

DEPARTMENT OF SPACE

DEMAND NO. 84

Department of Space

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

Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			<i>(In crores of Rupees)</i> Budget 2016-2017		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Revenue	2025.95	1325.00	3350.95	2535.29	1388.00	3923.29	2529.51	1359.44	3888.95	2646.84	1509.14	4155.98
Capital	2447.86	...	2447.86	3464.90	...	3464.90	3070.49	...	3070.49	3353.16	...	3353.16
Total	4473.81	1325.00	5798.81	6000.19	1388.00	7388.19	5600.00	1359.44	6959.44	6000.00	1509.14	7509.14
BE 2016-2017												
1. Secretariat - Economic Services	3451	...	...	...	...	...	...	...	...	...	28.15	28.15
Space Research												
Space Technology												
2. Vikram Sarabhai Space Centre (VSSC) & its Projects	3402	...	...	...	...	...	...	...	...	680.51	381.32	1061.83
	5402	...	...	...	...	...	...	...	...	773.59	...	773.59
<i>Total</i>	...	...	...	...	...	...	...	...	...	1454.10	381.32	1835.42
3. Inertial Systems Unit (IISU)	3402	...	...	...	...	...	...	...	...	35.00	...	35.00
	5402	...	...	...	...	...	...	...	...	25.00	...	25.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	60.00	...	60.00
4. Liquid Propulsion Systems Centre & its Project	3402	...	...	...	...	...	...	...	...	195.00	91.75	286.75
	5402	...	...	...	...	...	...	...	...	185.00	...	185.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	380.00	91.75	471.75
5. ISRO Propulsion Complex	3402	...	...	...	...	...	...	...	...	110.00	58.00	168.00
	5402	...	...	...	...	...	...	...	...	165.00	...	165.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	275.00	58.00	333.00
6. ISRO Satellite Centre (ISAC & its Projects)	3402	...	...	...	...	...	...	...	...	233.51	118.00	351.51
	5402	...	...	...	...	...	...	...	...	596.59	...	596.59
<i>Total</i>	...	...	...	...	...	...	...	...	...	830.10	118.00	948.10
7. Laboratory for Electro-Optics System (LEOS)	3402	...	...	...	...	...	...	...	...	35.00	...	35.00
	5402	...	...	...	...	...	...	...	...	10.00	...	10.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	45.00	...	45.00
8. Satish Dhawan Space Centre -SHAR (SDSC-SHAR) & its Project	3402	...	...	...	...	...	...	...	...	200.00	173.00	373.00

(In crores of Rupees)

Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			Budget 2016-2017		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
5402	...	...	...	...	...	...	...	...	...	470.00	...	470.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	670.00	173.00	843.00
9. ISRO Telemetry, Tracking & Command Network (ISTRAC)	3402	...	...	...	...	...	...	...	...	80.00	60.00	140.00
5402	...	...	...	...	...	...	...	...	...	30.00	...	30.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	110.00	60.00	170.00
10. ISRO Headquarters	3402	...	...	...	...	...	...	...	...	4.25	92.66	96.91
5402	...	...	...	...	...	...	...	...	...	40.50	...	40.50
<i>Total</i>	...	...	...	...	...	...	...	...	...	44.75	92.66	137.41
11. International Co-operation	3402	...	...	...	...	...	...	...	...	4.00	...	4.00
12. Master Control Facility (MCF)	3402	...	...	...	...	...	...	...	...	18.00	45.00	63.00
5402	...	...	...	...	...	...	...	...	...	45.00	...	45.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	63.00	45.00	108.00
Total-Space Technology	...	...	...	...	...	...	...	...	...	3935.95	1019.73	4955.68
Space Applications												
13. Space Applications Centre (SAC)	3402	...	...	...	...	...	...	...	...	215.00	198.39	413.39
5402	...	...	...	...	...	...	...	...	...	165.00	...	165.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	380.00	198.39	578.39
14. Development and Educational Communication Unit (DECU)	3402	...	...	...	...	...	...	...	...	12.00	8.00	20.00
5402	...	...	...	...	...	...	...	...	...	2.00	...	2.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	14.00	8.00	22.00
15. ISRO Space Applications Programmes	3402	...	...	...	...	...	...	...	...	55.00	...	55.00
5402	...	...	...	...	...	...	...	...	...	7.00	...	7.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	62.00	...	62.00
16. National Remote Sensing Centre (NRSC)	3402	...	...	...	...	...	...	...	...	110.00	112.00	222.00
5402	...	...	...	...	...	...	...	...	...	90.00	...	90.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	200.00	112.00	312.00
17. Indian Institute of Remote Sensing	3402	...	...	...	...	...	...	...	...	20.00	7.00	27.00
5402	...	...	...	...	...	...	...	...	...	18.00	...	18.00
<i>Total</i>	...	...	...	...	...	...	...	...	...	38.00	7.00	45.00
Total-Space Applications	...	...	...	...	...	...	...	...	...	694.00	325.39	1019.39
Space Sciences												
18. ISRO Space Science Programmes	3402	...	...	...	...	...	...	...	...	64.75	...	64.75
5402	...	...	...	...	...	...	...	...	...	3.10	...	3.10
<i>Total</i>	...	...	...	...	...	...	...	...	...	67.85	...	67.85

(In crores of Rupees)

	Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			Budget 2016-2017		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
19. ADITYA	3402	...	...	...	...	...	...	...	...	...	3.00	...	3.00
	5402	...	...	...	...	...	...	...	...	...	22.00	...	22.00
	<i>Total</i>	...	...	...	...	...	...	...	...	...	25.00	...	25.00
20. Astrostat 1 & 2	3402	...	...	...	...	...	...	...	...	...	0.50	...	0.50
	5402	...	...	...	...	...	...	...	...	...	0.50	...	0.50
	<i>Total</i>	...	...	...	...	...	...	...	...	...	1.00	...	1.00
21. Indian Lunar Mission - Chandrayan - 1 & 2	3402	...	...	...	...	...	...	...	...	...	2.00	...	2.00
	5402	...	...	...	...	...	...	...	...	...	78.00	...	78.00
	<i>Total</i>	...	...	...	...	...	...	...	...	...	80.00	...	80.00
22. X-RAY Polarimeter Mission (Xposat)	3402	...	...	...	...	...	...	...	...	...	0.50	...	0.50
	5402	...	...	...	...	...	...	...	...	...	4.50	...	4.50
	<i>Total</i>	...	...	...	...	...	...	...	...	...	5.00	...	5.00
23. Space Docking Experiment Mission	3402	...	...	...	...	...	...	...	...	...	0.01	...	0.01
	5402	...	...	...	...	...	...	...	...	...	0.09	...	0.09
	<i>Total</i>	...	...	...	...	...	...	...	...	...	0.10	...	0.10
Total-Space Sciences		...	...	...	...	...	...	...	...	...	178.95	...	178.95
INSAT Satellite System													
24. INSAT Satellite System	3402	...	...	...	...	...	...	...	...	...	173.81	...	173.81
	5402	...	...	...	...	...	...	...	...	...	622.29	...	622.29
	<i>Total</i>	...	...	...	...	...	...	...	...	...	796.10	...	796.10
25. Assistance to Autonomous Bodies	3402	...	...	...	...	...	...	...	...	...	395.00	135.87	530.87
Total-Space Research		...	...	...	...	...	...	...	...	...	6000.00	1480.99	7480.99
RE 2015-2016													
26. Secretariat - Economic Services	3451	...	21.70	21.70	...	28.90	28.90	...	26.97	26.97	...	...	...
Space Research													
Space Technology													
Launch Vehicle Technology													
27. GSLV MK-III Development	3402	102.97	...	102.97	111.00	...	111.00	111.00	...	111.00	...	...	...
	5402	4.00	...	4.00	9.00	...	9.00	9.00	...	9.00	...	...	...
	<i>Total</i>	106.97	...	106.97	120.00	...	120.00	120.00	...	120.00	...	...	...
28. Cryogenic Upper Stage Project (CUSP)	3402	...	...	...	...	...	...	...	...	...	...	...	...
29. Polar Satellite Launch Vehicle - Continuation (PSLV-C) Project	3402	10.25	...	10.25	12.25	...	12.25	12.00	...	12.00	...	...	...
	5402	61.25	...	61.25	300.00	...	300.00	268.39	...	268.39	...	...	...
	<i>Total</i>	71.50	...	71.50	312.25	...	312.25	280.39	...	280.39	...	...	...

(In crores of Rupees)

	Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			Budget 2016-2017		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
30. Vikram Sarabhai Space Centre (VSSC)	3402	345.28	335.33	680.61	370.60	309.00	679.60	371.53	344.79	716.32	...	...	...
	5402	266.75	...	266.75	349.40	...	349.40	396.83	...	396.83	...	...	...
	Total	612.03	335.33	947.36	720.00	309.00	1029.00	768.36	344.79	1113.15	...	...	...
31. Inertial Systems Unit (IISU)	3402	25.11	...	25.11	33.40	...	33.40	30.19	...	30.19	...	...	...
	5402	39.85	...	39.85	61.60	...	61.60	32.81	...	32.81	...	...	...
	Total	64.96	...	64.96	95.00	...	95.00	63.00	...	63.00	...	...	...
32. Liquid Propulsion Systems Centre	3402	102.45	73.96	176.41	123.00	79.00	202.00	125.93	76.48	202.41	...	...	...
	5402	92.54	...	92.54	107.00	...	107.00	75.77	...	75.77	...	...	...
	Total	194.99	73.96	268.95	230.00	79.00	309.00	201.70	76.48	278.18	...	...	...
33. ISRO Propulsion Complex	3402	68.95	45.13	114.08	93.00	64.00	157.00	97.89	47.88	145.77	...	...	...
	5402	60.37	...	60.37	81.00	...	81.00	71.53	...	71.53	...	...	...
	Total	129.32	45.13	174.45	174.00	64.00	238.00	169.42	47.88	217.30	...	...	...
34. GSLV Operational Project (Including MK-III Operational)	3402	171.81	...	171.81	182.50	...	182.50	191.00	...	191.00	...	...	...
	5402	3.06	...	3.06	12.50	...	12.50	4.00	...	4.00	...	...	...
	Total	174.87	...	174.87	195.00	...	195.00	195.00	...	195.00	...	...	...
35. Space Capsule Recovery Experiment (SRE)	3402	0.11	...	0.11	0.04	...	0.04	...	...	...	...	...	...
36. Manned Mission Initiatives/Human Space Flight Programme	3402	12.37	...	12.37	21.40	...	21.40	11.84	...	11.84	...	...	...
	5402	0.63	...	0.63	0.10	...	0.10	0.16	...	0.16	...	...	...
	Total	13.00	...	13.00	21.50	...	21.50	12.00	...	12.00	...	...	...
37. Indian Institute of Space Science & Technology	3402	65.00	15.00	80.00	130.00	21.00	151.00	60.00	16.50	76.50	...	...	...
38. Semi Cryogenic Engine Development	3402	37.20	...	37.20	53.00	...	53.00	59.53	...	59.53	...	...	...
	5402	67.80	...	67.80	97.00	...	97.00	83.47	...	83.47	...	...	...
	Total	105.00	...	105.00	150.00	...	150.00	143.00	...	143.00	...	...	...
39. Trisonic Wind Tunnel Project	3402	...	...	...	0.10	...	0.10	...	...	...	...	...	...
	5402	...	...	...	0.90	...	0.90	...	...	...	...	...	...
	Total	...	...	...	1.00	...	1.00	...	...	...	...	...	...
Total-Launch Vehicle Technology		1537.75	469.42	2007.17	2148.79	473.00	2621.79	2012.87	485.65	2498.52	...	...	...
Satellite Technology													
40. Resourcesat-2 and 3	3402	...	...	...	...	...	...	...	...	...	...	...	...
	5402	...	...	...	...	...	...	...	...	...	...	...	...
	Total	...	...	...	...	...	...	...	...	...	...	...	...
41. ISRO Satellite Centre (ISAC)	3402	147.02	124.86	271.88	147.00	111.00	258.00	169.97	111.00	280.97	...	...	...
	5402	94.87	...	94.87	128.00	...	128.00	101.58	...	101.58
	Total	241.89	124.86	366.75	275.00	111.00	386.00	271.55	111.00	382.55

