DEPARTMENT OF SPACE

DEMAND NO.92

Department of Space

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

(In crores of Rupees)

	Major Head	Budget 2001-2002 Plan	Budget 2001-2002 Non-Plan	Budget 2001-2002 Total	Revised 2001-2002 Plan	Revised 2001-2002 Non-Plan	Revised 2001-2002 Total	Budget 2002-2003 Plan	Budget 2002-2003 Non-Plan	Budget 2002-2003 Total
Revenue		1288.46	320.00	1608.46	1266.63	309.35	1575.98	1637.75	313.87	1951.62
Capital		*421.54*	*...*	*421.54*	*333.37*	*...*	*333.37*	*312.25*	*...*	*312.25*
Total		**1710.00**	**320.00**	**2030.00**	**1600.00**	**309.35**	**1909.35**	**1950.00**	**313.87**	**2263.87**
1. Secretariat - Economic Services	3451	0.01	4.17	4.18	0.01	3.81	3.82	...	3.85	3.85
Space Research										
Rocket Development										
2. Geo -Synchronous Satellite Launch Vehicle	3402	98.31	...	98.31	83.56	...	83.56	101.13	...	101.13
	5402	0.35	...	0.35	0.30	...	0.30	...	...	...
	Total	*98.66*	*...*	*98.66*	*83.86*	*...*	*83.86*	*101.13*	*...*	*101.13*
3. GSLV MK-III Development.	3402	5.00	...	5.00	1.00	...	1.00	163.00	...	163.00
	5402	...	...	...	...	...	...	17.00	...	17.00
	Total	*5.00*	*...*	*5.00*	*1.00*	*...*	*1.00*	*180.00*	*...*	*180.00*
4. Cryogenic Upper Stage (CUS) Project	3402	20.34	...	20.34	14.82	...	14.82	15.56	...	15.56
	5402	0.96	...	0.96	5.49	...	5.49	0.82	...	0.82
	Total	*21.30*	*...*	*21.30*	*20.31*	*...*	*20.31*	*16.38*	*...*	*16.38*
5. C-20 Cryogenic Stage Development.	3402	0.10	...	0.10	...	...	...	...	...	...
	5402	0.10	...	0.10	...	...	...	...	...	...
	Total	*0.20*	*...*	*0.20*	*...*	*...*	*...*	*...*	*...*	*...*
6. Polar Satellite Launch Vehicle - Continuation Project	3402	90.00	...	90.00	76.00	...	76.00	40.28	...	40.28
	5402	15.00	...	15.00	24.00	...	24.00	20.00	...	20.00
	Total	*105.00*	*...*	*105.00*	*100.00*	*...*	*100.00*	*60.28*	*...*	*60.28*
7. Vikram Sarabhai Space Centre	3402	63.31	100.36	163.67	81.68	97.55	179.23	64.55	97.09	161.64
	5402	43.22	...	43.22	15.20	...	15.20	15.15	...	15.15
	Total	*106.53*	*100.36*	*206.89*	*96.88*	*97.55*	*194.43*	*79.70*	*97.09*	*176.79*
8. Indian Space Research Organisation - Inertial Systems Unit(IISU).	3402	10.80	...	10.80	9.69	...	9.69	8.72	...	8.72
	5402	3.33	...	3.33	4.15	...	4.15	1.41	...	1.41
	Total	*14.13*	*...*	*14.13*	*13.84*	*...*	*13.84*	*10.13*	*...*	*10.13*
9. Sriharikota Centre	3402	34.10	41.67	75.77	39.23	39.77	79.00	40.34	41.77	82.11
	5402	15.80	...	15.80	14.80	...	14.80	19.23	...	19.23
	Total	*49.90*	*41.67*	*91.57*	*54.03*	*39.77*	*93.80*	*59.57*	*41.77*	*101.34*
10. ISRO Telemetry,Tracking & Command Network	3402	8.51	14.42	22.93	8.31	13.29	21.60	12.79	11.35	24.14
	5402	7.24	...	7.24	8.94	...	8.94	11.13	...	11.13
	Total	*15.75*	*14.42*	*30.17*	*17.25*	*13.29*	*30.54*	*23.92*	*11.35*	*35.27*
11. Liquid Propulsion Systems Centre	3402	24.02	35.71	59.73	28.46	34.34	62.80	27.86	33.35	61.21
	5402	37.86	...	37.86	13.08	...	13.08	12.69	...	12.69
	Total	*61.88*	*35.71*	*97.59*	*41.54*	*34.34*	*75.88*	*40.55*	*33.35*	*73.90*
12. Second Launch Pad & Common Facilities	3402	0.50	...	0.50	0.70	...	0.70	0.70	...	0.70
	5402	131.50	...	131.50	131.30	...	131.30	44.30	...	44.30
	Total	*132.00*	*...*	*132.00*	*132.00*	*...*	*132.00*	*45.00*	*...*	*45.00*
13. Other Schemes of Rocket Development	3402	0.10	...	0.10	...	...	...	...	...	...
	5402	0.10	...	0.10	...	...	...	...	...	...
	Total	*0.20*	*...*	*0.20*	*...*	*...*	*...*	*...*	*...*	*...*
14. Radar Development Cell	3402	0.98	...	0.98	0.98	...	0.98	0.98	...	0.98
	5402	0.30	...	0.30	0.51	...	0.51	0.60	...	0.60
	Total	*1.28*	*...*	*1.28*	*1.49*	*...*	*1.49*	*1.58*	*...*	*1.58*
15. GSLV Continuation Project	3402	*5.00*	*...*	*5.00*	*...*	*...*	*...*	*20.00*	*...*	*20.00*
	5402	...	...	...	...	...	...	5.00	...	5.00
	Total	*5.00*	*...*	*5.00*	*...*	*...*	*...*	*25.00*	*...*	*25.00*
16 Space Capsule Recovery Experiment	3402	...	...	...	...	...	...	19.00	...	19.00
	5402	...	...	...	...	...	...	1.00	...	1.00
	Total	*...*	*...*	*...*	*...*	*...*	*...*	*20.00*	*...*	*20.00*
Total - Rocket Development		**616.83**	**192.16**	**808.99**	**562.20**	**184.95**	**747.15**	**663.24**	**183.56**	**846.80**
Setellite Development										
17. IRS P4(Oceansat)	3402	0.50	...	0.50	1.55	...	1.55	...	...	...
	5402	...	...	...	...	...	...	...	...	...
	Total	0.50	...	0.50	1.55	...	1.55	...	...	...

