m boom	5x0.80								
			1230									
Dnepr 3th stage	2010 30 B	2010 Jun 20.093	Cylinder		2010 Jun 21.21	97.40	101.33	7200	498	1145	0.045	194
	[36606]											
Fragment	2010 30 C	[36607]			2010 Jun 21.20	97.45	94.42	6869	474	506	0.002	344
Ofeq 9	2010 31 A	2010 Jun 22.792	Box+2panels		2010 Jun 22.91	141.78	93.90	6844	343	588	0.018	48
[Shavit-2]	[36608]		275									
	PAL											
Shavit-2 4 th stage	2010 31 B	2010 Jun 22.792	Cylinder		2010 Jun 22.84	141.80	93.48	6823	294	595	0.022	52
	[36609]			2.3 dia	2010 Jun 23.17	141.78	93.48	6823	300	589	0.021	54

* Soyuz-TMA 19 with cosmonaut Yurchikhin and astronauts Wheelock and Walker docked 2010 Jun 17.265 with ISS (Zvezda aft port). Undocked 2010 Jun 28.884 and relocated it 2010 Jun 28.893 to the Rassvet port. Undocked 2010 Nov 26.058.

TerraSAR-X add-on Digital Elevation Measurement. Will fly in tandem with TerraSAR-X (2007 26 A) at several hundred meters.

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Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)	
COMS 1 [Ariane-5 ECA]	2010 32 A [36744] KOU-ELA3	2010 Jun 26.903 > million years	Box+ panel 2460	2.8 x 1.8 x 2.9 17.2 span	2010 Jun 27.15 2010 Jul 7.85	1.97 0.01	632.90 1436.10	24419 42165	260 35782	35820 35790	0.728 0.0001	178 26	
Arabsat 5A	2010 32 B [36745]	2010 Jun 26.903 > million years	Box+2 panels 4939	2.1 2.35 x 4.5 39.4 span	2010 Jun 27.03 2010 Jul 10.80 2010 Jul 14.02 2010 Jul 19.98 2010 Jul 20.72 2010 Jul 26.91	1.97 0.03 0.14 0.05 0.02 0.02	631.62 1436.08 1427.35 1436.00 1436.07 1436.12	24385 42165 41994 42163 42164 42165	259 35776 34530 35781 35782 35784	35755 35796 36700 35787 35790 35789	0.728 0.0002 0.025 0.0001 0.0001 0.0001	178 108 78 296 97 124	
Ariane-5 2 nd stage (+VEB+2 PA's)	2010 32 C [36746]	2010 Jun 26.903	Drum-cone 2600? (950+ 2x160)	4.71 long 5.46 dia (1.13 long)	2010 Jun 27.03	1.81	629.93	24342	261	35666	0.727	171	
Sylda 5A upperpart	2010 32 D [36747]	2010 Jun 26.903	Barrel shaped 517	6.4 long 4.6 dia	2010 Jun 27.03	1.97	632.18	34400	262	35781	0.728	178	
D Progress-M 06M * [Soyuz-U]	2010 33 A [36748] BAI	2010 Jun 30.649 68 days 2010 Sep 6	Cyl+beehive+ +spheroid+ 2 panels 7250?	7.5 long 2.72 maxdia 2.3 dia	2010 Jun 30.70 2010 Jun 30.96 2010 Jul 2.95 2010 Jul 4.60 2010 Jul 6.46 2010 Sep 6.38	51.61 51.64 51.65 51.65 51.65 51.64	88.62 89.43 91.62 91.65 91.58 91.47	6584 6625 6732 6734 6731 6725	188 230 341 344 345 335	224 263 366 367 359 358	0.003 0.003 0.002 0.002 0.001 0.002	78 123 108 110 48 314	
D Soyuz-U 3 rd stage	2010 33 B [36749]	2010 Jun 30.649 3 days 2010 Jul 3	Cylinder 2400?	8.1 long 2.66 dia	2010 Jun 30.70 2010 Jun 3.64	51.62 51.61	88.60 87.22	6584 6515	187 134	224 138	0.003 0.0004	73 146	

* The first attempt to dock with ISS was aborted 2010 Jul 2 due to communication interference.
Progress-M 06M docked 2010 Jul 4.762 with ISS (Zveda aft port); undocked 2010 Aug 31.476.

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite	Launch date Lifetime and descent date	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Echostar 15 [Proton-M/Breeze-M] (Proton #358)	2010 34 A [36792] BAI	2010 Jul 10.778	Box+2panels		2010 Jul 10.93	49.25	636.23	24504	419	35833	0.723	0
		> million years	5511		2010 Jul 11.41	18.72	747.78	27291	5989	35835	0.547	0
					2010 Jul 12.45	9.17	911.42	31139	13671	35851	0.356	0
					2010 Jul 14.35	4.48	1029.62	33777	19694	35102	0.228	5
					2010 Jul 15.67	0.32	1402.08	41497	34417	35819	0.017	356
					2010 Jul 16.65	0.05	1437.25	42188	35791	35827	0.0004	265
					2010 Jul 16.75	0.04	1436.70	42177	35790	35806	0.0002	298
					2010 Jul 20.96	0.07	1436.02	42163	35777	35792	0.0002	224
					2010 Aug 5.27	0.05	1436.08	42165	35778	35794	0.0002	227
Breeze-M stage	2010 34 B [36793]	2010 Jul 10.778	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Jul 11.41	18.47	704.28	26222	5330	34356	0.553	4
Breeze-M tank	2010 34 C [36794]	2010 Jul 10.778	Torus 1290	2.1 long 4.1 dia	2010 Jul 10.93	49.51	316.93	15398	333	17707	0.564	354
Cartosat 2B [PSLV-CA #C15]	2010 35 A [36795] SRI	2010 Jul 12.161	Hexagonal Box		2010 Jul 12.20	98.15	97.23	7005	615	638	0.002	267
			+2 panels 694		2010 Jul 12.41	98.15	97.33	7010	622	639	0.001	279
Studsat	2010 35 B [36796]	2010 Jul 12.161	Box+4 antenna 0.95	0.1 x 0.1 x 0.135	2010 Jul 12.27	98.15	97.32	7008	622	637	0.001	267
AISSat-1	2010 35 C [36797]	2010 Jul 12.161	Cube + rod 6.4	0.2 side	2010 Jul 12.34	98.15	97.25	7006	619	636	0.001	318
Alsats 2A	2010 35 D [36798]	2010 Jul 12.161	Box+ panel 116	0.6 x 0.6 x 1.0	2010 Jul 12.34	98.14	97.30	7008	620	638	0.001	282
					2010 Jul 16.35	98.17	97.52	7018	630	649	0.001	319
					2010 Jul 17.22	98.18	97.72	7028	646	653	0.0004	271
					2010 Jul 18.16	98.20	97.87	7036	653	660	0.0005	7
TIsat	2010 35 E [36799]	2010 Jul 12.161	Cube+4 antenna 1	0.1 side	2010 Jul 12.34	98.15	97.25	7005	616	638	0.002	291
					2010 Jul 12.54	98.16	97.28	7007	617	639	0.002	321
PSLV 4th stage	2010 35 F [36800]	2010 Jul 12.161	Cylinder 2500 full	2.6 long 2.8 dia	2010 Jul 12.27	98.09	96.85	6986	589	626	0.003	32
Dual launch adapter	2010 35 G [36801]	2010 Jul 12.161			2010 Jul 12.40	98.16	97.30	7008	621	638	0.001	308

