

DEPARTMENT OF SPACE

DEMAND NO.89

Department of Space

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

(In crores of Rupees)

Major Head	Budget 2008-2009			Revised 2008-2009			Budget 2009-2010		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Revenue	1820.50	474.00	2294.50	1708.08	685.00	2393.08	2008.88	859.00	2867.88
Capital	1779.50	...	1779.50	1105.92	...	1105.92	1591.12	...	1591.12
Total	3600.00	474.00	4074.00	2814.00	685.00	3499.00	3600.00	859.00	4459.00
1. Secretariat - Economic Services	3451	...	5.46	5.46	...	6.93	6.93	...	7.45
Space Research									
Space Technology									
Launch Vehicle Technology									
2. Geo -Synchronous Satellite Launch Vehicle	3402	1.00	...	1.00	...	...	...	...	...
3. GSLV MK-III Development	3402	167.00	...	167.00	152.00	...	152.00	135.86	...
	5402	103.00	...	103.00	88.19	...	88.19	81.14	...
	<i>Total</i>	<i>270.00</i>	...	<i>270.00</i>	<i>240.19</i>	...	<i>240.19</i>	<i>217.00</i>	...
4. Cryogenic Upper Stage Project [CUSP]	3402	0.10	...	0.10	0.70	...	0.70	0.37	...
5. Polar Satellite Launch Vehicle - Continuation (PSLV-C) Project	3402	170.00	...	170.00	143.50	...	143.50	162.00	...
	5402	10.00	...	10.00	6.50	...	6.50	18.00	...
	<i>Total</i>	<i>180.00</i>	...	<i>180.00</i>	<i>150.00</i>	...	<i>150.00</i>	<i>180.00</i>	...
6. Vikram Sarabhai Space Centre (VSSC)	3402	122.04	128.41	250.45	175.16	188.36	363.52	173.72	273.26
	5402	181.83	...	181.83	131.17	...	131.17	166.44	...
	<i>Total</i>	<i>303.87</i>	<i>128.41</i>	<i>432.28</i>	<i>306.33</i>	<i>188.36</i>	<i>494.69</i>	<i>340.16</i>	<i>273.26</i>
7. Indian Space Research Organisation - Inertial Systems Unit(IISU)	3402	10.79	...	10.79	13.02	...	13.02	14.20	...
	5402	12.37	...	12.37	10.17	...	10.17	16.64	...
	<i>Total</i>	<i>23.16</i>	...	<i>23.16</i>	<i>23.19</i>	...	<i>23.19</i>	<i>30.84</i>	...
8. Liquid Propulsion Systems Centre	3402	123.76	46.33	170.09	128.86	67.85	196.71	160.99	73.70
	5402	34.10	...	34.10	12.65	...	12.65	51.24	...
	<i>Total</i>	<i>157.86</i>	<i>46.33</i>	<i>204.19</i>	<i>141.51</i>	<i>67.85</i>	<i>209.36</i>	<i>212.23</i>	<i>73.70</i>
9. GSLV Operational Project	3402	235.00	...	235.00	230.64	...	230.64	257.71	...
	5402	20.00	...	20.00	9.36	...	9.36	17.29	...
	<i>Total</i>	<i>255.00</i>	...	<i>255.00</i>	<i>240.00</i>	...	<i>240.00</i>	<i>275.00</i>	...
10. Space Capsule Recovery Experiment (SRE)	3402	10.00	...	10.00	10.00	...	10.00	12.00	...
11. Manned Mission Initiatives/ Human Space Flight Programme	3402	100.00	...	100.00	29.01	...	29.01	20.00	...
	5402	25.00	...	25.00	13.00	...	13.00	30.00	...
	<i>Total</i>	<i>125.00</i>	...	<i>125.00</i>	<i>42.01</i>	...	<i>42.01</i>	<i>50.00</i>	...
12. Indian Institute of Space Science & Technology	3402	65.25	...	65.25	65.25	...	65.25	175.00	...
13. Semi Cryogenic Engine Development	3402	15.00	...	15.00	1.99	...	1.99	15.00	...
	5402	7.50	...	7.50	2.10	...	2.10	60.00	...
	<i>Total</i>	<i>22.50</i>	...	<i>22.50</i>	<i>4.09</i>	...	<i>4.09</i>	<i>75.00</i>	...
Total - Launch Vehicle Technology		1413.74	174.74	1588.48	1223.27	256.21	1479.48	1567.60	346.96
Satellite Technology									
14. Oceansat-2 and 3	3402	3.00	...	3.00	2.80	...	2.80	2.30	...
	5402	7.00	...	7.00	9.20	...	9.20	3.70	...
	<i>Total</i>	<i>10.00</i>	...	<i>10.00</i>	<i>12.00</i>	...	<i>12.00</i>	<i>6.00</i>	...
15. Resourcesat-2 and 3	3402	3.00	...	3.00	2.88	...	2.88	3.16	...
	5402	32.00	...	32.00	22.12	...	22.12	31.84	...
	<i>Total</i>	<i>35.00</i>	...	<i>35.00</i>	<i>25.00</i>	...	<i>25.00</i>	<i>35.00</i>	...
16. ISRO Satellite Centre (ISAC)	3402	93.74	51.36	145.10	130.46	83.10	213.56	147.83	111.80
	5402	70.75	...	70.75	39.88	...	39.88	45.24	...
	<i>Total</i>	<i>164.49</i>	<i>51.36</i>	<i>215.85</i>	<i>170.34</i>	<i>83.10</i>	<i>253.44</i>	<i>193.07</i>	<i>111.80</i>
17. Laboratory for Electro-Optics System(LEOS)	3402	22.59	...	22.59	19.49	...	19.49	24.48	...
	5402	14.55	...	14.55	12.14	...	12.14	20.11	...
	<i>Total</i>	<i>37.14</i>	...	<i>37.14</i>	<i>31.63</i>	...	<i>31.63</i>	<i>44.59</i>	...