(In crores of Rupees)

	Major Head	Budget 2001-2002 Plan	Non-Plan	Total	Revised 2001-2002 Plan	Non-Plan	Total	Budget 2002-2003 Plan	Non-Plan	Total
18. IRS P5(Cartosat)	3402	30.04	...	30.04	15.10	...	15.10	15.09	...	15.09
	5402	4.67	...	4.67	6.75	...	6.75	2.11	...	2.11
	Total	*34.71*	*...*	*34.71*	*21.85*	*...*	*21.85*	*17.20*	*...*	*17.20*
19. IRS P6 (Resourcesat)	3402	28.23	...	28.23	25.49	...	25.49	10.06	...	10.06
	5402	2.31	...	2.31	4.51	...	4.51	6.94	...	6.94
	Total	*30.54*	*...*	*30.54*	*30.00*	*...*	*30.00*	*17.00*	*...*	*17.00*
20. G-SAT-1	3402	3.00	...	3.00	5.75	...	5.75	...	...	...
	5402	...	...	...	...	...	...	...	...	...
	Total	*3.00*	*...*	*3.00*	*5.75*	*...*	*5.75*	*...*	*...*	*...*
21. G-SAT-2	3402	30.00	...	30.00	20.00	...	20.00	10.00	...	10.00
	5402	...	...	...	...	...	...	...	...	...
	Total	*30.00*	*...*	*30.00*	*20.00*	*...*	*20.00*	*10.00*	*...*	*10.00*
22. IRS-II (Cartosat-2) Satellite	3402	32.86	...	32.86	29.11	...	29.11	50.46	...	50.46
	5402	7.14	...	7.14	9.19	...	9.19	10.10	...	10.10
	Total	*40.00*	*...*	*40.00*	*38.30*	*...*	*38.30*	*60.56*	*...*	*60.56*
23. IRS-II B/C	3402	5.00	...	5.00	...	...	...	5.00	...	5.00
24. Direct-To-Home Satellite	3402	0.10	...	0.10	0.01	...	0.01	...	...	...
(including Launch Services)	5402	...	...	...	...	...	...	...	...	...
	Total	*0.10*	*...*	*0.10*	*0.01*	*...*	*0.01*	*...*	*...*	*...*
25. ISRO Satellite Centre	3402	52.81	33.56	86.37	41.33	32.55	73.88	40.73	35.47	76.20
	5402	38.64	...	38.64	9.21	...	9.21	28.20	...	28.20
	Total	*91.45*	*33.56*	*125.01*	*50.54*	*32.55*	*83.09*	*68.93*	*35.47*	*104.40*
26. Laboratory for Electro-Optics	3402	6.81	...	6.81	6.50	...	6.50	10.64	...	10.64
System	5402	11.54	...	11.54	10.44	...	10.44	3.55	...	3.55
	Total	*18.35*	*...*	*18.35*	*16.94*	*...*	*16.94*	*14.19*	*...*	*14.19*
27. G-SAT 3	3402	10.00	...	10.00	0.10	...	0.10	10.00	...	10.00
28. METSAT	3402	48.00	...	48.00	16.99	...	16.99	28.19	...	28.19
	5402	2.00	...	2.00	8.01	...	8.01	6.81	...	6.81
	Total	*50.00*	*...*	*50.00*	*25.00*	*...*	*25.00*	*35.00*	*...*	*35.00*
29. RISAT-1	3402	...	...	...	...	...	...	28.00	...	28.00
	5402	...	...	...	...	...	...	2.00	...	2.00
	Total	*...*	*...*	*...*	*...*	*...*	*...*	*30.00*	*...*	*30.00*