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Beidou-2 Compass IGSO 1 [CZ-3A]	2010 36 A [36828] XI	2010 Jul 31.896 > million years	Box+ 2 panels 2230 1130	1.70 high 18.10 span	2010 Aug 1.15	55.08	632.13	24399	189	35851	0.731	175
					2010 Aug 4.41	55.06	1437.08	42184	35652	35959	0.004	179
					2010 Aug 5.67	55.10	1435.43	42152	35652	35894	0.003	184
					2010 Aug 7.72	55.09	1435.82	42159	35669	35892	0.003	182
					2010 Oct 2.76	55.06	1436.03	42164	35676	35894	0.003	182
CZ-3A 3 rd stage	2010 36 B [36829]	2010 Jul 31.896	Cylinder 3060	12.375 long 3.0 dia	2010 Aug 1.15	54.72	630.65	24361	155	35809	0.732	175
					2010 Aug 4.22	54.62	630.90	24367	174	35803	0.731	175
Nilesat 201 [Ariane-5 ECA] (V196 #554)	2010 37 A [36830] KOU-ELA3	2010 Aug 4.874 > million years	Box+ 2 panels 3200	2.9 x 1.8 x2.8 29.6 span	2010 Aug 5.51	1.97	631.55	24384	247	35763	0.728	178
					2010 Aug 18.03	0.02	1436.10	42165	35785	35788	0.0003	46
Rascom-QAF 1R	2010 37 B [36831]	2010 Aug 4.874 > million years	Box+ 2 panels 3050	2.4 x 1.8 x 3.75 31.8 span	2010 Aug 5.49	1.97	631.28	24377	247	35749	0.728	179
					2010 Aug 18.06	0.02	1436.08	42164	35709	35863	0.002	115
					2010 Aug 20.01	0.02	1436.10	42165	35782	35790	0.00009	300
					2010 Aug 31.93	0.04	1436.35	42170	35781	35801	0.0002	333
					2010 Sep 7.90	0.03	1441.58	42272	35807	35980	0.002	141
Ariane-5 2 nd stage (+VEB+ 2 PA's)	2010 37 C [36832]	2010 Aug 4.874	Drum-cone 2600? (950+ 2x160)	4.71 long 5.46 dia (1.13 long)	2010 Aug 5.51	2.27	628.88	24315	245	35628	0.728	186
					2010 Aug 5.11	1.97	631.15	24374	256	35733	0.728	178
					2010 Aug 10.00	97.82	96.98	6992	607	621	0.001	55
Sylda 5K upperpart	2010 37 D [36833]	2010 Aug 4.874	Barrel shaped 530	7.0 long 4.6 dia	2010 Aug 5.11	1.97	631.15	24374	256	35733	0.728	178
Yaogan 10 [CZ-4C]	2010 38 A [36834] WUZ	2010 Aug 9.951			2010 Aug 10.00	97.82	96.98	6992	607	621	0.001	55
CZ-4 3 rd stage	2010 38 B [36835]	2010 Aug 9.951	Cylinder 1730?	4.93 long 2.9 dia	2010 Aug 10.00	97.78	94.90	6892	408	619	0.015	36
Fragments	2010 38 C-F	4 pieces, all in orbit										

For orbital information see extra pages at end of year

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
AEHF-1 * (USA 214) [Atlas-5 531] (AV-019)	2010 39 A [36868] CC-LC41	2010 Aug 14.463	Box+ 2 panels 6087		no TLE available; orbits based on amateur observations.							
					2010 Aug 14.47	27.66	99.27	7102	161	1286	0.079	160
					2010 Aug 14.48	22.27	930.77	31578	221	50179	0.791	180
					2010 Aug 27.63	22.12	927.60	31507	283	49973	0.789	186
					2010 Aug 30.20	21.67	930.83	31580	427	49975	0.785	187
					2010 Sep 1.14	21.62	934.37	31660	593	49970	0.780	188
					2010 Sep 1.79	21.27	935.05	31675	606	49987	0.779	188
					2010 Sep 3.08	20.86	937.42	31729	716	49984	0.776	189
					2010 Sep 3.73	20.81	938.83	31760	789	49975	0.774	189
					2010 Sep 5.03	20.43	942.25	31838	948	49970	0.770	190
					2010 Sep 5.69	20.36	942.78	31850	991	49951	0.767	190
					2010 Sep 9.62	19.69	951.15	32038	1368	49950	0.758	128
					2010 Sep 12.17	18.24	970.60	32473	2220	49968	0.735	193
					2010 Sep 14.95	17.01	990.18	32908	3089	49970	0.712	195
					2010 Sep 15.98	16.00	1009.70	33339	3942	49979	0.690	196
					2010 Sep 21.10	15.37	1023.32	33639	4544	49975	0.675	198
					2010 Sep 23.07	15.16	1026.37	33705	4678	49975	0.672	199
					2010 Sep 24.20	15.17	1027.03	33720	4705	49977	0.671	199
					2010 Oct 13.13	15.09	1027.05	33720	4713	49970	0.671	202
					2010 Oct 17.00	15.04	1027.97	33740	4756	49968	0.670	203
					2010 Oct 18.03	14.99	1028.98	33763	4800	49968	0.669	203
					2010 Oct 25.92	14.77	1036.00	33916	5103	49972	0.661	204
					2010 Oct 28.25	14.59	1044.78	34107	5381	50076	0.655	205
					2010 Nov 11.18	13.68	1068.88	34630	6301	50201	0.633	208
					2010 Nov 14.13	13.43	1073.98	34740	6463	50259	0.630	209
					2010 Nov 23.84	12.67	1090.22	35089	7030	50391	0.617	211
					2011 May 22.99	6.67	1592.17	45167	25891	51695	0.286	229
Atlas-5 2 nd stage (Centaur)	2010 39 B [36869]	2010 Aug 14.463	Cylinder 2100?	12.68 long 3.05 dia	no TLE available; orbits based on amateur observations.							
					2010 Aug 27.71	21.69	930.02	31562	225	50141	0.791	184
Tianhui 1 [CZ-2D #13]	2010 40 A [36985] JIUQ	2010 Aug 24.299			2010 Aug 24.41	97.35	94.52	6874	489	501	0.0009	315
					2010 Aug 24.61	97.35	94.52	6874	487	504	0.001	313
					2010 Aug 25.81	97.35	94.52	6874	487	503	0.001	308

* Advanced Extremely High Frequency; US military communication satellite. Main engine failed to ignite properly and shut down. Orbit is raised with hydrazine thrusters and xenon thrusters.