No.89/ Department of Space

		<i>(In crores of Rupees)</i>								
Major Head	Budget 2008-2009			Revised 2008-2009			Budget 2009-2010			
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
18. Radar Imaging Satellite-1 (RISAT-1)	3402	2.68	...	2.68	2.31	...	2.31	1.96	...	1.96
	5402	22.32	...	22.32	27.69	...	27.69	3.04	...	3.04
	<i>Total</i>	<i>25.00</i>	...	<i>25.00</i>	<i>30.00</i>	...	<i>30.00</i>	<i>5.00</i>	...	<i>5.00</i>
19. G.SAT-4	3402	5.00	...	5.00	3.75	...	3.75	2.90	...	2.90
	5402	2.00	...	2.00	0.55	...	0.55	...	...	...
	<i>Total</i>	<i>7.00</i>	...	<i>7.00</i>	<i>4.30</i>	...	<i>4.30</i>	<i>2.90</i>	...	<i>2.90</i>
20. Navigational Satellite System (NSS)	3402	18.00	...	18.00	16.85	...	16.85	21.96	...	21.96
	5402	252.00	...	252.00	183.15	...	183.15	248.04	...	248.04
	<i>Total</i>	<i>270.00</i>	...	<i>270.00</i>	<i>200.00</i>	...	<i>200.00</i>	<i>270.00</i>	...	<i>270.00</i>
21. Semi-conductor Laboratory (SCL)	3402	34.28	...	34.28	39.48	...	39.48	45.00	...	45.00
22. Advanced Communication Satellite	3402	15.00	...	15.00	...	...	...	1.00	...	1.00
	5402	7.50	...	7.50	1.00	...	1.00	4.00	...	4.00
	<i>Total</i>	<i>22.50</i>	...	<i>22.50</i>	<i>1.00</i>	...	<i>1.00</i>	<i>5.00</i>	...	<i>5.00</i>
23. Earth Observation - New Missions (Cartosat-3, SARAL, TES Hyperspectral, DMSAR-1)	3402	20.00	...	20.00	1.00	...	1.00	3.00	...	3.00
	5402	45.00	...	45.00	1.70	...	1.70	10.00	...	10.00
	<i>Total</i>	<i>65.00</i>	...	<i>65.00</i>	<i>2.70</i>	...	<i>2.70</i>	<i>13.00</i>	...	<i>13.00</i>
Total - Satellite Technology		670.41	51.36	721.77	516.45	83.10	599.55	619.56	111.80	731.36
Launch Support, Tracking Network & Range Facility										
24. Satish Dhawan Space Centre - SHAR	3402	95.29	55.25	150.54	112.57	75.84	188.41	121.38	99.91	221.29
	5402	87.45	...	87.45	130.54	...	130.54	119.12	...	119.12
	<i>Total</i>	<i>182.74</i>	<i>55.25</i>	<i>237.99</i>	<i>243.11</i>	<i>75.84</i>	<i>318.95</i>	<i>240.50</i>	<i>99.91</i>	<i>340.41</i>
25. ISRO Telemetry, Tracking & Command Network (ISTRAC)	3402	32.77	16.42	49.19	33.92	24.13	58.05	36.23	31.31	67.54
