## **DEPARTMENT OF SPACE**

DEMAND NO. 90

## **Department of Space**

A. The Budget allocations, net of recoveries, are given below:

(In crores of Rupees)

		Major	Actual 2010-2011			Budget 2011-2012			Revi	sed 2011-201	2	Budget 2012-2013			
		Head	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
		Revenue	1678.67	878.81	2557.48	2751.47	926.00	3677.47	2002.49	1000.00	3002.49	2476.43	1100.00	3576.43	
		Capital	1924.75		1924.75	2948.53		2948.53	1429.51		1429.51	3138.57		3138.57	
		Total	3603.42	878.81	4482.23	5700.00	926.00	6626.00	3432.00	1000.00	4432.00	5615.00	1100.00	6715.00	
1.	Secretariat - Economic Services	3451		7.41	7.41		9.20	9.20		8.61	8.61		9.12	9.12	
Space I	Research														
Spac	ce Technology														
•	nch Vehicle Technology														
	GSLV MK-III Development	3402	82.56		82.56	87.14		87.14	83.70		83.70	64.82		64.82	
	·	5402	42.39		42.39	38.50		38.50	26.37		26.37	7.27		7.27	
		Total	124.95		124.95	125.64		125.64	110.07		110.07	72.09		72.09	
3.	,,	3402	0.09	•••	0.09	0.10		0.10	0.10		0.10	0.10	•••	0.10	
4.	(CUSP) Polar Satellite Launch Vehicle - Continuation (PSLV-C) Project	3402	234.25		234.25	244.50		244.50	254.50		254.50	347.91		347.91	
	Continuation (1 GEV-C) 1 Toject	5402	7.75		7.75	5.50		5.50	10.50	•••	10.50	32.09	•••	32.09	
		Total	242.00		242.00	250.00		250.00	265.00		265.00	380.00		380.00	
5.	Vikram Sarabhai Space Centre (VSSC)	3402	204.81	228.81	433.62	231.07	223.00	454.07	247.02	223.58	470.60	239.48	240.98	480.46	
	(1227)	5402	126.34		126.34	231.96	•••	231.96	152.45	•••	152.45	303.90		303.90	
		Total	331.15	228.81	559.96	463.03	223.00	686.03	399.47	223.58	623.05	543.38	240.98	784.36	
6.	Indian Space Research Organisation - Inertial Systems Unit (IISU)	3402	12.78		12.78	19.33		19.33	17.89		17.89	22.90		22.90	
	• • •	5402	13.25		13.25	20.41		20.41	18.99		18.99	39.77		39.77	
		Total	26.03		26.03	39.74		39.74	36.88		36.88	62.67		62.67	
7.	Liquid Propulsion Systems Centre	3402	154.63	67.82	222.45	150.58	83.00	233.58	140.95	85.46	226.41	172.55	96.69	269.24	
		5402	36.12		36.12	80.75		80.75	72.78		72.78	167.11		167.11	
		Total	190.75	67.82	258.57	231.33	83.00	314.33	213.73	85.46	299.19	339.66	96.69	436.35	
8.	GSLV Operational Project (Including MK-III Operational)	3402	207.66		207.66	279.46	•••	279.46	192.98		192.98	244.06		244.06	
	. ,	5402	11.83		11.83	13.00		13.00	7.02		7.02	14.90		14.90	
		Total	219.49		219.49	292.46		292.46	200.00		200.00	258.96		258.96	