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		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
42. Laboratory for Electro-Optics System (LEOS)	3402	29.72	...	29.72	33.00	...	33.00	35.10	...	35.10	...	...	...
	5402	28.50	...	28.50	27.00	...	27.00	15.55	...	15.55	...	...	...
	Total	58.22	...	58.22	60.00	...	60.00	50.65	...	50.65	...	...	...
43. Radar Imaging Satellite-1 (RISAT-1)	3402	...	...	...	...	...	...	...	...	...	...	...	...
	5402	...	...	...	...	...	...	...	...	...	...	...	...
	Total	...	...	...	...	...	...	...	...	...	...	...	...
44. Navigational Satellite System (NSS)	3402	28.19	...	28.19	35.00	...	35.00	32.00	...	32.00	...	...	...
	5402	67.19	...	67.19	85.00	...	85.00	75.30	...	75.30	...	...	...
	Total	95.38	...	95.38	120.00	...	120.00	107.30	...	107.30	...	...	...
45. Semi-Conductor Laboratory (SCL)	3402	60.91	47.56	108.47	126.84	52.60	179.44	139.20	54.80	194.00	...	...	...
	3402	-19.56	...	-19.56	...	...	...	...	...	...	...	...	...
	Net	41.35	47.56	88.91	126.84	52.60	179.44	139.20	54.80	194.00	...	...	...
46. Advanced Communication Satellite (GSAT-11 including Launch Services)	3402	3.29	...	3.29	1.50	...	1.50	4.50	...	4.50	...	...	...
	5402	136.72	...	136.72	29.50	...	29.50	28.90	...	28.90	...	...	...
	Total	140.01	...	140.01	31.00	...	31.00	33.40	...	33.40	...	...	...
47. Earth Observation - New Missions, (Future EO Missions including RISAT-3)	3402	...	...	...	...	...	...	...	...	...	...	...	...
	5402	...	...	...	...	...	...	...	...	...	...	...	...
	Total	...	...	...	...	...	...	...	...	...	...	...	...
48. SARAL	3402	...	...	...	...	...	...	...	...	...	...	...	...
	5402	...	...	...	...	...	...	...	...	...	...	...	...
	Total	...	...	...	...	...	...	...	...	...	...	...	...
49. Geo-Imaging Satellite (GISAT)	3402	3.99	...	3.99	2.00	...	2.00	3.18	...	3.18	...	...	...
	5402	38.08	...	38.08	78.00	...	78.00	47.61	...	47.61	...	...	...
	Total	42.07	...	42.07	80.00	...	80.00	50.79	...	50.79	...	...	...
50. Resourcesat-2A	3402	1.60	...	1.60	3.00	...	3.00	2.50	...	2.50	...	...	...
	5402	29.05	...	29.05	47.00	...	47.00	47.38	...	47.38	...	...	...
	Total	30.65	...	30.65	50.00	...	50.00	49.88	...	49.88	...	...	...
51. Cartosat-3	3402	...	...	...	4.00	...	4.00	0.88	...	0.88	...	...	...
	5402	...	...	...	46.00	...	46.00	17.42	...	17.42	...	...	...
	Total	...	...	...	50.00	...	50.00	18.30	...	18.30	...	...	...
52. Scattsat	3402	...	...	...	1.50	...	1.50	1.38	...	1.38	...	...	...
	5402	28.50	...	28.50	9.62	...	9.62
	Total	30.00	...	30.00	11.00	...	11.00
53. Risat-1A	3402	0.50	...	0.50

(In crores of Rupees)