	5402	14.09	...	14.09	27.89	...	27.89	33.48	...	33.48
	<i>Total</i>	<i>46.86</i>	<i>16.42</i>	<i>63.28</i>	<i>61.81</i>	<i>24.13</i>	<i>85.94</i>	<i>69.71</i>	<i>31.31</i>	<i>101.02</i>
Total-Launch Support, Tracking Network & Range Facility		229.60	71.67	301.27	304.92	99.97	404.89	310.21	131.22	441.43
Total-Space Technology		2313.75	297.77	2611.52	2044.64	439.28	2483.92	2497.37	589.98	3087.35
Space Applications										
26. Space Applications Centre (SAC)	3402	54.51	58.67	113.18	61.61	95.45	157.06	72.65	119.37	192.02
	5402	56.66	...	56.66	38.07	...	38.07	62.08	...	62.08
	<i>Total</i>	<i>111.17</i>	<i>58.67</i>	<i>169.84</i>	<i>99.68</i>	<i>95.45</i>	<i>195.13</i>	<i>134.73</i>	<i>119.37</i>	<i>254.10</i>
27. Development and Educational Communication Unit (DECU)	3402	52.35	4.60	56.95	50.98	6.76	57.74	49.16	7.72	56.88
	5402	1.46	...	1.46	2.26	...	2.26	1.25	...	1.25
	<i>Total</i>	<i>53.81</i>	<i>4.60</i>	<i>58.41</i>	<i>53.24</i>	<i>6.76</i>	<i>60.00</i>	<i>50.41</i>	<i>7.72</i>	<i>58.13</i>
28. National Natural Resources Management System (NNRMS)	3402	28.23	...	28.23	26.63	...	26.63	20.00	...	20.00
29. Earth Observation Application Mission (EOAM)	3402	2.68	...	2.68	2.59	...	2.59	4.40	...	4.40
30. Regional Remote Sensing Service Centres (RRSSCs)	3402	7.62	...	7.62	9.94	...	9.94	10.82	...	10.82
	5402	3.48	...	3.48	3.83	...	3.83	11.07	...	11.07
	<i>Total</i>	<i>11.10</i>	...	<i>11.10</i>	<i>13.77</i>	...	<i>13.77</i>	<i>21.89</i>	...	<i>21.89</i>
31. National Remote Sensing Agency (NRSA)	3402	3.00	32.00	35.00	...	...	...	...	...	...
32. National Remote Sensing Centre (NRSC)	3402	...	...	...	25.10	30.00	55.10	68.96	35.30	104.26
	5402	...	...	...	15.21	...	15.21	36.90	...	36.90
	<i>Total</i>	...	...	...	<i>40.31</i>	<i>30.00</i>	<i>70.31</i>	<i>105.86</i>	<i>35.30</i>	<i>141.16</i>
33. Disaster Management Support System (DMS)	3402	50.00	...	50.00	24.32	...	24.32	30.00	...	30.00
	5402	15.00	...	15.00	5.00	...	5.00	10.00	...	10.00
	<i>Total</i>	<i>65.00</i>	...	<i>65.00</i>	<i>29.32</i>	...	<i>29.32</i>	<i>40.00</i>	...	<i>40.00</i>