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Cosmos 2464 * [Proton-M / Block DM-2]	2010 41 A [37137] BAI-IC81/24	2010 Sep 2.0378	Cyl+ 2 panels+ magnometerboom 1370	2.4 dia 3.7 height	2010 Sep 2.17 2010 Sep 2.29	64.78 64.84	676.13 675.67	25518 25506	19125 19115	19154 19140	0.0006 0.0005	67 113	
Cosmos 2465 *	2010 41 B [37138]	2010 Sep 2.0378	Cyl+ 2 panels+ magnometerboom 1370	2.4 dia 3.7 height	2010 Sep 2.17 2010 Sep 3.65	64.85 64.84	674.83 675.58	25486 25505	19089 19118	19125 19133	0.0007 0.0003	225 141	
Cosmos 2466 *	2010 41 C [37139]	2010 Sep 2.0378	Cyl+ 2 panels+ magnometerboom 1370	2.4 dia 3.7 height	2010 Sep 2.17 2010 Sep 2.60 2010 Sep 5.11	64.83 64.82 64.83	674.40 674.73 675.60	25475 25483 25505	19068 19068 19116	19124 19140 19137	0.001 0.001 0.0004	238 186 124	
Proton-M 4th stage (Block DM-2)	2010 41 D [37140]	2010 Sep 2.0378	Cylinder 2350?	6.22 long 3.7 maxdia	2010 Sep 2.17	64.80	676.18	25519	19127	19155	0.0006	56	
D Proton-M 3rd stage (8S812)	2010 41 E [37141]	2010 Sep 2.0378 < 1 day 2010 Sep 2	Cylinder 4185	4 long 4.1 dia	2010 Sep 2.28 2010 Sep 2.40	64.83 64.81	87.80 87.35	6544 6521	155 139	176 147	0.002 0.0006	346 309	
D Proton-M 4th stage Casing	2010 41 F [37142]	2010 Sep 2.0378 < 1 day 2010 sep 2	Hollow cyl 800?	4.0 long 3.7 dia	2010 Sep 2.28 2010 Sep 2.88	64.81 64.81	87.75 87.25	6542 6516	152 128	174 147	0.002 0.001	280 277	
Proton-M Ullage motor	2010 41 G [37143]	2010 Sep 2.0378	Cylinder 55	0.90 long 0.68 dia	2010 Sep 3.57	64.90	340.35	16148	403	19136	0.580	193	
Proton-M Ullage motor	2010 41 H [37144]	2010 Sep 2.0378	Cylinder 55	0.90 long 0.68 dia	2010 Sep 3.57	64.76	340.35	16148	405	19134	0.580	193	
Fragments	2010 41 J-M	4 pieces, all have decayed	For orbital information see extra pages at end of year										
Chinasat 6A [CZ-3B]	2010 42 A [37150] XI	2010 Sep 4.676 > million years				2010 Sep 4.42 2010 Sep 21.73 2010 Sep 27.45 2010 Sep 29.21 2010 Oct 7.35 2010 Oct 9.82	25.23 0.04 0.39 0.39 0.37 0.36	753.12 1436.10 1437.68 1436.02 1436.57 1436.08	27420 42165 42196 42163 42174 42165	197 35774 35789 35783 35791 35785	41886 35798 35846 35786 35800 35787	0.760 0.0003 0.0007 0.00004 0.0001 0.00003	179 131 187 308 355 281
CZ-3B 3 rd stage	2010 42 B [37151]	2010 Sep 4.676	Cylinder 3060	12.38 long 3.0 dia	2010 Sep 4.44	25.23	753.28	27424	194	41897	0.760	179	

* Glonass-M satellites.

Year of Launch 2010			RAE Table of Earth Satellites					(Compiled 2010)					Page 17	
Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)		
Cosmos 2467 # [Rokot #14]	2010 43 A [37152] PLE-IC133	2010 Sep 8.146	Cylindrical + gravity boom 0.8 dia 280	1.6 high	2010 Sep 8.37	82.46	116.00	7879	1496	1506	0.0006	327		
Strela 3 #	2010 43 B [37153]	2010 Sep 8.146	Cylindrical + gravity boom 0.8 dia 280?	1.6 high	2010 Sep 8.29	82.45	116.05	7882	1497	1509	0.0008	351		
Cosmos 2468 #	2010 43 C [37154]	2010 Sep 8.146	Cylindrical + gravity boom 0.8 dia 280?	1.6 high	2010 Sep 8.29	82.45	116.03	7880	1497	1507	0.0006	355		
Rokot 3 rd stage (Breeze-KM)	2010 45 D [37155]	2010 Sep 8.146	Cylindrical 1700	3 long 2.5 dia	2010 Sep 8.28	82.46	112.62	7726	1192	1502	0.020	269		
D Progress-M 07M * [Soyuz-U]	2010 44 A [37156] BAI	2010 Sep 10.432 163 days 2011 Feb 20	Cyl+beehive+ +spheroid+ 2 panels 7250?	7.5 long 2.72 maxdia 2.3 dia	2010 Sep 10.45 2010 Sep 10.82 2010 Sep 11.86 2010 Sep 12.56	51.61 51.64 51.64 51.65	88.57 89.75 89.80 91.62	6582 6641 6643 6732	186 249 254 348	220 275 274 359	0.003 0.002 0.001 0.0008	79 127 128 5		
D Soyuz-U 3 rd stage	2010 44 B [37157]	2010 Sep 10.432 2 days 2010 Sep 12	Cylinder 2400?	8.1 long 2.66 dia	2010 Sep 10.45 2010 Sep 12.87	51.62 51.61	88.52 87.27	6579 6518	187 138	214 140	0.002 0.0002	74 140		
Michibiki \$ (QZS-1) [H2A 202 #18]	2010 45 A [37158] TAN-LC1	2010 Sep 11.470 > million years	Box + 2 panels 4000	2.9x3.1 6.2 25.3 span	2010 Sep 11.58 2010 Sep 13.20 2010 Sep 14.48 2010 Sep 16.16 2010 Sep 17.51 2010 Sep 27.13 2010 Oct 3.62	31.81 40.74 40.97 40.96 40.96 40.96 40.96	623.90 1333.07 1442.80 1521.70 1422.22 1436.03 1436.08	24187 40123 42296 43824 41893 42164 42165	280 31525 35869 35916 32046 32904 32608	35336 35965 35965 38975 38982 38965 38964	0.725 0.055 0.001 0.035 0.083 0.075 0.075	180 181 181 270 270 270 270		
H-2A 2 nd stage	2010 45 B [37159]	2010 Sep 11.470	Cone+Cyl 3000?	10.6 long 4 dia	2010 Sep 13.42	31.81	624.48	24202	294	35352	0.724	181		

Gonets-M and 2 Strela (military Gonets) satellites.

* Progress-M 07M docked with ISS (Zvezda aft port) 2010 Sep 12. Undocked 2011 Feb

\$ Supplemental GPS-satellite in a quasi zenith orbit; Quasi Zenith Satellite.