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		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
	5402	...	...	...	1.50	...	1.50	10.20	...	10.20	...	...	...
	<i>Total</i>	...	...	...	2.00	...	2.00	10.20	...	10.20	...	...	...
54. Oceansat-3	3402	...	...	...	3.00	...	3.00	0.20	...	0.20	...	...	...
	5402	...	...	...	22.00	...	22.00	14.50	...	14.50	...	...	...
	<i>Total</i>	...	...	...	25.00	...	25.00	14.70	...	14.70	...	...	...
55. Cartosat-2E	3402	0.50	...	0.50	2.00	...	2.00	1.03	...	1.03	...	...	...
	5402	4.28	...	4.28	43.00	...	43.00	21.50	...	21.50	...	...	...
	<i>Total</i>	4.78	...	4.78	45.00	...	45.00	22.53	...	22.53	...	...	...
56. Risat-3	3402	...	...	...	0.50	...	0.50	...	...	...	...	...	...
	5402	...	...	...	1.50	...	1.50	...	...	...	...	...	...
	<i>Total</i>	...	...	...	2.00	...	2.00	...	...	...	...	...	...
57. NASA ISRO Synthetic Aperature Radar Mission (NISAR)	3402	...	...	...	10.00	...	10.00	0.68	...	0.68	...	...	...
	5402	...	...	...	40.00	...	40.00	25.30	...	25.30	...	...	...
	<i>Total</i>	...	...	...	50.00	...	50.00	25.98	...	25.98	...	...	...
Total-Satellite Technology		654.35	172.42	826.77	946.84	163.60	1110.44	805.48	165.80	971.28	...	...	...
Launch Support, Tracking Network & Range Facility													
58. Satish Dhawan Space Centre - SHAR (SDSC-SHAR)	3402	155.89	170.44	326.33	147.00	174.00	321.00	205.00	145.00	350.00	...	...	...
	5402	199.42	...	199.42	238.00	...	238.00	242.68	...	242.68	...	...	...
	<i>Total</i>	355.31	170.44	525.75	385.00	174.00	559.00	447.68	145.00	592.68	...	...	...
59. Realisation of Second Vehicle Assembly Building (SVAB)	3402	...	...	...	...	...	...	...	...	...	...	...	...
	5402	3.00	...	3.00	120.00	...	120.00	130.00	...	130.00	...	...	...
	<i>Total</i>	3.00	...	3.00	120.00	...	120.00	130.00	...	130.00	...	...	...
60. ISRO Telemetry, Tracking & Command Network (ISTRAC)	3402	64.35	55.31	119.66	76.00	66.00	142.00	70.00	64.00	134.00	...	...	...
	5402	18.16	...	18.16	43.00	...	43.00	25.30	...	25.30	...	...	...
	<i>Total</i>	82.51	55.31	137.82	119.00	66.00	185.00	95.30	64.00	159.30	...	...	...
Total-Launch Support, Tracking Network & Range Facility		440.82	225.75	666.57	624.00	240.00	864.00	672.98	209.00	881.98	...	...	...
Total-Space Technology		2632.92	867.59	3500.51	3719.63	876.60	4596.23	3491.33	860.45	4351.78	...	...	...
Space Applications													
61. Space Applications Centre (SAC)	3402	153.07	156.46	309.53	152.00	177.00	329.00	211.73	175.00	386.73	...	...	...
	5402	67.64	...	67.64	123.00	...	123.00	137.29	...	137.29	...	...	...
	<i>Total</i>	220.71	156.46	377.17	275.00	177.00	452.00	349.02	175.00	524.02	...	...	...
62. Development and Educational Communication Unit(DECU)	3402	9.04	8.09	17.13	32.30	11.11	43.41	6.00	7.00	13.00	...	...	...
	5402	0.52	...	0.52	1.00	...	1.00	1.20	...	1.20	...	...	...

(In crores of Rupees)

Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			Budget 2016-2017		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
<i>Total</i>	9.56	8.09	17.65	33.30	11.11	44.41	7.20	7.00	14.20	...	...	...
63. National Natural Resources Management System(NNRMS)	3402	19.95	...	19.95	56.70	...	56.70	50.10	...	50.10	...	...
64. Earth Observation Application Mission(EOAM)	3402	2.71	...	2.71	5.20	...	5.20	3.70	...	3.70	...	...
65. National Remote Sensing Centre (NRSC)	3402	86.79	105.80	192.59	101.00	110.00	211.00	107.00	100.00	207.00	...	...
	5402	52.16	...	52.16	94.00	...	94.00	78.00	...	78.00	...	...
<i>Total</i>		138.95	105.80	244.75	195.00	110.00	305.00	185.00	100.00	285.00	...	...
66. Indian Institute of Remote Sensing	3402	16.71	6.08	22.79	17.00	8.00	25.00	17.93	8.00	25.93	...	...
	5402	7.75	...	7.75	19.00	...	19.00	15.54	...	15.54	...	...
<i>Total</i>		24.46	6.08	30.54	36.00	8.00	44.00	33.47	8.00	41.47	...	...
67. Disaster Management Support (DMS)	3402	12.79	...	12.79	11.50	...	11.50	12.38	...	12.38	...	...
	5402	10.51	...	10.51	18.50	...	18.50	22.74	...	22.74	...	...
<i>Total</i>		23.30	...	23.30	30.00	...	30.00	35.12	...	35.12	...	...
68. North Eastern Space Applications Centre (NE-SAC)	3402	15.00	3.90	18.90	20.50	4.50	25.00	9.90	4.12	14.02	...	...
Total-Space Applications		454.64	280.33	734.97	651.70	310.61	962.31	673.51	294.12	967.63	...	...
Space Sciences												
69. Physical Research Laboratory (PRL)	3402	67.33	38.00	105.33	100.71	40.29	141.00	80.12	44.14	124.26	...	...
70. National Atmospheric Research Laboratory (NARL)	3402	13.90	6.10	20.00	17.00	6.20	23.20	17.00	6.20	23.20	...	...
71. RESPOND	3402	18.50	...	18.50	25.15	...	25.15	24.85	...	24.85	...	...
72. Sensor Payload Development / Planetary Science Programme	3402	0.96	...	0.96	2.50	...	2.50	0.90	...	0.90	...	...
73. Megha-tropiques Project	3402	...	...	...	...	...	...	...	...	...	...	...
	5402	...	...	...	...	...	...	...	...	...	...	...
<i>Total</i>		...	...	...	...	...	...	...	...	...	...	...
74. ADITYA	3402	0.41	...	0.41	1.00	...	1.00	1.16	...	1.16	...	...
	5402	6.45	...	6.45	19.00	...	19.00	12.84	...	12.84	...	...
<i>Total</i>		6.86	...	6.86	20.00	...	20.00	14.00	...	14.00	...	...
75. Astrosat 1 & 2	3402	0.39	...	0.39	0.50	...	0.50	0.50	...	0.50	...	...
	5402	1.04	...	1.04	2.50	...	2.50	1.50	...	1.50	...	...
<i>Total</i>		1.43	...	1.43	3.00	...	3.00	2.00	...	2.00	...	...
76. Indian Lunar Mission - Chandrayan - 1 & 2	3402	1.60	...	1.60	3.00	...	3.00	1.25	...	1.25	...	...
	5402	34.38	...	34.38	37.00	...	37.00	50.25	...	50.25	...	...
<i>Total</i>		35.98	...	35.98	40.00	...	40.00	51.50	...	51.50	...	...
77. Mars Orbiter Mission	3402	4.21	...	4.21	1.00	...	1.00	0.69	...	0.69
	5402	86.62	...	86.62	5.00	...	5.00	5.96	...	5.96