Total - Satellite Development		313.65	33.56	347.21	210.04	32.55	242.59	267.88	35.47	303.35
Space Applications.										
30. Space Applications Centre	3402	37.84	43.90	81.74	37.90	41.59	79.49	59.27	40.24	99.51
	5402	12.36	...	12.36	12.25	...	12.25	12.97	...	12.97
	Total	*50.20*	*43.90*	*94.10*	*50.15*	*41.59*	*91.74*	*72.24*	*40.24*	*112.48*
31. Development and Educational	3402	3.62	3.89	7.51	1.66	3.62	5.28	1.15	4.18	5.33
Communication Unit	5402	14.38	...	14.38	5.01	...	5.01	29.59	...	29.59
	Total	*18.00*	*3.89*	*21.89*	*6.67*	*3.62*	*10.29*	*30.74*	*4.18*	*34.92*
32. National Natural Resources Management System	3402	17.19	...	17.19	19.21	...	19.21	40.13	...	40.13
33. Remote Sensing Application Mission(RSAM)	3402	...	...	...	6.10	...	6.10	8.10	...	8.10
34. Regional Remote Sensing Service Centers(RRSSC)	3402	...	...	...	4.83	...	4.83	4.97	...	4.97
	5402	...	...	...	0.44	...	0.44	0.73	...	0.73
	Total	...	...	...	5.27	...	5.27	5.70	...	5.70
35. National Remote Sensing Agency	3402	8.61	2.54	11.15	8.46	2.54	11.00	7.46	2.54	10.00
36. Disaster Management System	3402	...	...	...	2.00	...	2.00	10.00	...	10.00
37. Others	3402	10.88	...	10.88	...	...	...	...	...	...
	5402	1.44	...	1.44	0.60	...	0.60	...	...	...
	Total	*12.32*	*...*	*12.32*	*0.60*	*...*	*0.60*	*...*	*...*	*...*
38. North Eastern Space Applications Centre	3402	5.00	...	5.00	5.00	...	5.00	5.00	...	5.00
Total - Space Applications		**111.32**	**50.33**	**161.65**	**103.46**	**47.75**	**151.21**	**179.37**	**46.96**	**226.33**
Space Sciences										
39. Physical Research Laboratory	3402	19.12	6.60	25.72	20.36	6.60	26.96	19.82	6.70	26.52
40. Sensor Development	3402	...	...	...	4.93	...	4.93	16.40	...	16.40
41. Megha-tropiques	3402	...	...	...	2.04	...	2.04	5.35	...	5.35
42. India Millenium Mission	3402	10.00	...	10.00	10.00	...	10.00	...	...	...
43. Others (NMRF & Other	3402	24.77	0.85	25.62	14.96	0.85	15.81	20.33	0.85	21.18
Schemes)	5402	...	...	...	...	...	...	...	...	...
	Total	*24.77*	*0.85*	*25.62*	*14.96*	*0.85*	*15.81*	*20.33*	*0.85*	*21.18*
Total - Space Sciences		**53.89**	**7.45**	**61.34**	**52.29**	**7.45**	**59.74**	**61.90**	**7.55**	**69.45**