Plan			Major	Actu	ıal 2010-2011		Bud	get 2011-201	2	Revi	sed 2011-201	2	(In crores of Rupe Budget 2012-2013		
SKE    10   Manned Mission Initiatives/Human   3402   12.90   12.90   12.90   12.90   10.27   10.27   29.74   10.27		<u>-</u>		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Manned Mission Initiatives/Human   Space Flight Programme   Space Flight Programme   Space Flight Programme   Fordal   19.27   19.27   3.31.7   33.17   33.17   2.90   2.90   30.72	9.		3402	4.80		4.80	4.40		4.40	2.20		2.20	2.20		2.20
5402   5402	10.	Manned Mission Initiatives/Human	3402	12.90		12.90	65.64		65.64	10.27		10.27	29.74		29.74
11   Incliain Institute of Space Science & 3402   3402   3402   9,30   9,30   89,41   89,41   21,40   21,40   43,41   34,41		Sparse inglier inglier	5402	6.37	•••	6.37	33.17		33.17	2.90		2.90	30.72		30.72
Technology   1.1			Total	19.27		19.27	98.81		98.81	13.17		13.17	60.46		60.46
12. Semi Cryögenic Engine Development   3402   9.30   9.30   89.41   89.41   89.41   21.40   21.40   43.41   8.41   .	11.		3402	10.00		10.00	100.00		100.00	10.00		10.00	100.00		100.00
Total Launch Vehicle Technology	12.	Semi Cryogenic Engine Development	3402	9.30	•••	9.30	89.41		89.41	21.40	•••	21.40	43.41	•••	43.41
National Path Path Path Path Path Path Path Path			5402	1.15		1.15	60.59	•••	60.59	28.60		28.60	106.59		106.59
Sample   S			Total	10.45		10.45	150.00		150.00	50.00		50.00	150.00		150.00
13. Oceansat-2 and 3	Tota	al-Launch Vehicle Technology		1178.98	296.63	1475.61	1755.51	306.00	2061.51	1300.62	309.04	1609.66	1969.52	337.67	2307.19
14   Resourcesat-2 and 3   3402   2.23   2.23   3.45   3	Sate	ellite Technology													
Total   7.37     7.37   50.00     50.00   1.00     1.00   50.00	13.	Oceansat-2 and 3	3402	0.43		0.43	2.75		2.75				2.52		2.52
14.   Resourcesat-2 and 3   3402   2.23     2.23   3.45     3.45   1.83     1.83   1.40       5402   12.50     12.50   29.21     29.21   12.17     12.17   9.10       70tal   14.73     14.73   32.66     32.66   14.00     14.00   10.50       15.   ISRO Satellite Centre (ISAC)   3402   85.19   104.01   89.20   85.57   87.69   173.26   109.48   96.85   206.33   125.51   119.61     5402   126.15     126.15   147.43     147.43   115.22     115.22   225.94       70tal   211.34   104.01   315.35   233.00   87.69   320.69   224.70   96.85   321.55   351.45   119.61     16.   Laboratory for Electro-Optics System (LEOS)   5402   64.00     64.00   18.28     18.28   7.23     7.23   28.13       17.   Radar Imaging Satellite-1 (RISAT-1)   3402   0.71     0.71   0.16     0.16   0.16   0.16   0.16   0.12       18.   G.SAT-4/G.SAT-4R/G.SAT-11 EM   3402     1.58     1.58   0.95     0.95   0.95     0.95   0.25       19.   Navigational Satellite System (NSS)   3402   21.10     21.10   32.07   32.07   27.39   31.60       19.   Navigational Satellite System (NSS)   3402   21.59     125.99   186.23     186.23   117.11     117.11   138.40       10.   147.09   218.30     218.30     218.30   144.50     170.00			5402	6.94		6.94	47.25		47.25	1.00		1.00	47.48		47.48
15. ISRO Satellite Centre (ISAC)   12.50     12.50   29.21     29.21   12.17     12.17   9.10       15. ISRO Satellite Centre (ISAC)   3402   85.19   104.01   189.20   85.57   87.69   173.26   109.48   96.85   206.33   125.51   119.61     16. Laboratory for Electro-Optics System (LEOS)   3402   24.98     24.98   24.57     24.57   24.87     24.87   26.65       16. Laboratory for Electro-Optics System (LEOS)   5402   6.40     6.40     6.40     82.85     42.85   32.10     32.10   54.78       17. Radar Imaging Satellite-1 (RISAT-1)   3402   0.71     0.71   0.16     0.16   0.16     0.16   0.12       18. G.SAT-4/G.SAT-4R/G.SAT-11 EM   3402			Total	7.37		7.37	50.00		50.00	1.00		1.00	50.00		50.00
Total   14.73     14.73   32.66     32.66   14.00     14.00   10.50	14.	Resourcesat-2 and 3	3402	2.23		2.23	3.45		3.45	1.83		1.83	1.40		1.40
15. ISRO Satellite Centre (ISAC) 3402 85.19 104.01 189.20 85.57 87.69 173.26 109.48 96.85 206.33 125.51 119.61 5402 126.15 126.15 147.43 147.43 115.22 115.22 225.94 126.15 147.43 147.43 115.22 115.22 225.94 116.15 147.43 147.43 115.22 115.22 225.94 116.16 147.43 115.22 115.22 225.94 116.16 147.43 115.22 115.22 225.94 116.16 147.43 115.22 115.22 225.94 116.16 147.43 115.22 115.22 225.94 116.16 147.43 115.22 115.22 225.94 116.16 147.43 115.22 115.22 225.94 116.16 147.15 115.21 119.61 147.15 115.21 119.61 147.43 115.22 115.22 225.94 115.22 125.94 115			5402	12.50	•••	12.50	29.21		29.21	12.17		12.17	9.10	•••	9.10
126.15			Total	14.73		14.73	32.66		32.66	14.00		14.00	10.50		10.50
Total   211.34   104.01   315.35   233.00   87.69   320.69   224.70   96.85   321.55   351.45   119.61	15.	ISRO Satellite Centre (ISAC)	3402	85.19	104.01	189.20	85.57	87.69	173.26	109.48	96.85	206.33	125.51	119.61	245.12
16. Laboratory for Electro-Optics System (LEOS)       3402 (LEOS)       24.98			5402	126.15	•••	126.15	147.43		147.43	115.22		115.22	225.94		225.94
(LEOS)			Total	211.34	104.01	315.35	233.00	87.69	320.69	224.70	96.85	321.55	351.45	119.61	471.06
Total   31.38     31.38   42.85     42.85   32.10     32.10   54.78	16.					24.98									26.65
17. Radar Imaging Satellite-1 (RISAT-1)       3402       0.71        0.71       0.16        0.16       0.16        0.16       0.12          18. G.SAT-4/G.SAT-4R/G.SAT-11 EM       3402         1.58       0.95       0.95       0.95        0.95       0.25          18. G.SAT-4/G.SAT-11 EM       3402         1.00       1.00			5402												28.13
5402   0.87     0.87   0.79     0.79   0.79     0.79   0.79     0.79   0.13       Total   1.58     1.58   0.95     0.95   0.95     0.95   0.95     0.95   0.25       18. G.SAT-4/G.SAT-4R/G.SAT-11 EM   3402             49.00                   5402                 50.00                     19. Navigational Satellite System (NSS)   3402   21.10     21.10   32.07     32.07   27.39     27.39   31.60       17. Total   147.09     147.09   218.30     218.30   144.50     144.50   170.00       18. G.SAT-4/G.SAT-4R/G.SAT-11 EM   3402                       19. Navigational Satellite System (NSS)   3402   21.10     21.10   32.07     32.07   27.39     27.39   31.60												32.10			54.78
18. G.SAT-4/G.SAT-11 EM 3402 1.58 0.95 0.95 0.95 0.95 0.25	17.	Radar Imaging Satellite-1 (RISAT-1)													0.12
18. G.SAT-4/G.SAT-11 EM       3402         1.00        1.00              49.00        49.00			5402			0.87			0.79			0.79			0.13
5402 49.00 49.00 49.00				1.58		1.58				0.95		0.95	0.25		0.25
Total 50.00 50.00 50.00	18.	G.SAT-4/G.SAT-4R/G.SAT-11 EM													
19. Navigational Satellite System (NSS) 3402 21.10 21.10 32.07 32.07 27.39 27.39 31.60 5402 125.99 125.99 186.23 186.23 117.11 117.11 138.40 Total 147.09 147.09 218.30 218.30 144.50 144.50 170.00			5402				49.00		49.00						
5402     125.99      125.99     186.23      186.23     117.11      117.11     138.40        Total     147.09      147.09     218.30      218.30     144.50      144.50     170.00															
Total 147.09 147.09 218.30 218.30 144.50 144.50 170.00	19.	Navigational Satellite System (NSS)	3402	21.10	•••	21.10	32.07		32.07	27.39	•••	27.39	31.60	•••	31.60
			5402						186.23	117.11		117.11			138.40
20. Semi-Conductor Laboratory (SCL)       3402       26.42       31.58       58.00       45.72       34.28       80.00       41.92       34.66       76.58       36.58       38.89			Total						218.30			144.50	170.00		170.00
	20.	Semi-Conductor Laboratory (SCL)	3402	26.42	31.58	58.00	45.72	34.28	80.00	41.92	34.66	76.58	36.58	38.89	75.47