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
FIA radar 1 (USA 215, NROL-41) [Atlas-5 501 #2)	2010 46 A [37162] VDB-SLC-3E	2010 Sep 21.169			No TLE available; orbit from amateur observations. 2010 Sep 22.18 2010 Sep 23.07 2010 Oct 1.73 2010 Oct 9.37 2010 Oct 11.38 2010 Oct 12.42	123.00 123.00 123.00 123.00 123.00 123.00	106.57 106.68 106.70 107.22 107.28 107.33	7446 7452 7452 7476 7479 7482	1060 1064 1065 1094 1099 1101	1075 1083 1082 1101 1102 1105	0.001 0.001 0.001 0.0004 0.0003 0.0003	359 64 82 94 97 98
Atlas-5 2 nd stage (Centaur)	2010 46 B [NNA]	2010 Sep 21.169	Cylinder 2100?	12.68 long 3.05 dia	No TLE available							
Yaogan 11 [CZ-2D]	2010 47 A [37165] JIUQ	2010 Sep 22.112	Box + 2 panels		2010 Sep 22.16 2010 Sep 22.90	98.01 98.01	97.57 97.52	7021 7019	627 624	657 656	0.002 0.002	304 295
Zheda Pixing 1B	2010 47 B [37166]	2010 Sep 22.112			2010 Sep 22.23 2010 Sep 22.50	98.03 98.02	97.50 97.50	7018 7018	623 622	654 656	0.002 0.002	300 298
Zheda Pixing 1C	2010 47 B [37167]	2010 Sep 22.112			2010 Sep 22.29	98.00	97.52	7018	624	655	0.002	302
SBSS 1 (Block 10)* (USA 216) [Minotaur 4]	2010 48 A [37168] VDB-SLC-8	2010 Sep 26.695	Box + 2 panels + telescope 1031		No TLE available; orbit from amateur observations. 2010 Oct 12.70	97.97	97.35	7011	631	633	0.0001	0
Minotaur 4 4 th stage (Orion 38)	2010 48 B [37169]	2010 Sep 26.695			No TLE available; orbit from amateur observations. 2010 Sep 30.81	98.00	95.35	6914	530	541	0.0008	325

* Space Based Satellite Surveillance

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Cosmos 2469 [Molniya-M]	2010 49 A [37170] PLE-IC16/2	2010 Sep 30.709			2010 Sep 30.79 2010 Oct 31.39	62.79 62.81	704.20 717.67	26220 26553	554 607	39128 39741	0.736 0.737	287 287
Molniya-M 4th stage	2010 49 B [37171]	2010 Sep 30.709	Cylinder 900	2.3 long 2.2 dia	2010 Sep 30.81	62.77	703.32	26198	558	39080	0.735	287
D Molniya-M 4 th stage Casing	2010 49 C [37172]	2010 Sep 30.709 76 days 2010 Dec 14	300		2010 Sep 30.91 2010 Dec 14.74	62.80 62.78	92.05 87.22	6754 6515	226 125	524 147	0.022 0.002	113 130
Molniya-M 3rd stage	2010 49 D [37173]	2010 Sep 30.709	Cylinder 2000	8.1 long 2.66 dia	2010 Oct 1.91	62.92	91.97	6750	192	550	0.027	114
Fragment	2010 49 E [37176]				2010 Oct 1.21	62.82	92.21	6768	224	555	0.024	115
Chang`e 2 * [CZ-3C]	2010 50 A [37174] XI	2010 Oct 1.458	Box + 2 panels 2300 full		2010 Oct 1.46	29.19	89.54	6648	263	276	0.001	105
CZ-3C 3 rd stage (H-18)	2010 50 B [37175]	2010 Oct 1.458	Cylinder 3060	12.375 long 3.0 dia	2010 Oct 1.44	32.36	110.87	7645	-209	2742	0.193	63
SJ-6G [CZ-4B]	2010 51 A [37179] WUZ	2010 Oct 6.034			2010 Oct 6.07 2010 Oct 7.89 2010 Oct 9.63 2010 Oct 10.12 2010 Oct 15.14	97.76 97.75 97.76 97.74 97.76	96.60 96.57 96.52 96.33 96.57	6974 6973 6971 6952 6973	588 584 580 565 583	604 604 604 601 605	0.001 0.001 0.002 0.003 0.002	333 331 327 320 292
SJ-6H	2010 51 B [37180]	2010 Oct 6.034			2010 Oct 6.15 2010 Oct 7.89	97.62 97.75	96.70 96.60	6979 6975	511 588	690 604	0.013 0.001	288 327
CZ-4B 3 rd stage	2010 51 C [37181]	2010 Oct 6.034	Cylinder 1727	4.93 long 2.9 dia	2010 Oct 6.15 2010 Oct 7.89	97.76 97.62	96.58 96.70	6974 6979	587 512	603 689	0.001 0.013	334 282
Fragment	2010 51 D [37182]				2010 Oct 6.62	97.76	96.57	6973	584	604	0.001	337

* Moon probe launched into a highly eccentric orbit. After a half hour burn on 2010 Oct 6.129 captured by Moon's gravitation and entered a 12 hour moon orbit.

Year of Launch 2010			RAE Table of Earth Satellites							(Compiled 2010)		Page 20	
Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)	
D Soyuz TMA-01M 1 3M [Soyuz-U] R	2010 52 A [37183] BAI-IC1	2010 Oct 07.966 159.364 days 2011 Mar 16.330	Cyl+beehive+ +spheroid+ 2 panels 7250?	7.5 long 2.72 maxdia 2.3 dia	2010 Oct 7.96 2010 Oct 8.73 2010 Oct 9.84 2011 Mar 15.43	51.61 51.65 51.65 51.65	88.87 89.82 91.60 91.55	6597 6644 6732 6729	195 246 348 346	242 285 358 354	0.004 0.003 0.0008 0.0006	71 351 79 68	
D Soyuz-FG 3 rd stage	2010 52 B [37184]	2010 Oct 07.966 4 days 2010 Oct 11	Cylinder 2400?	8.1 long 2.66 dia	2010 Oct 7.96 2010 Oct 11.27	51.62 51.60	88.78 87.40	6593 6525	192 142	236 150	0.003 0.0007	65 81	
Sirius XM 5 [Proton/Breeze-M]	2010 53 A [37185] BAI	2010 Oct 14.787 > million years	Box +2 panels		2010 Oct 14.94 2010 Oct 15.41 2010 Oct 18.39 2010 Oct 23.73 2010 Oct 26.17 2010 Oct 28.22	49.15 22.82 5.01 0.04 0.03 0.03	635.47 710.25 1046.27 1438.97 1436.03 1436.08	24485 26370 34139 42221 42164 42165	423 4187 19743 35775 35777 35778	35789 35795 35778 35910 35793 35794	0.722 0.599 0.235 0.002 0.0002 0.0002	0 0 1 262 251 260	
Breeze-M stage	2010 53 B [37186]	2010 Oct 14.787	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Oct 15.41	22.56	663.53	25200	3609	34034	0.604	4	
Breeze-M tank	2010 53 C [37187]	2010 Oct 14.787	Torus 1290	2.1 long 4.1 dia	2010 Oct 15.52	49.58	279.43	14158	326	15234	0.526	353	
Globalstar M079 [Soyuz 2-1a/Fregat]	2010 54 A [37188] BAI-LC31	2010 Oct 19.716	Trapezoidal box + 2 panels 700 full 350 dry	0.60 x 1.50 x 1.60 12 span	2010 Oct 19.78 2010 Oct 19.85	52.01 52.00	103.37 103.47	7297 7301	912 919	924 925	0.0008 0.0004	243 208	
Globalstar M074	2010 54 B [37189]	2010 Oct 19.716	Trapezoidal box + 2 panels 700 full 350 dry	0.60 x 1.50 x 1.60 12 span	2010 Oct 19.92	52.00	103.47	7301	919	927	0.0006	193	
Globalstar M076	2010 54 C [37190]	2010 Oct 19.716	Trapezoidal box + 2 panels 700 full 350 dry	0.60 x 1.50 x 1.60 12 span	2010 Oct 19.92	52.01	103.40	7298	913	925	0.0008	227	
Globalstar M077	2010 54 D [37191]	2010 Oct 19.716	Trapezoidal box + 2 panels 700 full 350 dry	0.60 x 1.50 x 1.60 12 span	2010 Oct 19.92	52.00	103.42	7299	914	925	0.0007	220	