(In crores of Rupees)

	Major Head	Budget , 2000-2001 Plan	Non-Plan	Total	Revised, 2000-2001 Plan	Non-Plan	Total	Budget, 2001-2002 Plan	Non-Plan	Total
44. Other Programmes	3402	54.20	24.15	78.35	41.87	25.36	67.23	26.19	28.30	54.49
	5402	17.27	...	17.27	2.55	...	2.55	3.52	...	3.52
.	*Total*	*71.47*	*24.15*	*95.62*	*44.42*	*25.36*	*69.78*	*29.71*	*28.30*	*58.01*
INSAT Operational										
45. Master Control Facility	3252	4.05	8.18	12.23	5.29	7.48	12.77	5.30	8.18	13.48
	5252	3.58	...	3.58	4.33	...	4.33	12.90	...	12.90
	Total	*7.63*	*8.18*	*15.81*	*9.62*	*7.48*	*17.10*	*18.20*	*8.18*	*26.38*
46. INSAT-2 Satellites	3252	35.20	...	35.20	62.96	...	62.96	...	...	...
(Including Launch Services)	5252	...	...	...	...	...	...	...	...	...
	Total	*35.20*	*...*	*35.20*	*62.96*	*...*	*62.96*	*...*	*...*	*...*
47. INSAT-3 Satellites	3252	449.55	...	449.55	512.69	...	512.69	256.20	...	256.20
(Including Launch Services)	5252	50.45	...	50.45	42.31	...	42.31	38.50	...	38.50
	Total	*500.00*	*...*	*500.00*	*555.00*	*...*	*555.00*	*294.70*	*...*	*294.70*
48. INSAT-4 Satellites(Including	3252	...	...	...	...	...	...	429.00	...	429.00
Launch Services)	5252	...	...	...	...	...	...	6.00	...	6.00
	Total	*...*	*...*	*...*	*...*	*...*	*...*	*435.00*	*...*	*435.00*
Total - INSAT Operational		**542.83**	**8.18**	**551.01**	**627.58**	**7.48**	**635.06**	**747.90**	**8.18**	**756.08**
49. Aid Materials & Equipment-Gross	3606	...	0.15	0.15	...	0.15	0.15	...	0.02	0.02
Deduct-Transfers to Functional Major Head	3606	...	-0.15	-0.15	...	-0.15	-0.15	...	-0.02	-0.02
Net-Aid Materials & Equipment	*Total*	*...*	*...*	*...*	*...*	*...*	*...*	*...*	*...*	*...*
Grand Total		***1710.00***	***320.00***	***2030.00***	***1600.00***	***309.35***	***1909.35***	***1950.00***	***313.87***	***2263.87***
C. Plan Outlay*	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
1. Space Research	13402	1710.00	...	1710.00	1600.00	...	1600.00	1950.00	...	1950.00

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 scope of the GSLV Project is to develop and qualify a Geo-Synchronous satellite Launch Vehicle (GSLV) for placing 2000-2500 kg INSAT-2 class of satellites into Geo-Synchronous Transfer Orbit (GTO). The first developmental flight of GSLV, viz., GSLV-D1, was launched successfully on April 18, 2001, injecting GSAT-1 in orbit. The subsequent developmental flights, GSLV-D2 and GSLV-D3 carrying GSAT-2 and GSAT-3 satellites, are targeted for launch in the timeframe 2002-2004.

3 **GSLV MK-III Development:** This is an improved version of GSLV with C-20 Cryo Upper Stage and large solid booster to achieve a payload capability of 3000 to 3500 kg in Geo-Synchronous Transfer Orbit (GTO).

4. **Cryogenic Upper Stage (CUS) Project :** The objective of the Cryogenic Upper Stage Project is to develop and qualify a restartable Cryogenic Stage using Liquid Oxygen and Liquid Hydrogen for the upper stage of GSLV.