												(	In Crores of	
		Maian	Actu	ıal 2010-2011		Budg	get 2011-2012	2	Revis	sed 2011-201	2		get 2012-2013	•
		Major Head	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
21.	Advanced Communication Satellite (G - SAT 11 including Launch Services)	3402	5.89		5.89	7.55		7.55	7.22		7.22	6.75		6.75
	- OAT TT Including Eautien Services)	5402	18.41		18.41	402.45		402.45	45.28		45.28	243.25		243.25
		Total	24.30		24.30	410.00		410.00	52.50		52.50	250.00		250.00
22.	Earth Observation - New Missions, (Cartostat-3, TES Hyperspectral, DMSAR- 1,ENVISAT,SCATSAT,RISAT-3,	3402				18.75		18.75	0.90		0.90	2.52		2.52
	Future EO Missions and GISAT)	5402				181.25		181.25	11.10		11.10	47.48		47.48
		Total				200.00		200.00	12.00		12.00	50.00		50.00
23.	SARAL	3402	1.26	•••	1.26	1.63	***	1.63	1.37		1.37	1.60	***	1.60
		5402	10.84		10.84	20.87		20.87	19.18		19.18	13.40		13.40
		Total	12.10		12.10	22.50		22.50	20.55		20.55	15.00		15.00
24.	Geo-Imaging Satellite (GI-SAT)	3402										2.55		2.55
		5402	•••				•••					47.45		47.45
		Total										50.00		50.00
Total-Satellite Technology		476.31	135.59	611.90	1305.98	121.97	1427.95	544.22	131.51	675.73	1038.56	158.50	1197.06	
Laur	nch Support, Tracking Network & Range	e Facility												
25.	Satish Dhawan Space Centre - SHAR (SDSC-SHAR)	3402	121.99	105.88	227.87	148.50	97.52	246.02	107.71	125.88	233.59	58.06	151.84	209.90
		5402	125.53		125.53	188.75		188.75	92.79		92.79	227.94		227.94
		Total	247.52	105.88	353.40	337.25	97.52	434.77	200.50	125.88	326.38	286.00	151.84	437.84
26.	ISRO Telemetry, Tracking & Command Network (ISTRAC)	3402	28.60	41.90	70.50	28.00	47.79	75.79	27.50	78.58	106.08	29.30	61.50	90.80
		5402	26.14		26.14	17.57		17.57	26.77		26.77	35.22	•••	35.22
		Total	54.74	41.90	96.64	45.57	47.79	93.36	54.27	78.58	132.85	64.52	61.50	126.02
Tota Faci	I-Launch Support, Tracking Network &	Range	302.26	147.78	450.04	382.82	145.31	528.13	254.77	204.46	459.23	350.52	213.34	563.86
	I-Space Technology		1957.55	580.00	2537.55	3444.31	573.28	4017.59	2099.61	645.01	2744.62	3358.60	709.51	4068.11
Spac	ce Applications													
27.	Space Applications Centre (SAC)	3402	89.04	116.98	206.02	101.07	128.76	229.83	104.65	123.75	228.40	109.98	132.56	242.54
		5402	66.76		66.76	190.92		190.92	79.20		79.20	64.01		64.01
		Total	155.80	116.98	272.78	291.99	128.76	<i>4</i> 20.75	183.85	123.75	307.60	173.99	132.56	306.55
28.	Development and Education Communication Unit(DECU)	3402	12.56	8.55	21.11	72.54	10.80	83.34	11.39	9.14	20.53	40.20	10.11	50.31
		5402	1.31		1.31	1.02		1.02	1.02		1.02	0.81		0.81
		Total	13.87	8.55	22.42	73.56	10.80	84.36	12.41	9.14	21.55	41.01	10.11	51.12
29.	National Natural Resources Management System(NNRMS)	3402	29.41		29.41	74.82		74.82	36.14		36.14	53.74		53.74