		(In crores of Rupees)								
Major Head	Budget 2008-2009			Revised 2008-2009			Budget 2009-2010			
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
34. North Eastern Space Applications Centres (NE-SAC)	3402	4.35	0.65	5.00	4.00	1.00	5.00	5.90	1.10	7.00
Total - Space Applications		279.34	95.92	375.26	269.54	133.21	402.75	383.19	163.49	546.68
Space Sciences										
35. Physical Research Laboratory(PRL)	3402	35.72	15.72	51.44	36.05	24.86	60.91	38.49	23.83	62.32
36. National Atmospheric Research Laboratory(NARL)	3402	10.35	0.96	11.31	10.78	2.00	12.78	13.13	2.30	15.43
37. RESPOND	3402	13.00	...	13.00	12.65	...	12.65	13.00	...	13.00
38. Sensor Payload Development / Planetary Science Programme	3402	5.00	...	5.00	4.50	...	4.50	5.00	...	5.00
39. Megha-tropiques Project	3402	2.22	...	2.22	2.23	...	2.23	2.38	...	2.38
	5402	17.78	...	17.78	17.77	...	17.77	12.62	...	12.62
	<i>Total</i>	<i>20.00</i>	<i>...</i>	<i>20.00</i>	<i>20.00</i>	<i>...</i>	<i>20.00</i>	<i>15.00</i>	<i>...</i>	<i>15.00</i>
40. Astrosat 1 & 2	3402	0.65	...	0.65	0.57	...	0.57	1.17	...	1.17
	5402	24.35	...	24.35	20.43	...	20.43	18.83	...	18.83
	<i>Total</i>	<i>25.00</i>	<i>...</i>	<i>25.00</i>	<i>21.00</i>	<i>...</i>	<i>21.00</i>	<i>20.00</i>	<i>...</i>	<i>20.00</i>
41. Indian Lunar Mission - Chandrayan - 1 & 2	3402	3.85	...	3.85	4.43	...	4.43	5.38	...	5.38
	5402	74.15	...	74.15	83.57	...	83.57	84.62	...	84.62
	<i>Total</i>	<i>78.00</i>	<i>...</i>	<i>78.00</i>	<i>88.00</i>	<i>...</i>	<i>88.00</i>	<i>90.00</i>	<i>...</i>	<i>90.00</i>
42. ISRO Geosphere Biosphere Programme (ISRO GBP)	3402	19.00	...	19.00	21.50	...	21.50	25.78	...	25.78
43. Atmospheric Science Programmes	3402	14.49	...	14.49	15.30	...	15.30	20.96	...	20.96
44. Small Satellites for Atmospheric Studies	3402	10.00	...	10.00	...	...	...	2.00	...	2.00
45. Other Schemes	3402	19.38	1.75	21.13	9.90	1.75	11.65	12.50	1.75	14.25
Total - Space Sciences		249.94	18.43	268.37	239.68	28.61	268.29	255.86	27.88	283.74
Direction & Administration / Other Programmes										
46. Special Indigenisation/ Advance Ordering	3402	20.00	...	20.00	21.07	...	21.07	12.86	...	12.86
	5402	330.00	...	330.00	2.00	...	2.00	1.00	...	1.00
	<i>Total</i>	<i>350.00</i>	<i>...</i>	<i>350.00</i>	<i>23.07</i>	<i>...</i>	<i>23.07</i>	<i>13.86</i>	<i>...</i>	<i>13.86</i>
47. Others	3402	3.15	44.38	47.53	3.17	61.09	64.26	3.17	51.28	54.45
	5402	11.05	...	11.05	13.89	...	13.89	19.21	...	19.21
	<i>Total</i>	<i>14.20</i>	<i>44.38</i>	<i>58.58</i>	<i>17.06</i>	<i>61.09</i>	<i>78.15</i>	<i>22.38</i>	<i>51.28</i>	<i>73.66</i>
Total - Direction & Administration / Other Programmes		364.20	44.38	408.58	40.13	61.09	101.22	36.24	51.28	87.52
INSAT Operational										
48. Master Control Facility(MCF)	3252	12.66	12.04	24.70	10.76	15.88	26.64	10.40	18.92	29.32
	5252	30.11	...	30.11	27.46	...	27.46	35.24	...	35.24
	<i>Total</i>	<i>42.77</i>	<i>12.04</i>	<i>54.81</i>	<i>38.22</i>	<i>15.88</i>	<i>54.10</i>	<i>45.64</i>	<i>18.92</i>	<i>64.56</i>
49. INSAT-3 Satellites	3252	3.00	...	3.00	3.41	...	3.41	1.76	...	1.76
	5252	7.00	...	7.00	16.69	...	16.69	6.94	...	6.94
	<i>Total</i>	<i>10.00</i>	<i>...</i>	<i>10.00</i>	<i>20.10</i>	<i>...</i>	<i>20.10</i>	<i>8.70</i>	<i>...</i>	<i>8.70</i>
50. INSAT-4 Satellites (Including Launch Services)	3252	80.00	...	80.00	30.95	...	30.95	40.96	...	40.96
	5252	260.00	...	260.00	130.74	...	130.74	332.04	...	332.04
	<i>Total</i>	<i>340.00</i>	<i>...</i>	<i>340.00</i>	<i>161.69</i>	<i>...</i>	<i>161.69</i>	<i>373.00</i>	<i>...</i>	<i>373.00</i>
Total - INSAT Operational		392.77	12.04	404.81	220.01	15.88	235.89	427.34	18.92	446.26
51. Aid Materials & Equipment-Gross Deduct-Transfers to Functional Major Head Net-Aid Materials & Equipment	3606	...	0.02	0.02	...	...	...	...	...	...
	3606	...	-0.02	-0.02	...	...	...	...	...	...
	<i>Total</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>
Grand Total		3600.00	474.00	4074.00	2814.00	685.00	3499.00	3600.00	859.00	4459.00
C. Plan Outlay	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
1. Space Research	13402	3600.00	...	3600.00	2814.00	...	2814.00	3600.00	...	3600.00