6. **PSLV Continuation Project:** These launch vehicles are capable of placing 1000-2000 kg class IRS satellites in Polar Sun Synchronous orbit and 2800 kg class satellites in Low Earth orbit. The PSLV-C1 carrying IRS-1D was successfully launched on September 29, 1997. The PSLV-C2 carrying IRS-P4 (Oceansat) and two foreign satellites, KITSAT-3 and TUBSAT, was successfully launched on May 26, 1999, heralding India's entry into commercial launch vehicle market. The PSLV-C3 was successfully launched on October 22, 2001, with Technology Experimental Satellite (TES), PROBA of Belgium and BIRD of Germany.

7. **Vikram Sarabhai Space Centre:** This is the lead Centre for all rocket and launch vehicle programmes. The research and development activities of the Centre are mainly in the areas of avionics, aeronautics, launch vehicles, materials, mechanical engineering, solid propulsion, composites, propellants, systems reliability, polymers and chemicals. The main thrust of the work in the Centre is towards indigenous development of rockets and satellite launch vehicles with their associated control and guidance systems and electronics.

8. **ISRO Inertial Systems Unit (IISU):** The major task of IISU is to pursue a strong research and development programme in the critical area of inertial systems for satellite launch vehicles and allied inertial components and systems for satellite programmes of ISRO.

9. **Sriharikota (SHAR) Centre:** The Sriharikota (SHAR) Centre is the main launch centre of ISRO. It caters to the production of solid propellant rocket boosters, qualification of rocket motors and their sub-systems, integration, check-out and launch of satellite launch vehicles, launch of balloons and sounding rockets, liquid propellants and cryo propellants, tracking and telecommand stations, range & flight safety, storage and servicing facilities.

10. **ISRO Telemetry, Tracking and Command Network (ISTRAC):** The ISTRAC has the prime responsibility to provide TTC and Spacecraft Control support for ISRO's near-earth orbit and Launch Vehicle missions. To realise its objectives, ISTRAC has an integrated ground network stations at Bangalore, Lucknow, Sriharikota, Port Blair, Thiruvananthapuram, Mauritius, Bearslake, Biak Indonesia and Brunei, and a multi-mission Spacecraft Control Centre co-located with the Bangalore Ground Station. It is also in charge of operations of the Local User Terminal/ Mission Control Centre (LUT/ MCC) under the International Programme for Satellite Aided Search and Rescue.

11. **Liquid Propulsion Systems Centre**: LPSC is the lead centre for R&D in liquid and cryogenic propulsion stages for launch vehicles and auxiliary propulsion systems for both launch vehicles and satellites. It has the responsibility of research and development in cryogenic engines, propulsion systems including fluid components, spacecraft propulsion systems engineering, transducer manufacturing and precision fabrication.

12. **Second Launch Pad and Common Facilities:** The Second Launch Pad being established at Sriharikota is to take care of the requirements of PSLV and GSLV launches.

14. **Radar Development Cell (RDC):** Radar Development Cell (RDC) is responsible for research, development and productionisation of Radars.

15. **GSLV - Continuation:** After successful completion of GSLV developmental programme, in order to cater to the launch of 2.5 tonne class of satellites into Geo-Synchronous Transfer Orbit (GTO), the GSLV-Continuation Project is planned. The GSLV-Project envisages development of 3 flights (GSLV-C1, C2 & C3) and procurement/fabrication of long lead items/materials for GSLV-C4, C5 & C6.

16. **Space Capsule Recovery Experiment:** Space Capsule Recovery Experiment envisages the development of critical technologies related to the re-entry and to conduct micro-gravity research experiments. These are planned to provide technological inputs for future advanced re-usable launch vehicle systems.

18. **IRS-P5 (Cartosat-I):** The main objective of the project is to design, develop, launch and operate an advanced Space-based mission with enhanced spatial resolution for large scale thematic mapping applications and to further stimulate applications in the newer areas of cartography, urban management, disaster assessment and relief planning and management, environmental impact assessment and Geographical Information Systems (GIS) applications.