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		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
	Total	90.83	...	90.83	6.00	...	6.00	6.65	...	6.65	...	...	...
78.	ISRO Geosphere Biosphere Programme (ISRO GBP)	3402	11.11	...	11.11	20.00	...	20.00	17.30	...	17.30	...	...
79.	Atmospheric Science Programmes	3402	11.51	...	11.51	10.50	...	10.50	11.88	...	11.88	...	...
		5402	...	...	...	1.00	...	1.00	0.50	...	0.50	...	...
	Total	11.51	...	11.51	11.50	...	11.50	12.38	...	12.38	...	...	...
80.	Small Satellites for Atmospheric Studies and Astronomy	5402	0.45	...	0.45	2.40	...	2.40	0.68	...	0.68	...	...
81.	Other Schemes	3402	2.47	...	2.47	5.50	...	5.50	20.03	...	20.03	...	...
Total-Space Sciences			261.33	44.10	305.43	253.76	46.49	300.25	247.41	50.34	297.75	...	...
Direction & Administration/Other Programmes													
82.	Special Indigenisation/Advance Ordering	3402	...	...	...	...	...	...	...	...	...	...	...
		5402	...	...	...	...	...	...	...	...	...	...	...
	Total	...	...	...	...	...	...	...	...	...	...	...	...
83.	Development of Space Materials and Components	3402	12.18	...	12.18	26.00	...	26.00	12.00	...	12.00	...	...
84.	Advance Ordering	5402	13.60	...	13.60	24.00	...	24.00	11.40	...	11.40	...	...
85.	Others	3402	4.20	72.40	76.60	4.60	85.40	90.00	4.60	87.56	92.16	...	...
		5402	20.43	...	20.43	39.50	...	39.50	32.00	...	32.00	...	...
	Total	24.63	72.40	97.03	44.10	85.40	129.50	36.60	87.56	124.16	...	...	...
Total-Direction & Administration/Other Programmes			50.41	72.40	122.81	94.10	85.40	179.50	60.00	87.56	147.56	...	...
INSAT Operational													
86.	Master Control Facility (MCF)	3252	9.63	38.88	48.51	11.00	40.00	51.00	16.49	40.00	56.49	...	...
		5252	12.62	...	12.62	39.00	...	39.00	23.06	...	23.06	...	...
	Total	22.25	38.88	61.13	50.00	40.00	90.00	39.55	40.00	79.55	...	...	...
87.	INSAT-3 Satellites (Including Launch Services)	3252	2.36	...	2.36	3.00	...	3.00	1.55	...	1.55	...	...
		5252	7.98	...	7.98	14.00	...	14.00	9.53	...	9.53	...	...
	Total	10.34	...	10.34	17.00	...	17.00	11.08	...	11.08	...	...	...
88.	INSAT-4 Satellites (Including Launch Services and Leasing of Transponders)	3252	3.18	...	3.18	5.00	...	5.00	5.77	...	5.77	...	...
		5252	25.90	...	25.90	29.00	...	29.00	11.16	...	11.16	...	...
	Total	29.08	...	29.08	34.00	...	34.00	16.93	...	16.93	...	...	...
89.	Service Charges for Leasing INSAT/GSAT Transponders	3252	70.50	...	70.50	93.00	...	93.00	72.87	...	72.87	...	...
90.	INSAT-3D Launch Services	3252	1.35	...	1.35	...	...	...	...	...	...	...	...
		5252	...	...	...	...	...	...	...	...	...	...	...
	Total	1.35	...	1.35	...	...	...	...	...	...	...	...	...