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* Soyuz TMA-01M 1 with 2 cosmonauts and 1 astronaut (Kalari, Skripochka and Kelly) docked 2010 Oct 10.001 with ISS (POISK port); undocked 2011 Mar 16.185.

Year of Launch 2010			RAE Table of Earth Satellites						(Compiled 2010)		Page 21	
Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Globalstar M075	2010 54 E [37192]	2010 Oct 19.716	Trapezoidal box + 2 panels 700 full 350 dry	0.60 x 1.50 x 1.60 12 span	2010 Oct 19.99	52.00	103.48	7302	920	926	0.0004	193
Globalstar M073	2010 54 F [37193]	2010 Oct 19.716	Trapezoidal box + 2 panels 700 full 350 dry	0.60 x 1.50 x 1.60 12 span	2010 Oct 19.99	52.00	103.45	7300	917	926	0.0006	212
Fregat stage	2010 54 G [37194]	2010 Oct 19.716	Spheres + nozzle 1100?	1.5 high 3.3 dia	No TLE available							
D Progress-M 08M * [Soyuz-U]	2010 55 A [37196] BAI	2010 Oct 27.633 89 days 2011 Jan 24	Cyl+beehive+ +spheroid+ 2 panels 7250?	7.5 long 2.72 maxdia 2.3 dia	2010 Oct 27.89 2010 Oct 29.88 2010 Oct 30.75 2011 Jan 23.73 2011 Jan 24.17	51.64 51.65 51.65 51.64 51.65	89.72 89.75 91.58 91.60 91.60	6639 6641 6731 6731 6732	247 250 347 350 352	274 275 358 355 355	0.002 0.002 0.0009 0.0004 0.0002	153 160 140 214 161
D Soyuz-U 3 rd stage	2010 55 B [37197]	2010 Oct 27.633 2 days 2010 Oct 29	Cylinder 2400?	8.1 long 2.66 dia	2010 Oct 27.87 2010 Oct 29.89	51.63 51.61	88.52 87.02	6579 6505	184 120	218 132	0.003 0.0009	82 135
Eutelsat W3B # [Ariane-5 ECA]	2010 56 A [37206] KOU-ELA3	2010 Oct 28.910	Box +2 panels 5370 (full)	5.8 x 2.0 x 2.2 34 span	2010 Oct 29.54 2010 Nov 6.90	1.96 1.97	632.40 632.67	24406 24413	263 249	35791 35820	0.728 0.729	178 185
BSAT 3B	2010 56 B [37207]	2010 Oct 28.910	Box +2 panels 1967 (full)	3.8 1.9 x 1.9 16.65 span	2010 Oct 29.16 2010 Oct 31.40 2010 Nov 2.16 2010 Nov 3.10 2010 Nov 6.85 2010 Nov 9.63	1.99 0.41 0.07 0.03 0.01 0.01	631.08 1007.28 1365.60 1433.32 1435.75 1436.07	24372 33286 40774 42110 42158 42164	257 18092 33065 35725 35725 35756 35766	24372 35722 35725 35739 35803 35805	0.728 0.265 0.033 0.0002 0.0006 0.0005	178 179 160 307 0 28
Ariane-5 2 nd stage (+VEB+ 2 PA's)	2010 56 C [37208]	2010 Oct 28.910	Drum-cone 2600? (950+ 2x160)	4.71 long 5.46 dia (1.13 long)	2010 Oct 29.11	2.32	629.93	24342	254	35673	0.728	186
Sylda 5A upperpart	2010 56 D [37209]	2010 Oct 28.910	Barrel shaped 500	6.4 long 4.6 dia	2010 Oct 29.16	1.99	630.80	24365	257	35715	0.728	178

* Progress-M 08M docked 2010 Oct 30.692 with ISS (PIRS port); undocked 2011 Jan 23.

Due to a hydrazine fuel leak shortly after release from Ariane stage stranded in GTO and declared a total loss. Solar panels and antenna's not deployed.

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Beidou G4 [CZ-3C]	2010 57 A [37210] XI	2010 Oct 31.685 > million years			2010 Oct 31.92	20.48	631.65	24386	188	35827	0.731	180
					2010 Nov 6.22	1.83	1356.13	42166	35767	35807	0.0005	214
					2010 Nov 10.55	1.82	1356.08	42165	35764	35808	0.0005	208
					2010 Nov 29.43	1.78	1356.12	42165	35779	35794	0.0001	223
CZ-3C 3 rd stage (H-18)	2010 57 B [37211]	2010 Oct 31.685	Cylinder 3060	12.375 long 3.0 dia	2010 Oct 31.92	20.48	631.60	24385	185	35829	0.731	180
Meridian 3 {Soyuz 2-1a/Fregat}	2010 58 A [37212] PLE-LC43/4	2010 Nov 2.041	Box +2 panels		2010 Nov 3.61	62.83	725.60	26748	966	39773	0.725	270
					2010 Nov 14.53	62.78	720.28	26618	960	39518	0.724	270
					2010 Nov 16.68	62.80	717.70	26554	961	39389	0.724	270
Fregat stage	2010 58 B [37213]	2010 Nov 2.041	Spheres + nozzle 1100?	1.5 high 3.3 dia	2010 Nov 3.68	62.81	718.95	26585	807	39605	0.730	270
FengYun 3B [CZ-4C]	2010 59 A [37214] WUZ	2010 Nov 4.776	Box + panel 2298.5		2010 Nov 4.82	98.70	100.93	7181	797	808	0.0008	283
CZ-4C 3rd stage	2010 59 B [37215]	2010 Nov 4.776	Cylinder 1730?	4.93 long 2.9 dia	2010 Nov 4.82	98.76	99.62	7119	676	805	0.009	47
Skymed 4 [Delta-2 #93]	2010 60 A [37216] VDB	2010 Nov 6.014	Box +2 panels +SAR antenna 1700		2010 Nov 6.14	97.86	97.08	6997	616	621	0.0004	243
					2010 Nov 6.27	97.86	97.15	7001	621	624	0.0002	111
					2010 Nov 13.63	97.86	96.97	6992	612	614	0.0002	14
Delta-2 2 nd stage	2010 60 B [37217]	2010 Nov 6.014	Cylinder 919	5.88 long 2.44 dia	2010 Nov 6.14	97.75	92.73	6787	184	632	0.033	261
Skyterra 1 [Proton/Breeze-M]	2010 61 A [37218] BAI	2010 Nov 14.728 > million years	Box + 2 panels + antenna 5360	22 dia	2010 Nov 15.36	18.84	739.25	27083	5873	35535	0.548	1
					2010 Nov 30.04	6.06	1436.08	42164	35782	35790	0.0001	61
					2010 Dec 1.97	6.06	1436.12	42165	35781	35792	0.0001	74
Breeze-M stage	2010 61 B [37219]	2010 Nov 14.728	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Nov 15.36	18.95	747.98	27296	5999	35835	0.547	0
Breeze-M tank	2010 61 C [37220]	2010 Nov 14.728	Torus 1290	2.1 long 4.1 dia	2010 Nov 14.88	49.50	306.23	15050	321	17021	0.555	354