		Maian	Actu	ıal 2010-2011		Budo	get 2011-2012	2	Revi	sed 2011-201	2		In crores of get 2012-2013	
		Major Head	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
30.	Earth Observation Application	3402	1.74		1.74	2.53		2.53	1.79		1.79	2.80		2.80
31.	Mission(EOAM) National Remote Sensing Centre	3402	59.47	67.50	126.97	62.92	78.25	141.17	63.85	81.58	145.43	69.03	82.22	151.25
	(NRSC)	5402	68.84		68.84	82.63		82.63	54.84		54.84	122.27		122.27
		Total	128.31	67.50	195.81	145.55	78.25	223.80	118.69	81.58	200.27	191.30	82.22	273.52
32.	Indian Institute of Remote Sensing	3402										19.30	10.00	29.30
		5402										3.18		3.18
		Total										22.48	10.00	32.48
33.	Disaster Management Support (DMS)	3402	17.26		17.26	28.40		28.40	13.98		13.98	21.48		21.48
		5402	3.92		3.92	6.17		6.17	4.89		4.89	8.90		8.90
		Total	21.18		21.18	34.57		34.57	18.87		18.87	30.38		30.38
34.	North Eastern Space Applications Centre (NE-SAC)	3402		1.75	1.75	6.07	1.93	8.00	6.07	1.93	8.00	5.90	2.10	8.00
Tota	Il-Space Applications		350.31	194.78	545.09	629.09	219.74	848.83	377.82	216.40	594.22	521.60	236.99	758.59
Spa	ce Sciences													
35.	Physical Research Laboratory (PRL)	3402	33.97	13.16	47.13	48.31	32.39	80.70	39.65	35.88	75.53	71.97	39.93	111.90
36.	National Atmospheric Research Laboratory (NARL)	3402	8.43	0.67	9.10	16.44	2.90	19.34	12.58	3.25	15.83	13.70	3.50	17.20
37.	National Institute of Climate change and Environmental Studies	3402				0.10	•••	0.10	0.10		0.10	1.00	•••	1.00
38.	RESPOND	3402	14.10		14.10	15.00		15.00	16.10		16.10	21.80		21.80
39.	Sensor Payload Development / Planetary Science Programme	3402	3.03		3.03	30.00		30.00	1.95		1.95	20.00	•••	20.00
40.	Megha-tropiques Project	3402	1.94		1.94	1.13	•••	1.13	1.55	•••	1.55	0.31	•••	0.31
		5402	6.84		6.84	0.87		0.87	3.80		3.80	0.09		0.09
		Total	8.78		8.78	2.00		2.00	5.35		5.35	0.40		0.40
41.	ADITYA	3402	•••			1.22	•••	1.22	0.70	•••	0.70	0.75	•••	0.75
		5402	6.09		6.09	38.78	•••	38.78	17.80	•••	17.80	19.25	•••	19.25
		Total	6.09		6.09	40.00	•••	40.00	18.50	•••	18.50	20.00		20.00
42.	Astrosat 1 & 2	3402	0.59		0.59	0.83		0.83	0.77	•••	0.77	0.80	•••	0.80
		5402	6.63		6.63	9.17		9.17	6.23	•••	6.23	5.20	•••	5.20
		Total	7.22		7.22	10.00		10.00	7.00		7.00	6.00		6.00
43.	Indian Lunar Mission - Chandrayan - 1 & 2	3402 5402	3.19		3.19	7.70		7.70	5.01 64.99		5.01	5.83		5.83 76.67
		Total	22.73 25.92	•••	22.73 25.92	72.30 <i>80.00</i>	•••	72.30 <i>80.00</i>	70.00		64.99 70.00	76.67 <i>82.50</i>	•••	82.50
11	Mars Orbiter Mission	3402										4.10		4.10
44.	IVIAI 3 OI DILEI IVIISSIUII	5402	•••	•••		•••	•••		10.00	•••	10.00	120.90	•••	4.10 120.90
			•••	•••	•••	•••	•••		10.00	•••	10.00	125.00	•••	125.00
		Total							10.00		10.00	120.00		120.00