(In crores of Rupees)

	Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			Budget 2016-2017		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
91.	GSAT-7 Launch Services	3252	1.51	...	1.51	...	...	...	...	...	...	...	...
		5252	...	...	...	...	...	...	...	...	...	...	...
	Total	1.51	...	1.51	...	...	...	...	...	...	...	...	...
92.	GSAT-15 Satellite	3252	22.14	...	22.14	24.00	...	24.00	32.44	...	32.44	...	...
		5252	70.45	...	70.45	96.00	...	96.00	99.26	...	99.26	...	...
	Total	92.59	...	92.59	120.00	...	120.00	131.70	...	131.70	...	...	...
93.	GSAT-15 Satellite - Launch Services	3252	...	...	...	3.00	...	3.00	3.00	...	3.00	...	...
		5252	320.12	...	320.12	42.00	...	42.00	36.50	...	36.50	...	...
	Total	320.12	...	320.12	45.00	...	45.00	39.50	...	39.50	...	...	...
94.	GSAT-16 Satellite	3252	33.05	...	33.05	4.00	...	4.00	4.34	...	4.34	...	...
		5252	134.00	...	134.00	41.00	...	41.00	31.88	...	31.88	...	...
	Total	167.05	...	167.05	45.00	...	45.00	36.22	...	36.22	...	...	...
95.	GSAT-16 Satellite - Launch Services	3252	...	...	...	1.00	...	1.00	1.50	...	1.50	...	...
		5252	359.72	...	359.72	...	...	...	...	...	...	...	...
	Total	359.72	...	359.72	1.00	...	1.00	1.50	...	1.50	...	...	...
96.	GSAT-17 Satellite	3252	...	...	...	12.50	...	12.50	18.12	...	18.12	...	...
		5252	...	...	...	82.50	...	82.50	29.60	...	29.60	...	...
	Total	...	...	...	95.00	...	95.00	47.72	...	47.72	...	...	...
97.	GSAT-17 Satellite - Launch Services	3252	...	...	...	5.00	...	5.00	...	...	...	...	...
		5252	...	...	...	230.00	...	230.00	171.58	...	171.58	...	...
	Total	...	...	...	235.00	...	235.00	171.58	...	171.58	...	...	...
98.	GSAT-18 Satellite	3252	...	...	...	17.00	...	17.00	23.79	...	23.79	...	...
		5252	...	...	...	78.00	...	78.00	103.21	...	103.21	...	...
	Total	...	...	...	95.00	...	95.00	127.00	...	127.00	...	...	...
99.	GSAT-18 Satellite - Launch Services	3252	...	...	...	5.00	...	5.00	...	...	...	...	...
		5252	...	...	...	407.00	...	407.00	426.30	...	426.30	...	...
	Total	...	...	...	412.00	...	412.00	426.30	...	426.30	...	...	...
100.	GSAT-19 Satellite	3252	...	...	...	4.00	...	4.00	2.09	...	2.09	...	...
		5252	...	...	...	21.00	...	21.00	3.71	...	3.71	...	...
	Total	...	...	...	25.00	...	25.00	5.80	...	5.80	...	...	...
101.	GSAT follow-on Satellites including Launch Services	5252	...	...	...	1.00	...	1.00	...	...	...	...	...
102.	Augmentation of Capacity through leasing of transponders from foreign Satellite	3252	...	...	...	10.00	...	10.00	...	...	...	...	...
103.	Procurement of Heavier class of Satellites	5252	...	...	...	1.00	...	1.00	...	...	...	...	...

(In crores of Rupees)

	Major Head	Actual 2014-2015			Budget 2015-2016			Revised 2015-2016			Budget 2016-2017		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
104. Development of a Satellite for SAARC Countries	3252	...	...	...	1.00	...	1.00	...	...	...	...	...	...
	5252	...	...	...	1.00	...	1.00	...	...	...	...	...	...
	<i>Total</i>	...	...	...	2.00	...	2.00	...	...	...	...	...	...
Total-INSAT Operational		1074.51	38.88	1113.39	1281.00	40.00	1321.00	1127.75	40.00	1167.75	...	...	...
105. Investment in Public Enterprises													
105.01 Issue of Bonus Shares by Antrix Corporation Ltd.	5402	...	3.00	3.00	...	...	...	...	...	...	...	...	...
105.02 Less Receipts Netted	4000	...	-3.00	-3.00	...	...	...	...	...	...	...	...	...
	<i>Net</i>	...	...	...	...	...	...	...	...	...	...	...	...
Total-Space Research		4473.81	1303.30	5777.11	6000.19	1359.10	7359.29	5600.00	1332.47	6932.47	...	...	...
Grand Total		4473.81	1325.00	5798.81	6000.19	1388.00	7388.19	5600.00	1359.44	6959.44	6000.00	1509.14	7509.14
	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
C. Plan Outlay													
1. Space Research	13402	4473.81	...	4473.81	6000.19	...	6000.19	5600.00	...	5600.00	6000.00	...	6000.00

1. **Secretariat Economic Services:** Provision is for expenditure to be incurred on the Secretariat of the Department of Space.

2. **Vikram Sarabhai Space Centre (VSSC) & Its Projects:** VSSC is the lead Centre for the development of satellite launch vehicles and sounding rockets and it houses the major test and fabrication facilities for launch vehicles. Projects under VSSC include:

a) **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).

b) **Polar Satellite Launch Vehicle - Continuation (PSLV-C) Project:** The 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.

c) **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.

d) **Manned Mission Initiatives/Human Space Flight Programme:** The programme envisages development of a fully autonomous orbital vehicle carrying two or three crew-members to about 275 km low earth orbit and their safe return. Currently, the critical technologies required for human spaceflight programme are being developed as pre-project activities.

e) **Trisonic Wind Tunnel Facility:** Trisonic Wind Tunnel Facility is planned to be established at Vikram Sarabhai Space Centre for meeting the test requirements of future launch vehicles.

f) **Development of Space Materials:** Development of Space materials is an effort to indigenously develop space grade materials with the help of Indian Industry for Indian Space Programme in order to reduce dependency on foreign sources.

g) **Advance Ordering:** Advance Ordering aims at procurement of certain long lead and critical items for futuristic missions.