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
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STPSAT 2* (USA 217) [Minotaur IV]	2010 62 A [37222] KOD-IC1	2010 Nov 19.059	Cube +3 panels	0.6 side	No TLE available.	In 72°,	641x652 km orbit					
RAX # (USA 218)	2010 62 B [37223]	2010 Nov 19.059	3U Cube 2.6	0.1 x 0.1 x 0.3	2010 Dec 7.65	71.97	97.47	7016	622	654	0.002	282
O/OREOS \$ (USA 219)	2010 62 C [37224]	2010 Nov 19.059	3U Cube	0.1 x 0.1 x 0.3	2010 Dec 7.65	71.97	97.50	7017	624	654	0.002	279
FASTSAT/HSV01 % (USA 220)	2010 62 D [37225]	2010 Nov 19.059	140		2010 Dec 5.55	71.97	97.52	7019	626	654	0.002	280
FALCONSAT 5 (USA 221)	2010 62 E [37226]	2010 Nov 19.059	Box 160.7	0.7 x 0.64 x 0.54	No TLE available.	In 72°,	641x652 km orbit					
FAST 1 & (USA 222) (Fastracsat 1 SARA LILY)	2010 62 F [37227]	2010 Nov 19.059	Hexagonal 28		2010 Dec 9.28	71.97	97.53	7019	627	654	0.002	274
Fastracsat 2 EMMA	2010 62 ?? [???	2010 Nov 19.059	Hexogonal 28		2011 Apr 27.87	71.97	97.53	7019	626	655	0.002	300
Minotaur IV 4 th stage	2010 62 G [37228]	2010 Nov 19.059			No TLE available.	In 72°,	641x652 km orbit					
HAPS ^	2010 62 H [37229]	2010 Nov 19.059			No TLE available.	In 72°,	1200 km orbit					
Ballast A	2010 62 J [37230]	2010 Nov 19.059			No TLE available.	In 72°,	1200 km orbit					
Ballast B	2010 62 K [37231]	2010 Nov 19.059			No TLE available.	In 72°,	1200 km orbit					

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* Space Test Program SATellite 2; # Radio Aurora eXplorer; \$ Organism / Organic Exposure to Orbital Stresses

& aka FASTRAC; Formation Autonomous Spacecraft with Thruster, ReInav, Attitude and Crosslink; split 2011 March 22.274 in two sats SARA LILY and EMMA

^ Hydrazine Auxiliary Propulsion System

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Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)	
Nanosail D %	2010 62 L [37361]	2010 Nov 19.059	Cube + Sail 3.85	0.1x0.1x0.3 3.05 x 3.05	2011 Feb 3.51 2011 Apr 28.08 2011 May 31.91 2011 Jun 3.92	71.97 71.96 71.95 71.94	97.45 96.53 96.23 96.18	7015 6971 6957 6954	624 567 559 547	648 618 597 604	0.002 0.004 0.003 0.001	161 294 180 187	
FAST 2	2010 62 M [37380]	2010 Nov 19.059			No TLE available.								
NROL-32 (USA 223)* Mentor 5 [Delta-4H]	2010 63 A [37232] CC-LC37B	2010 Nov 21.957 > million years	+ antenna	100 dia ??	2011 Apr 3.94	6.75	1436.05	42164	35602	35969	0.004	348	
Delta-4H 2 nd stage	2010 63 B [37233]	2010 Nov 21.957	Cylinder 3490	12 long 2.44 dia	No TLE available.								
Zhongxing 20 (Chinasat 20) [CZ 3A]	2010 64 A [37234] XI	2010 Nov 24.673 > million years	Box + 2 panels 5000? (full)		2010 Nov 24.85 2010 Nov 30.81	24.90 0.55	752.08 1436.05	27395 42164	197 35772	41836 35798	0.760 0.0003	180 347	
CZ 3A 3 rd stage	2010 64 B [37235]	2010 Nov 24.673	Cylinder 3060	12.375 long 3.0 dia	2010 Nov 25.20	24.89	750.90	27366	199	41777	0.760	180	
HYLAS 1 # [Ariane-5 ECA] (V198 #556)	2010 65 A [37237] KOU-ELA3	2010 Nov 26.777 > million years	Box + 2 panels 2542 launch 1125 dry	2.5 1.6 x 1.5 9? span	2010 Nov 27.46 2010 Nov 30.00 2010 Dec 1.93 2010 Dec 7.64 2010 Dec 9.90	2.03 0.11 0.10 0.07 0.08	633.05 1337.90 1429.50 1433.38 1436.12	24423 40220 42036 42112 42165	225 31874 35516 35667 35777	35862 35809 35799 35799 35796	0.730 0.049 0.003 0.002 0.0002	178 127 79 86 83	
Intelsat 17	2010 65 B [37238]	2010 Nov 26.777 > million years	Box + 2 panels 5540 launch 2393 dry	7.7 x 2.7 x 3.4 26.1 span	2010 Nov 27.02 2010 Nov 30.34 2010 Dec 2.09 2010 Dec 6.00 2010 Dec 7.00 2010 Dec 9.79	2.03 0.22 0.42 0.09 0.08 0.07	632.15 990.40 1239.33 1440.75 1441.37 1436.05	24399 32913 38220 42256 42268 42164	224 17191 27886 35646 35775 35778	35818 35878 35796 35108 36003 35793	0.729 0.284 0.103 0.005 0.003 0.0002	178 15 8 115 135 322	
Ariane-5 2 nd stage (+VEB+ 2 PA's)	2010 65 C [37239]	2010 Nov 26.777	Drum-cone 2600? (950+ 2x160)	4.71 long 5.46 dia (1.13 long)	2010 Nov 27.06	1.79	630.92	24368	212	35766	0.730	168	
Sylda 5A upperpart	2010 65 D [37240]	2010 Nov 26.777	Barrel shaped 500	6.4 long 4.6 dia	2010 Nov 27.89	2.03	632.37	24405	220	35832	0.730	179	

% Fast Affordable Science and Technology SATellite; was to eject 2010 Dec 6.272 Nanosail D; no confirmation the solar sail unfurled 2010 Dec 9. Nanosail D was ejected 'spontaneously' 2011 Jan 18.125; sail deployed 2011 Jan 21.125; TLE from projects website and amateur observations.