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		i	A . (	1 0040 0044	I	Б. 1		.	Б			-	(In crores of	•
		Major		ıal 2010-2011		•	get 2011-201		_	sed 2011-201			get 2012-201	
45.	ISRO Geosphere Biosphere	Head 3402	Plan 17.15	Non-Plan	Total 17.15	Plan 24.74	Non-Plan	Total 24.74	Plan 21.10	Non-Plan	Total 21.10	Plan 27.69	Non-Plan	<u>Total</u> 27.69
40.	Programme (ISRO GBP)	3402	17.13	•••	17.13	24.74	•••	24.74	21.10	•••	21.10	27.09	•••	27.09
46.	Atmospheric Science Programmes	3402	16.94	•••	16.94	25.20		25.20	15.87		15.87	18.70		18.70
47.	Small Satellites for Atmospheric Studies and Astronomy	3402	1.74		1.74	4.00		4.00	4.55		4.55	1.10		1.10
		5402				1.00		1.00	1.00		1.00	1.36		1.36
		Total	1.74		1.74	5.00		5.00	5.55		5.55	2.46		2.46
48.	Other Schemes	3402	6.50	2.00	8.50	17.04	2.00	19.04	8.80	2.00	10.80	14.10	3.00	17.10
Tota	I-Space Sciences		149.87	15.83	165.70	313.83	37.29	351.12	232.55	41.13	273.68	425.32	46.43	471.75
Dire	ction & Administration/Other Program	mes												
49.	Special Indigenisation/Advance Ordering	3402	11.57		11.57	218.76		218.76	15.39		15.39	10.74		10.74
		5402	460.00		460.00	20.00		20.00	1.50	•••	1.50	94.25	•••	94.25
		Total	471.57		471.57	238.76		238.76	16.89		16.89	104.99		104.99
50.	Others	3402	1.89	54.40	56.29	2.95	58.86	61.81	2.80	59.35	62.15	2.80	66.38	69.18
		5402	22.65		22.65	12.76		12.76	12.62		12.62	12.39		12.39
		Total	24.54	54.40	78.94	15.71	58.86	74.57	15. <i>4</i> 2	59.35	74.77	15.19	66.38	81.57
Tota	Total-Direction & Administration/Other Programmes		496.11	54.40	550.51	254.47	58.86	313.33	32.31	59.35	91.66	120.18	66.38	186.56
INSA	AT Operational													
51.	Master Control Facility (MCF)	3252	7.02	26.39	33.41	8.00	27.63	35.63	7.84	29.50	37.34	8.02	31.57	39.59
		5252	6.95		6.95	9.80		9.80	6.27		6.27	30.93	•	30.93
		Total	13.97	26.39	40.36	17.80	27.63	45.43	14.11	29.50	43.61	38.95	31.57	70.52
52.	INSAT-3 Satellites (Including Launch Services)	3252	0.09		0.09	82.81		82.81	88.14		88.14	39.00		39.00
		5252	16.77		16.77	44.59		44.59	111.96	•••	111.96	261.75	•••	261.75
		Total	16.86		16.86	127.40	•••	127.40	200.10		200.10	300.75		300.75
53.	INSAT-4 Satellites (Including Launch Services and Leasing of Transponders)	3252	88.46		88.46	227.54	•••	227.54	130.36		130.36	246.56		246.56
	,	5252	530.29		530.29	685.56		685.56	164.24		164.24	395.34		395.34
		Total	618.75		618.75	913.10		913.10	294.60		294.60	641.90		641.90
54.	GSAT-7 Launch Services	3252		•••					60.00		60.00	52.70	•••	52.70
		5252	•••						120.90		120.90	155.00		155.00
		Total							180.90		180.90	207.70		207.70
Tota	I-INSAT Operational		649.58	26.39	675.97	1058.30	27.63	1085.93	689.71	29.50	719.21	1189.30	31.57	1220.87
Total-S	pace Research <i>Total</i>		3603.42 3603.42	871.40 878.81	4474.82 4482.23	5700.00 5700.00	916.80 <i>926.00</i>	6616.80 <i>6626.00</i>	3432.00 3432.00	991.39 <i>1000.00</i>	4423.39 <i>4432.00</i>	5615.00 5615.00	1090.88 <i>1100.00</i>	6705.88 6715.00

	1			. 1			. 1					(In crores of	•
	Major	Actual 2010-2011		Bud	Budget 2011-2012			ised 2011-201	2	Budget 2012-2013			
	Head	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
											(in cr	ores of Rupe	es)
	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
C. Plan Outlay		-											
Space Research	13402	3603.42	•••	3603.42	5700.00		5700.00	3432.00		3432.00	5615.00	•••	5615.00