3. **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 realize the flight units of these systems for the launch vehicle and satellite programmes.

4. **Liquid Propulsion Systems Centre (LPSC) & Its Project:** 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. Project under LPSC include:

a) **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.

5. **ISRO Propulsion Complex (IPRC):** The ISRO Propulsion Complex has the prime responsibility for development and realization of the Earth-storable Liquid Engines & Stages for PSLV & GSLV, the Cryogenic Upper Stage for GSLV & GSLV-Mk-III and development of Semi-Cryogenic Engine for meeting the requirements of the Indian Space Programme.

6. **ISRO Satellite Centre (ISAC) & Its Projects:** ISAC is the lead Center for the design, fabrication, testing and management of satellite systems for scientific, technological and application missions. The Projects under ISAC include:

a) Navigation Satellite System (NSS): The Indian Regional Navigation Satellite System (IRNSS), is planned to be a constellation of 7 satellites aimed at providing position accuracies similar to Global Positioning System (GPS) in a region centered around India with a coverage extending up to 1500 km from India.

b) Geo-Imaging Satellite (GISAT): Geo-Imaging satellite (GISAT) is conceived as a multi-spectral, multi-resolution advanced remote sensing satellite capable of imaging from geo-stationary orbit.

c) Resourcesat-2A: Resourcesat-2A is planned as a follow-on mission to Resourcesat-2 satellite. Apart from providing continuity of already established services, it will also provide opportunity to explore newer application areas in Land and Water resources management.

d) Cartosat-3: Cartosat-3 is an advanced remote sensing satellite with enhanced resolution of 0.25m for cartographic applications and high resolution mapping.

e) Scatsat: Scatsat is a remote sensing satellite which will carry a pencil beam Ku-band scatterometer to provide measurement of wind vector and a millimeter wave sounder to provide data on vertical temperature profile of the atmosphere. This will be mainly used for atmospheric and oceanographic studies.

f) Risat-1A: Risat-1A is a follow-on mission to RISAT-1 with C-band multi-polarized Synthetic Aperture Radar having capability of imaging under all weather conditions.

g) Oceansat-3 & 3A: Oceansat-3 is an advanced remote sensing satellite with for oceanographic applications. This will carry an Ocean Color Monitor (OCM-3) with 13 bands and a Ku-band pencil beam scatterometer.

h) Cartosat-2E: Cartosat-2E is a high resolution cartographic satellite with improved resolution of 0.65m in panchromatic band along with imaging capability in multi-spectral bands. The satellite will provide value added products and services to the user community especially for large scale mapping and monitoring requirements.

i) Risat-3: Risat-3 is an advanced remote sensing satellite with a Synthetic Aperture Radar for all weather day night imaging.

j) NASA-ISRO Synthetic Aperture Radar Mission (NISAR): NISAR is a dual frequency radar imaging satellite to be jointly developed by NASA and ISRO to study surface deformation, terrestrial biomass structure, natural resources mapping & monitoring and studies related to dynamics of ice sheets, glaciers, forest fire, oil slick etc.

k) Development of Space Components: Development of Space components is an effort to indigenously develop space grade components with the help of Indian Industry for Indian Space Programme in order to reduce dependency on foreign sources.

l) Resourcesat-3S/3SA: Resourcesat-3S & 3SA are two high resolution remote sensing satellites with improved resolution for advanced land, water resources and large scale stereo mapping applications with two Panchromatic cameras.

7. **Laboratory for Electro-Optics Systems (LEOS):** LEOS is responsible for research & development and production of electro-optics sensors.

8. **Satish Dhawan Space Centre-SHAR (SDSC-SHAR) & Its Project:** SDSC-SHAR is the spaceport of India and provides the launch infrastructure as well as solid propellant processing. The Project under SDSC-SHAR includes:

a) Second Vehicle Assembly Building (SVAB): SVAB is planned to be realized at Satish Dhawan Space Centre, Sriharikota. SVAB will provide enhanced launch frequency of PSLV and GSLV. It will also provide redundancy to existing vehicle assembly building for integration of GSLV Mk III.

9. **ISRO Telemetry, Tracking and Command Network (ISTRAC):** ISTRAC provides spacecraft TTC and Mission Control services to major launch vehicle and spacecraft missions.

10. **ISRO HQ:** Under this, provision has been included for the expenses of ISRO Headquarters, setting up of Digital workflow systems & Spacenet Augmentation, support for conferences, symposia, ISRO Award Scheme and Central Management.

11. **International Co-operation:** Under this, provision has been included for the expenses of International Co-operation and CSSTE-AP.

12. **Master Control Facility:** MCF is responsible for initial orbit raising, payload testing and in-orbit operation of all geo-stationary satellites.

13. **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.

14. **Development and Educational Communication Unit (DECU):** DECU is involved in the conceptualization, definition, planning, implementation and socio-economic evaluation of developmental space applications.