* Believed to the 5th Mentor satellite; a.k.a. Advanced Orion; for gathering signal intelligence from an inclined geosynchronous orbit.

Name	Cospar ID	Launch date	Shape and	Size	Date of	Orbital	Nodal	Semi	Perigee	Apogee	Orbital	Argument
[Launcher]	[Norad#] Launchsite	Lifetime and descent date	weight (kg)	(m)	orbital	Inclination	period	major axis	height	height	eccentricity	of perigee
Fragment	Cospar ID	[Norad#]	Descent date	Lifetime	determination	(deg)	(min)	(km)	(km)	(km)		(deg)

Highly Adaptable Satellite (the satellite can adapt onboard resources depending on demand)

Year of Launch 2010		RAE Table of Earth Satellites										(Compiled 2010)		Page 26	
Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)			
D R Dragon C1 % (COTS 1) [Falcon 9]	2010 66 A [37244] CC-LC40	2010 Dec 8.655 0.140 days 2010 Dec 8.795	Cone+ Cyl	3.66 dia 5.1 high	2010 Dec 8.71	34.55	90.38	6672	280	306	0.002	264			
D QBX 2 *2	2010 66 B [37245]	2010 Dec 8.655 39 days 2011 Jan 16	Cube	0.1x0.1x0.1	2010 Dec 9.65 2011 Jan 16.08	34.53 34.53	90.47 88.08	6676 6558	282 172	312 187	0.002 0.001	247 268			
D SMDC ONE *1	2010 66 C [37246]	2010 Dec 8.655 35 days 2011 Jan 12	3Cube	0.1x0.1x0.3	2010 Dec 9.65 2011 Jan 12.15	34.53 34.54	90.43 88.05	6674 6557	282 173	310 184	0.002 0.0008	255 252			
D Perseus 003 *4	2010 66 D [37247]	2010 Dec 8.655 23 days 2010 Dec 31	Cube		2010 Dec 9.65 2010 Dec 30.76	34.53 34.51	90.42 88.18	6673 6563	281 178	309 190	0.002 0.0009	248 135			
D Perseus 001 *5	2010 66 E [37248]	2010 Dec 8.655 23 days 2010 Dec 31	Cube		2010 Dec 9.65 2010 Dec 30.76	34.53 34.53	90.42 88.07	6674 6558	281 175	310 183	0.002 0.0006	256 115			
D QBX 1 *3	2010 66 F [37249]	2010 Dec 8.655 29 days 2011 Jan 6	Cube		2010 Dec 9.65 2011 Jan 6.58	34.54 34.52	90.43 88.07	6674 6558	282 178	309 180	0.002 0.0002	249 329			
D Perseus 002 *	2010 66 G [37250]	2010 Dec 8.655 22 days 2010 Dec 30	Cube		2010 Dec 9.65 2010 Dec 29.45	34.54 34.52	90.47 88.25	6676 6566	283 183	312 193	0.002 0.0008	220 101			
D Perseus 000 *	2010 66 H [37251]	2010 Dec 8.655 22 days 2010 Dec 30	Cube		2010 Dec 10.72 2010 Dec 29.38	34.52 34.52	90.10 88.18	6658 6563	252 179	306 189	0.004 0.0008	286 105			
D Mayflower *6	2010 66 J [37252]	2010 Dec 8.655 14 days 2010 Dec 22	Cube	0.1x0.1x0.1	2010 Dec 10.72 2010 Dec 21.60	34.54 34.53	90.35 88.22	6675 6565	279 179	314 194	0.003 0.001	242 8			
Falcon 9 2 nd stage	2010 66 K [37253]	2010 Dec 8.655	Cylinder	??? long 3.66 dia	First orbit(s) similar to objects A-J; then engine restarted. 2010 Dec 12.68	34.55	219.62	12058	276	11084	0.448	270			

% Testflight of the Dragon capusule; landed in Pacific Ocean about 800 km from Mexican coast. Commercial Orbital Transportation Services.

* Released 2010 Dec 8.?? from Falcon 9 2nd stage.

- 1 - SMDC-ONE (stands for Operational Nanosatellite Effect) - a store and forward communications satellite for the US Army Space and Missile Command, part of an ongoing experiment to evaluate the use of nanosats in tactical communications (CubeSat size 3U),
- 2 and 3 - CubeSat for the Los Alamos National Laboratory with classified payload, probably for energetic charged particle measurements (size 1U?),
- 4 and 5 - Colony 1 (#1 and #2) CubeSat for the National Reconnaissance Office with classified payload (size 3U),
- 6 - CAERUS - an amateur radio CubeSat built by the University of Southern California (size 1U). Signals have been received on 437.6 MHz.

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
D Soyuz-TMA 20 \$ 3M [Soyuz-FG] R	2010 67 A [37254] BAI	2010 Dec 15.840 159.262 days 2011 May 24.102	Cyl+beehive+ +spheroid+ 2 panels 7250?	7.5 long 2.72 maxdia 2.3 dia	2010 Dec 15.97 2010 Dec 17.05 2010 Dec 17.67 2011 May 23.89	51.65 51.65 51.65 51.64	89.33 89.42 91.52 91.40	6620 6624 6727 6722	221 228 343 340	263 263 354 346	0.003 0.003 0.0008 0.005	49 60 1 339
D Soyuz-FG 3 rd stage (Blok I)	2010 67 B [37255]	2010 Dec 15.840 3. days 2010 Dec 19	Cylinder 2400?	8.1 long 2.66 dia	2010 Dec 15.98 2010 Dec 19.10	51.63 51.62	88.72 87.15	6590 6512	194 129	229 137	0.003 0.0006	78 33
Beidou-2 Compass IGSO 2 [CZ-3A]	2010 68 A [37256] XI	2010 Dec 17.847 > million years	Box+ 2 panels 2230 1130	1.70 high 18.10 span	2010 Dec 18.21 2010 Dec 22.57	54.63 55.24	623.53 1436.08	24177 42165	191 35716	35405 35856	0.728 0.002	175 179
D CZ-3A 3 rd stage	2010 68 B [37257]	2010 Dec 17.847 45 days 2011 Jan 31	Cylinder 3060	12.375 long 3.0 dia	2010 Dec 18.10 2011 Jan 30.91	55.26 54.66	628.98 92.00	24318 6751	101 84	35777 662	0.734 0.043	175 199
KA-SAT [Proton-M/Breeze-M]	2010 69 A [37258] BAI	2010 Dec 26.910 > million years	Box + 2 panels +4 dishes 6150		2010 Dec 27.06 2010 Dec 27.53 2011 Jan 10.14	49.04 24.55 0.13	635.68 700.18 1436.00	24490 26120 42163	436 3705 35714	35788 35778 35855	0.722 0.614 0.002	0 0 201
Breeze-M stage	2010 69 B [37259]	2010 Dec 26.910	Stubby Cyl 1220	2.62 long ~2.4 dia	2010 Dec 27.53	24.29	650.55	24871	3142	33842	0.617	4
Breeze-M tank	2010 69 C [37260]	2010 Dec 26.910	Torus 1290	2.1 long 4.1 dia	2010 Dec 27.06	49.58	269.00	13804	330	14521	0.514	352