- 1. **Secretariat Economic Services:** Provision is made for expenditure to be incurred on the Secretariat of the Department of Space.
- 2. **GSLV Mk III Development:** GSLV Mk-III is intended to develop a cost-effective launch vehicle capable of launching 4 tonne class of communication satellites to Geo-synchronous Transfer Orbit (GTO). The Project envisages the development of a number of technologies which include, among others, 200 tonne solid stage booster (S-200), 25 tonne cryogenic engines (C-25) and L-110 tonne liquid stage engines as core boosters.
- 3. **Cryogenic Upper Stage (CUS) Project:** The objective of the Project is to develop and qualify an indigenous restartable cryogenic stage employing liquid oxygen as oxidizer and liquid hydrogen as fuel for the upper stage of GSLV. CUS-3 stage was flight tested in GSLV D3 mission on 15th April, 2010 which was unsuccessful. A comprehensive technical assessment of CUS-3 flight stages by National Panel of Eminent Experts was carried out and recommendations are being implemented
- 4. Polar Satellite Launch Vehicle Continuation (PSLV C) Project: PSLV is capable of placing 1400 & 1600 Kg class IRS satellites in Polar Sun-Synchronous Orbit, 1000 Kg class satellites into Geo synchronous Transfer Orbit and upto 2800 Kg class satellites into Low Earth Orbit. During 2011-12, the PSLV C16 flight successfully launched Resourcesat 2 satellite along with Indo Russian science satellite Youthsat and Singapores first satellite X sat. PSLV C17 launched the communication satellite GSAT 12 and PSLV C18 launched Indo French joint mission Megha tropiques along with two mini satellites built by Indian universities and Vesselsat 1 from Luxemburg. The launch of PSLC C19 carrying RISAT 1,the first microwave remote sensing satellite of India is scheduled in March 2012. During 2012 13, 3 PSLV flights are planned viz. PSLV C20, C21 and C22 which will carry Indo French joint project SARAL, India's first Navigational satellite, IRNSS 1, and a commercial satellite into their intended orbit.
- 5. **Vikram Sarabhai Space Centre (VSSC):** VSSC is the lead Centre for the development of satellite launch vehicles and sounding rockets and houses the major test and fabrication facilities for launch vehicles.
- 6. **ISRO Inertial Systems Unit (IISU):** IISU is responsible for research & development in the area of inertial sensors, inertial systems, navigation software, actuators and mechanisms and to realise the flight units of these system for the launch vehicle and satellite programmes.

- 07. **Liquid Propulsion Systems Centre (LPSC):** LPSC is the lead Centre in the area of liquid and cryogenic rocket engines and stages for launch vehicle and small thrust engines for launch vehicles and spacecraft control.
- 08. **GSLV-Operational Project (including GSLV Mk-III Operational):** The GSLV-Operational Project has been conceived to meet the launch requirement of 2 tonne class of operational INSAT/GSAT satellites.
- O9. Space Capsule Recovery Experiment (SRE): The main objective of the Space Capsule Recovery Experiment (SRE) is to develop and demonstrate capability to recover an orbiting capsule back on earth. SRE-I was successfully launched on-board PSLV-C7 on January 10, 2007 and was also successfully recovered from Bay of Bengal on January 22, 2007. SRE-II is a follow-on mission to SRE-I to further validate the re-entry technologies.
- 10. **Manned Mission Initiatives/Human Space Flight Programme:** Detailed feasibility studies on undertaking indigenous human spaceflight mission with an aim to build and demonstrate the capability for carrying humans to low earth orbit and their safe return to earth has been undertaken. The programme envisages development of a fully autonomous orbital vehicle carrying two or three crewmembers to about 275 km low earth orbit and their safe return. Currently, the critical technologies required for human spaceflight pragramme are being developed as pre-project activities.
- 11. **Indian Institute of Space Science & Technology:** Indian Institute of Space Science & Technology is an autonomous body under DOS with the primary objective of creating world class Institution in the area of advanced Space Science & Technology education and generating high quality human resources requirement of DOS/ISRO. The Institute has undergraduate, post-graduate and doctoral programme in the area of space science, technology and applications.
- 12. **Semi Cryogenic Engine Development:** The objective of this project is to develop and qualify a high thrust Semi-Cryogenic engine and stage (employing kerosene of required grade/spar as fuel and Liquid Oxygen as oxidizer) for the future advanced launch vehicle.
- 13. **Oceansat-2 & 3:** The main objective of Oceansat-2 is to provide continuity of data & services hitherto provided by Oceansat-1 on Oceanography and coastal studies. Oceansat-2 was successfully launched onboard PSLV-C14 on September 23, 2009. Oceansat-3, planned to be realized

during 12th plan, will be a follow-on satellite for Oceansat-2 to provide continuity of data on Ocean & Coastal resources.