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

2. **Geo-Synchronous Satellite Launch Vehicle (GSLV) Project:** The GSLV Project envisaged the development of a launch vehicle capable of launching 2 tonne INSAT-class satellites into Geo-synchronous Transfer Orbit (GTO). The third test flight will carry the indigenous cryogenic engine & stage.

3. **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 in Geo-synchronous Transfer Orbit (GTO). The Project envisages the development of a number of technologies which include, among other, 200 tonne solid stage booster (S-200), 25 tonne cryogenic engines (C-25), and L-110 tonne liquid stage engines as core boosters. The first developmental flight of GSLV MK III is expected by 2010-2011.

4. **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. The first flight of the indigenous cryo stage is targeted for flight testing by GSLV during 2009-2010.

5. **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. The PSLV-C-11 in its fourteenth flight successfully launched Chandrayaan-1 spacecraft carrying 11 scientific payloads on October 22, 2008.

6. **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.

7. **ISRO Inertial Systems Unit (IISU):** IISU is responsible for research & development in the area of inertial sensors & systems for launch vehicles, satellites and allied satellite elements.

8. **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.

9. **GSLV-Operational Project:** The GSLV-Operational Project has been conceived to meet the launch requirement of 2 tonne class of operational INSAT satellites. The GSLV-F06 carrying INSAT-3D will be launched during 2009-2010.

10. **Space Capsule Recovery Experiment (SRE):** The main objective of the Space Capsule Recovery Experiment (SRE) is to develop and demonstrate capability to recover on orbiting capsule back on earth. SRE-I has successfully launched on-board PSLV on January 10, 2007 and was also successfully recovered from Bay of Bengal on January 22, 2007. The SRE-II will be launched by PSLV-C16 during the third quarter of 2009-2010.

11. **Manned Mission Initiatives/Human Space Flight Programme:** The main objective of the Indian Manned Mission Space program is to develop a fully autonomous manned space vehicle to carry two crew to 400 km LEO and safe return to earth. Detailed studies have been initiated on the technologies required

for realizing the flight safety and reliability, propulsion systems, advanced materials etc. The project proposal has been submitted for approval of the Government.

12. **Indian Institute of Space Science & Technology:** Indian Institute of Space Science & Technology is an autonomous body under DOS with the objective of creating quality human resources tuned to suit the state-of-art space technology requirement of Indian Space Programme. The Institute offers graduate, post-graduate and doctoral programme in the area of space science technology and applications. The Institute has started functioning from the academic year 2007-2008 around the existing infrastructure of ISRO Centres in Thiruvananthapuram. A permanent infrastructure for the Institute is in progress near LPSC, Valiamala.

13. **Semi Cryogenic Engine/Stage Development:** The objective of the 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.

14. **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. The launch of Oceansat-2 onboard PSLV is planned during the first quarter of 2009-2010. Oceansat-3, planned to be initiated towards end of 11th plan will be a follow-on satellite for Oceansat-2 to provide continuity of data on Ocean & Coastal resources.

15. **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 Payload realization and sub-system fabrication are targeted for 2009-2010. Resourcesat-3 will provide continuity of data after Resourcesat-2.