\$ Soyuz-TMA 20 docked 2010 Dec 17.841 with ISS (Rassvet port) with 1 cosmonaut and 2 astronauts (Kondratyev, Nespoli and Coleman). Undocked 2011 May 23.899 and halted some 200 m behind the ISS to photograph the ISS with the docked shuttle Endeavour.

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Hispasat 1E [Ariane 5 ECA] (V-199)	2010 70 A [37264] KOU-ELA3	2010 Dec 29.894 > million years	Box + 2 panels	5.4 x 2.8	2010 Dec 30.50	3.54	629.15	24322	249	35638	0.728	183
			5318 launch	x 2.2	2011 Jan 1.34	0.37	1033.55	33862	19242	32725	0.243	167
			2175 dry	26.7 span	2011 Jan 2.52	0.10	1397.05	41397	34294	35743	0.017	162
					2011 Jan 3.46	0.07	1433.32	42110	35722	35742	0.0002	156
					2011 Jan 6.15	0.06	1434.52	42134	35724	35787	0.0007	193
					2011 Jan 8.04	0.07	1435.93	42162	35781	35785	0.00005	5
					2011 Jan 13.89	0.06	1436.08	42165	35785	35787	0.00002	60
Koreasat 6	2010 70 B [37265]	2010 Dec 29.894 > million years	Box + 2 panels	4.3 x 2.3	2010 Dec 30.46	3.01	632.00	24395	252	35781	0.728	178
			2850 launch	x 3.2	2011 Jan 1.23	2.27	717.72	26554	4592	35759	0.587	179
			1150 dry	18 span	2011 Jan 3.25	0.87	1036.03	33916	19311	35765	0.243	181
					2011 Jan 4.33	0.20	1260.73	38658	28790	35770	0.090	185
					2011 Jan 6.07	0.04	1433.75	42119	35707	35774	0.0008	186
					2011 Jan 8.26	0.06	1434.52	42134	35731	35780	0.0006	168
					2011 Jan 9.97	0.04	1436.08	42165	35778	35794	0.0002	339
		2011 Jan 15.89	0.03	1436.13	42165	35783	35790	0.00009	341			
Ariane-5 2 nd stage (+VEB + 2 PA's)	2010 70 C [37266]	2010 Dec 29.894	Drum-cone 2600? (950+ 2x50)	4.71 long 5.46 dia (1.13 long)	2010 Dec 30.77	3.01	631.27	24376	259	35736	0.728	179
Sylda 5A upperpart	2010 70 D [37267]	2010 Dec 29.894	Barrel shaped 517	6.4 long 4.6 dia	2010 Dec 30.57	3.01	631.67	24387	260	35756	0.727	178

Year of Launch 2009

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(Compiled 2010)

Extra Page 1

Cospar ID	[Norad#]	Descent date	Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
Cosmos 2462 fragments; 4 pieces, 1 has decayed											
D 2010 14 C	[36513]			2010 Apr 16.94	67.14	89.57	6632	169	337	0.013	100
		2010 Apr 18	2 days	2010 Apr 17.80	67.13	88.48	6578	158	241	0.006	85
2010 14 D	[36821]										
2010 14 E	[36822]										
2010 14 F	[36823]										
Yaogan 10 CZ-4 3 rd stage fragments; 4 pieces, all in orbit											
2010 38 C	[37567]										
2010 38 D	[37568]										
2010 38 E	[37569]										
2010 38 F	[37570]										
Cosmos 2464-2466 Proton stage fragments; 4 pieces, all have decayed											
D 2010 41 J	[37145]			2010 Sep 2.29	64.82	90.95	6700	158	484	0.024	42
		2010 Sep 5	3 days	2010 Sep 5.47	64.79	88.40	6574	143	247	0.008	47
D 2010 41 K	[37146]			2010 Sep 2.29	64.63	91.02	6703	175	474	0.022	58
		2010 Sep 5	3 days	2010 Sep 5.48	64.63	88.63	6585	149	265	0.009	67
D 2010 41 L	[37147]			2010 Sep 2.35	64.82	91.08	6706	173	482	0.023	86
		2010 Sep 6	4 days	2010 Sep 6.23	64.82	88.37	6572	141	246	0.008	87
2010 41	[37148]			2010 Sep 2.35	64.97	91.80	6741	156	569	0.031	54
D 2010 41 M	[37149]			2010 Sep 2.41	64.97	91.40	6722	176	510	0.025	66
		2010 Sep 6	4 days	2010 Sep 6.50	64.96	88.37	6573	142	246	0.008	73

Re-assigned to 1974 89 FH

Name [Launcher] Fragment	Cospar ID [Norad#] Launchsite Cospar ID	Launch date Lifetime and descent date [Norad#]	Shape and weight (kg) Descent date	Size (m) Lifetime	Date of orbital determination	Orbital Inclination (deg)	Nodal period (min)	Semi major axis (km)	Perigee height (km)	Apogee height (km)	Orbital eccentricity	Argument of perigee (deg)
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Failures

GSAT 4 [GSLV Mk2]	2010 F1 [---] SRI	2010 Apr 15.456	Box+2 panels 2180 1063 dry									Third stage started tumbling after ignition. Maximum altitude 140 km.
STSAT 2B [KSLV-1]	2010 F2 [---] NSC	2010 Jun 10.334	Box+ 2 panels 99									After 137 seconds the 1 st stage malfunctioned and contact was lost. Maximum height 64-80 km.
3x Glonass-M & [Proton/Block DM]	2010 F3 [-----] BAI	2010 Dec 5.434	Cyl+ 2 panels+ 2.4 dia magnometerboom 3.7 height 1370									Proton 3 rd stage deviated 8 degrees from it course near the time of separation of the 3 rd stage with the Block DM/satellites. They fell into the Pacific Ocean about 1500 km NW of Honolulu, Hawaii. Probably caused by too much fuel in up-graded 3 rd stage.
GSAT 5P [GSLV Mk2]	2010 F4 [-----] SRI	2010 Dec 25.440	Box + 2 panels 2310									Control was lost with the rocket 47 sec after liftoff when commands didn't reached the strap-on booster that perform steering for the 1 st stage, due to dislodging of cable connectors.