- 14. **Resourcesat-2 & 3:** Taking into account the increased use of space imageries for different applications and continued Earth Observation services required from the IRS satellites, Resourcesat-2 has been conceived as a continuity mission with enhanced capabilities which will be mainly for crop applications, vegetation dynamics and natural resources census applications. The spacecraft is configured with I1.5 K bus which carries three optical Remote Sensing Payloads, LISS-3, LISS-4 and AWIFS & additional AO payload known as AIS from COMDEV, Cananda. Resourcesat-2 was launched on April 20, 2011 on-board PSLV-C16. Resourcesat-3 satellite which is planned as a follow-on mission to Resourcesat-2 will provide continuity of data and services.
- 15. **ISRO Satellite Centre (ISAC):** ISAC is the lead Center for the design, fabrication, testing and management of satellite systems for scientific, technological and application missions.
- 16. **Laboratory for Electro-Optics Systems (LEOS):** LEOS is responsible for research & development and production of electro-optics sensors.
- 17. Radar Imaging Satellite-1 (RISAT-1): Radar Imaging Satellite (RISAT-1) is intended to provide all-weather, day and night imaging capability providing vital inputs for various agricultural and disaster management applications. RISAT-1 weighing 1850 kg is planned to be launched on-board PSLV during March 2012.
- 18. **GSAT-4/GSAT-4R/GSAT-11 EM:** The objective of the GSAT-4 was to conduct various experiments in the communications area and early introduction of geo-based navigation system. The satellite was launched on April 15, 2010 on board GSLV D3 which was unsuccessful. GSAT-4R & GSAT-11 EM are the two experimental Satellites being planned as payloads for future GSLV flights.
- 19. **Navigation Satellite System (NSS):** The Indian Regional Navigation Satellite System (IRNSS), is planned to be a constellation of 7 satellites 3 in GEO and 4 in GSO orbit. This satellite is expected to provide position accuracies similar to Global Positioning System (GPS) in a region centered around India with a coverage extending upto 1500 km from India. The IRNSS spacecraft bus is being realised around I 1K bus specifically configured for PSLV Launch with a lift off mass of 1370 kg. The first IRNSS satellite (IRNSS 1) is targeted for launch during 2012 2013.
- 20. **Semi-conductor Laboratory:** SCL is engaged in the Design, Development and Manufacture of Very Large Scale Integrated (VLSIs) devices and Board Level Products to meet the stringent quality requirement of strategic sectors. SCL is to undertake radiation hardened devices and about more than 60 types of ASICs have been identified for development by SCL for Space Programme.
- 21. Advanced Communication Satellite (GSAT-11 including Launch Services): The main objective is to develop a 4 tonne class communication satellite incorporating advanced technologies of relevance for future. The configuration of the satellite is under finalisation.
- 22. Earth Observation New Missions (TES Hyperspectral, DMSAR 1, Cartosat-3, ENVISAT, SCATSAT, RISAT 3, Future EO Missions & GISAT): Indian Earth Observation program is directed towards providing continuity of EO data for resource management applications and enhancing the imaging capability. Towards this, it is planned to undertake development of Technology Experiment

Satellite in Hyper Spectral Imaging (TES-Hyperspectral), Radar Imaging Satellite for Disaster Management (DMSAR-1) & advanced cartography satellite (Cartosat-3) & GISAT.

- 23. **SARAL:** The objective of the Satellite with Argos and Altika (SARAL) mission are to design and develop satellite bus in the weight range of 400 Kg & to establish required ground infrastructure for receiving and processing of the data within India for ocean related applications. Two payloads namely Altika and ARGOS are planned in this mission. SARAL is a co-operative mission between DOS/ISRO and CNES, France with payloads from CNES and the spacecraft bus from DOS/ISRO.
- 24. **GISAT:** Geo Imaging satellite (GISAT) is conceived as a multi-spectral, multi-resolution advanced remote sensing satellite capable of imaging from geo-stationary orbit.
- 25. **Satish Dhawan Space Centre-SHAR (SDSC SHAR)::** SDSC SHAR provides the launch infrastructure as well as solid propellant processing.
- 26. **ISRO Telemetry, Tracking and Command Network (ISTRAC)::** ISTRAC provides spacecraft TTC and Mission Control services to major launch vehicle and spacecraft missions.
- 27. **Space Applications Centre (SAC)::** SAC is the lead Center for the development of communication, meteorological and remote sensing payloads besides R&D in space applications.
- 28. **Development and Educational Communication Unit (DECU)::** DECU is involved in the conceptualisation, definition, planning, implementation and socio-economic evaluation of developmental space applications.
- 29. **National Natural Resources Management System (NNRMS)::** The National Natural Resources Management System (NNRMS) has the objective of ensuring optimal management/utilization of natural resources by integrating information derived from remote sensing data with conventional techniques.
- 30. **Earth Observation Applications Mission (EOAM)::** The main goal of the Earth Observation Application Mission (EOAM) are to (i) evolve newer application/R&D programmes based on technology trends leading to operational applications programmes; (ii) guiding total remote sensing applications programmes towards implementation of remote-sensing based solutions and (iii) steering commercial activities of remote sensing involving development of value-added services.
- 31. **National Remote Sensing Centre (NRSC)::** NRSC is responsible for acquisition, processing, distribution and archiving of data from remote sensing satellites and is continuously exploring the practical uses of remote sensing technology for multilevel (global to local applications).
- 32. **Indian Institute of Remote Sensing (IIRS)::** Indian Institute of Remote Sensing (IIRS), located at Dehradun, is a premier training and educational institute set up for developing trained professional in the field of Remote Sensing, Geoinformatics and GPS Technology for Natural Resources, Environmental and Disaster Management.
- 33. **Disaster Management Support (DMS)::** The main objective of Disaster Management Support Programme is to provide Space inputs & services on a timely & reliable basis for the Disaster Management System in the country.