16. **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.

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

18. **Radar Imaging Satellite-1 Project (RISAT-1):** Radar Imaging Satellite (RISAT) is intended to provide all-weather, day and night imaging capability providing vital inputs for various agricultural and disaster applications. The satellite is targeted to be launched by PSLV-C-13 during first quarter of 2009-2010.

19. **GSAT-4:** The satellite will be utilized for conducting various experiments in the communications area and early introduction of geo-based navigation system. The satellite is targeted for launch during 2009-2010.

20. **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 GPS in a region centered around India with a coverage extending upto 1500 km from India. The configuration of the satellite has been finalized and procurement of components & materials has been initiated.

21. **Semi-conductor Laboratory:** SCL is engaged in the Design, Development and Manufacture of very large scale integrated circuits (VLSIs) 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.

22. **Advanced Communication Satellite:** The main objective is to develop a 4 tonne class communication satellite incorporating advanced technologies of relevance for future.

23. **Earth Observation – New Missions (SARAL, TES-Hyp, DMSAR-1 & Carto-3):** 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 small satellite with Argos & Altimeter (SARAL) for oceanography studies, Technology Experiment Satellite in Hyper Spectral Imaging (TES-HYP), Radar Imaging Satellite for Disaster Management (DMSAR) & advanced cartography satellite (Carto-3).

24. **Satish Dhawan Space Centre-SHAR (SDSC-SHAR):** SDSC-SHAR provides the launch infrastructure as well as solid propellant processing.

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

26. **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.

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

28. **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.

29. **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.

30. **Regional Remote Sensing Services Centres (RRSSCs):** The five Regional Remote Sensing Services Centres (RRSSCs) at Bangalore, Dehradun, Jodhpur, Kharagpur and Nagpur have been established under the aegis of NNRMS with the prime objective of providing remote sensing application services to the user in the respective regions for better planning and optimal utilization of natural resources and also bring about awareness amongst the users on the potential of remote sensing and associated technologies.

31. **National Remote Sensing Agency (NRSA):** NRSA is a registered society and is the nodal agency for operational remote sensing activities in the country. It is responsible for acquisition, processing, distribution and archiving of data from

remote sensing satellites. NRSA has been converted from a Registered society to a Government entity called "National Remote Sensing Centre" (NRSC) from 1.9.2008.

32. **National Remote Sensing Centre (NRSC):** Considering the fact that the NRSA is closely associated with various programmes of DOS/ISRO, in particular the Earth Observation Programme, Disaster Management Support and other Programmes of national importance and to enable NRSA to carryout its responsibilities in a more effective manner, the Government have decided to convert it into a Government entity, to be called as National Remote Sensing Centre (NRSC), a center under DOS/ISRO w.e.f. 01.09.2008. NRSC has facilities for generation of data products for various applications from remotely sensed data. NRSC also operates a fleet of instrumented aircraft and has a satellite receiving station at Shadnagar, near Hyderabad.

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, earth sciences, astronomy & aeronomy & planetary exploration.

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. **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 through grants-in-aid.

38. **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.

39. **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.

40. **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 for launch in 2010 onboard PSLV.

41. **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 the PSLV-C11. The follow-on mission Chandrayaan-2 has been recently approved by the Government.

42. 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.

43. Atmospheric Science Program: Atmospheric Science Program is intended to develop advanced observation tools & techniques of atmospheric modeling, leading to operational end user products indifferent domains of atmospheric science.

44. Small Satellite for Atmospheric Studies & Astronomy: The project 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.

45. Other Schemes: These includes Microgravity Research, Space Science promotion, Multi-institutional research programs, Space Station experiment, setting up of Digital workflow systems, support for conferences, symposia, etc.

46. 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.

47. Others: Under this, provision has been included for ISRO Headquarters, International Co-operation and Central Management.

48. Master Control Facility: MCF is responsible for initial orbit raising, payload testing and in-orbit operation of all geostationary satellites.

49. 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 the last satellite in INSAT-3 series is targeted for launch during 2009-2010.

50. INSAT-4 Satellites (including Launch Services): The fourth generation INSAT-4 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 satellite in the INSAT-4 series have been launched & operationalised. Work on INSAT-4D, 4E, 4F (User funded) and INSAT-4G is in progress.