15. **ISRO Space Application Programmes:** Under this, provision has been included for the expenses of Space Application Programmes undertaken by ISRO which include:

a) 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.

b) 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 remote sensing applications with value-added services to the users.

c) **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.

16. **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).

17. **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, Geo-informatics and GPS Technology for Natural Resources, Environmental and Disaster Management.

18. **ISRO Space Science Programmes:** Under this, provision has been included for the expenses of Space Science Programmes undertaken by ISRO which include

A. 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 through grants in aid.

B. 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.

C. ISRO Geosphere Biosphere Programme 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.

D. Atmospheric Science Programmes Atmospheric Science Programmes is intended to develop advanced observation tools and techniques of atmospheric modeling, leading to operational end user products in different domains of atmospheric science.

E. Small Satellite for Atmospheric Studies and Astronomy envisages development of small satellites for study of Earth's near space environment, magnetometer studies, study of aerosol and gases, tropical weather and climate studies.

F. Other Schemes includes Microgravity Research, Space Science promotion, Multi institutional research programs, Space Station experiment etc.

19. **ADITYA-1:** 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)

20. **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.

21. **Indian Lunar Mission Chandrayaan-1 & 2:** The Chandrayaan-1 was successfully launched on October 22, 2008 on-board PSLV-C11. The follow-on mission Chandrayaan-2 is planned to further expand 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.

22. **X-Ray Polarimeter Mission (XpoSat):** XpoSat is a small satellite aims to measure the degree and direction of the X-ray polarization of a few bright cosmic X-ray sources using the principle of anisotropic Thomson scattering in 5-30 keV energy band.

23. **Space Docking Experiment Mission:** Space docking experiment aims at developing and demonstrating the technology required for docking of two small satellites in space.

24. **INSAT Satellite Systems:** INSAT Satellite Systems include the following:

a) **INSAT 3 Satellites including Launch Services:** The objective of INSAT 3 Spacecraft Project is to build advanced meteorological satellites INSAT 3DR and INSAT 3DS with imager and sounder.

b) **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.

c) **Service Charges for Leasing INSAT - GSAT Transponders:** This is envisaged for payment of services charges for Leasing of INSAT - GSAT Transponders.

d) **GSAT 15 Satellite:** GSAT 15 is a communication satellite which will carry 24 Ku band transponders and a GAGAN payload.

e) **GSAT 15 Satellite Launch Services:** GSAT 15 satellite launch services is envisaged for securing procured launch services for GSAT 15 satellite.

f) **GSAT 16 Satellite:** GSAT 16 is a communication satellite which will carry 24 C band, 12 Upper Ext C band and 12 Ku band transponders.

g) **GSAT 16 Satellite Launch Services:** GSAT 16 satellite launch services is envisaged for securing procured launch services for GSAT 16 satellite.

h) **GSAT 17 Satellite:** GSAT 17 communication satellite will provide a mix of c band and ext C band and MSS transponders. Weighing about 3500 Kgs, GSAT 17 is intended to be placed at 93.50E orbital location with a provision to move to other orbital locations. The satellite will carry 24 C band, 2 Lower Ext C band, 12 Upper Ext C band, 4 MSS and 1 DRT, SAS and R transponders.

i) GSAT 17 Satellite Launch Services: GSAT 17 satellite launch services is envisaged for securing procured launch services for GSAT 17 satellite.

J) GSAT 18 Satellite: GSAT 18 communication satellite will have a unique mix of ku band, c band and ext C-band transponders. Weighing about 3500 Kgs, GSAT 18 is intended to be placed at 740E orbital location. The satellite will carry 24 C band, 12 Upper Ext C band, 12 Ku band transponders. In addition, it will carry a Ku band Beacon transmitter.

K) GSAT 18 Satellite Launch Services: GSAT 18 satellite launch services is envisaged for securing procured launch services for GSAT 18 satellite.

L) GSAT 19 Satellite: GSAT 19 is a communication satellite weighing about 3500 Kgs to be launched onboard the first developmental flight of GSLV Mk III vehicle. GSAT 19 will carry 3 Ka band, 2 C band and 2 MSS transponders.

M) GSAT follow on Satellites including Launch Services: GSAT follow on missions are the future communication satellites planned during the 12th Plan period. GSAT follow on missions Launch Services is envisaged for securing procured launch services for future communication satellites.

N) Augmentation of Capacity through Leasing of transponders from foreign Satellite: This is meant for short term augmentation of INSAT - GSAT transponder capacity by leasing of transponders from a foreign satellite to meet the immediate demand for transponders.

O) Procurement of Heavier class of Satellite: A heavier class of communication satellite is planned to be procured from a foreign agency to meet the growing demand for communication transponders.

P) Development of a Satellite for SAARC Countries: This is a communication satellite being developed to cover the entire region of SAARC countries to meet the socio-economic development and welfare needs of SAARC countries through space technology.

Q) Advanced Communication Satellite (GSAT 11 including Launch Services): The main objective is to develop a 4 Ton class of communication satellite incorporating advanced technologies of relevance for future.

R) GSAT 20 : GSAT 20 is being configured as a Ka-band communication satellite.

25. **Assistance to Autonomous Bodies:** This includes the Budgetary support extended by ISRO to its five Autonomous Bodies by way of Grant-in-Aid as is detailed below:

a) 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.

b) 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.

c) 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.

d) 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. PRL is also responsible for the administration of Udaipur Solar observatory.

e) National Atmospheric Research Laboratory (NARL): NARL, a registered Society, is responsible for carrying out advanced research in atmospheric and space sciences and related disciplines.