- 34. **North Eastern-Space Applications Centres (NE-SAC)::** NE-SAC set up as an autonomous society jointly with North Eastern Council, is supporting the North Eastern region by providing information on natural resources utilization and monitoring, infrastructure developmental planning and interactive training using space technology inputs of remote sensing and satellite communication
- 35. **Physical Research Laboratory (PRL)::** PRL, an autonomous institution funded by the Department of Space through grant-in-aid, is one of the premier research institutions in the country carrying out basic research in several areas of experimental & theoretical physics and earth sciences.
- 36. **National Atmospheric Research Laboratory (NARL)::** NARL, a registered Society, is responsible for carrying out advanced research in atmospheric and space sciences and related disciplines.
- 37. National Institute of Climate Change & Environment Studies (NICES):: It is envisaged to set up an Institute to carry out focused research in Climate Change & Environment.
- 38. **RESPOND::** The (RESPOND) Programme of ISRO supports sponsored research activity in Space Science, Space Applications and Space Technology in various national academic/research institutions and Space Technology Cells in premier technological institutes of the country.
- 39. **Sensor Payload Development/Planetary Science Programme::** It includes funding requirement for advance action for activities related to scientific payload developments for space science and planetary exploration studies in different institutions and universities.
- 40. **Megha-tropiques Project::** Megha-tropiques is an ISRO CNES (France) joint mission and is intended for studying tropical atmosphere and climate related to aspects such as monsoons, cyclones, etc., using a satellite platform. The satellite was launched on October 12, 2011 onboard PSLV-C18.
- 41. **ADITYA::** The ADITYA-1 Project will be the first Indian Space based solar coronagraph, which will be available for solar coronal observation to all the Indian researchers in the field of Solar Astronomy. The major scientific objective of the ADITYA-1 is to achieve a fundamental understanding of the physical processes that heat the solar corona (base to the extended), accelerate the solar wind and produce Coronal Mass Ejections (CMEs). Work on ADITYA-1 has been initiated.
- 42. **Astrosat 1 & 2::** The objective of the Astrosat project is to build and launch an astronomical observatory satellite for expanding the scientific knowledge about the evolution of stellar objects and gather valuable scientific data on high energy Astronomy and Astrophysics research. The satellite is planned to be launched on-board PSLV during 2013-2014.
- 43. **Indian Lunar Chandrayaan-1 & 2::** The main objective of Indian Lunar Chandrayaan-1 is for expanding the scientific knowledge about the moon, upgrading the technological capability and providing the challenging opportunity for planetary research for a large number of growing young people of the country benefiting the human society at large. The Chandrayaan-1 was successfully launched on October 22, 2008 on-board PSLV-C11. The follow-on mission Chandrayaan-2 has been planned to be launched during 2014-15.

- 44. **Mars Orbiter Mission:** Mars Orbiter Mission envisages launching an Orbiter around Mars using Polar Satellite Launch Vehicle (PSLV-XL) during the November 2013 launch opportunity. MARS orbiter will be placed in an orbit of 500 x 80,000 km around MARS and will have a provision for carrying nearly 25 kg of scientific payloads on-board.
- 45. **ISRO Geosphere-Biosphere Programme (ISRO-GBP)::** ISRO-GBP encompasses the study of land and ocean interaction, past climate, changes in atmospheric composition, aerosols, carbon cycle, bio-mass estimation, bio-diversity and other related areas of scientific investigation.
- 46. **Atmospheric Science Programmes::** Atmospheric Science Programmes are intended to develop advanced observation tools & techniques of atmospheric modeling, leading to operational end user products in different domains of atmospheric science.
- 47. **Small Satellite for Atmospheric Studies & Astronomy::** The project envisages development of small satellites for study of Earth near space environment, magnetometer studies, study of aerosol and gases, tropical weather and climate studies.
- 48. **Other Schemes::** These includes Microgravity Research, Space Science promotion, Multi-institutional research programmes, Space Station experiment, setting up of Digital workflow systems, support for conferences, symposia, etc.
- 49. **Special Indigenisation/Advance Ordering::** Indigenisation envisages ISRO to have interface with the Indian Industry to develop various electronic components, materials, chemicals, etc., for the space programme. The scope of the scheme also includes procurement of certain long lead and critical items for futuristic missions and upgradation of VLSI fabrication facilities at SCL.
- 50. **Others::** Under this, provision has been included for ISRO Headquarters, International Co-operation and Central Management.
- 51. **Master Control Facility::** MCF is responsible for initial orbit raising, payload testing and in-orbit operation of all geo-stationary satellites.
- 52. **INSAT-3 Satellites (including Launch Services)::** The objective of INSAT-3 Spacecraft Project are to (i) build five INSAT-3 satellites (INSAT-3A to INSAT-3E) keeping the flexibility for mid-course corrections to accommodate emerging requirements, carry out mission planning, launch campaign and initial phase operations and (ii) establish required programme elements for carrying out the same. INSAT-3D satellite which is scheduled to be launched during 2012-13 has been configured as an advanced meteorological Satellite with new payloads such as Imager and Sounder.
- 54. INSAT-4/GSAT Satellites (including Launch Services and Leasing of Transponders):: The fourth generation INSAT-4/GSAT Satellite series has been planned to meet the capacity and service requirements projected by various users and development needs of the country. INSAT-4A, 4B, 4CR, GSAT-12, GSAT-4G satellites in the INSAT-4 series have been launched & operationalised. Work on INSAT 4E, GSAT-9 and GSAT-10 are in progress.
- 54. **GSAT-7 Launch Services::** GSAT-7 is a user funded communication satellite. GSAT-7 was initially planned for launch on-board GSLV. Due to the schedule criticality of GSAT-7

satellite, now approval for the launch of GSAT-7 satellite through procured launch services is being sought.

No. 90/Department of Space