19. **IRS-P6 (Resourcesat-I):** The main objective of the project is to provide continued remote sensing data services on an operational basis for integrated land and water resources management at micro level with enhanced multi spectral/spatial coverage and stereo viewing capability, and to further carry out studies in advanced areas of user applications like improved crop discrimination, crop yield, crop stress, pest/disease surveillance, disaster management and Geographic Information System (GIS) applications.

21. **G-SAT-2:** The main objective of the project is to design and develop a communication test satellite for GSLV-D2 targeted for launch during 2002-2003.

22. **IRS-II A (Cartosat-2):** The project envisages design, development, fabrication, testing and launching of an advanced remote sensing application satellite carrying onboard a panchromatic camera capable of providing scene-specific imageries of nominal 1m spatial resolution to meet the information requirements for urban and rural planning, micro watershed development, geo-engineering applications, etc. The satellite is targeted for launch onboard PSLV-C7 during 2003-2004.

23. **IRS-IIB/C:** Taking into account the increased use of space imageries for different applications and continued service required from IRS satellites, provision has been made for taking up work relating to IRS-IIB/C satellites.

25. **ISRO Satellite Centre (ISAC):** ISAC is the lead centre for satellite technology and is entrusted with the prime responsibility of implementing indigenous spacecraft projects for various scientific, technological and applications missions. The research and development activities of this centre cover digital systems, power systems, communications, altitude control, spacecraft assembly and testing, structures, thermal control, spacecraft mission computers, etc.

26. **Laboratory for Electro-Optics Systems (LEOS):** LEOS, under the overall umbrella of ISRO Satellite Centre (ISAC), carries out research and development in the field of electro-optic sensors and systems for launch vehicles and satellites.

27. **G.SAT-3:** The G.SAT-3 satellite will be launched on board GSLV-D3 during 2003-2004.

28. **METSAT:** The sanctioned cost of the project is Rs.75.00 crore. The main objective of METSAT, which will be launched by PSLV-C4, is to design, develop, fabricate, test, launch an exclusive meteorological satellite with a Very High Resolution Radiometer (VHRR) to provide meteorological data and weather imagery on a continuous basis.

29. **RISAT-1**: The Radar Imaging Satellite (RISAT-1) with active microwave sensors is intended to provide all-weather capability crucial for many vital applications including agriculture, forestry, soil moisture, hydrology and disaster management support applications.

30. **Space Applications Centre (SAC):** SAC is entrusted with the task of research and development works in satellite communications, remote sensing, geodesy and meteorology. It is also responsible for the development of payload for remote sensing and communication satellites and for the planning and execution of the identified applications project and for generation of necessary hardware and software for such projects.

31. **Development and Educational Communication Unit (DECU):** DECU is involved in the conception, definition, planning, implementation and socio/techno-economic evaluation of space applications programmes. Its primary functions include organising space application experiments and demonstrations providing communication support for application projects, planning and policy studies on the application of space technology, production of video programmes on education, transfer of technology/expertise and social- science research on the society-technology interface.

32. **National Natural Resources Management System (NNRMS):** The main objective of the NNRMS is optimal management of the country's natural resources using remote sensing data in conjunction with conventional techniques. The NNRMS umbrella includes a large cross-section of Government Departments/Agencies which are responsible for resources management sectorally and other agencies associated in developmental activities. A large number of remote sensing application projects in the fields of agriculture, forestry, environment, geology, ground water, flood, drought, earthquake and landslide are being carried out under the aegis of NNRMS. Some of the other activities planned include Natural Resources Census, Large Scale Mapping, Land Use/Land Cover Mapping, Soils and Land Degradation Mapping, Geomorphological Mapping, Urban Information System and inputs to Disaster Management System (DMS).

33. **Remote Sensing Applications Mission (RSAM):** The main aim of RSAM has been pursuing the goals of NNRMS through (i) development and utilisation of operational remote sensing applications, (ii) evolving newer applications/R&D programme based on technology trends leading to operational applications programmes, (iii) guiding total applications programmes for implementation of remote sensing based solutions, and (iv) steering commercial activities of remote sensing involving development of value added services.

34. **Regional Remote Sensing Service Centres (RRSSCs):** The RRSSCs at Bangalore, Dehradun, Jodhpur, Kharagpur and Nagpur are engaged in the execution of various national level projects, user projects, application validation projects and technology & software development projects in the areas of land use/land cover mapping, agriculture, forestry , geology, mineral exploration, water resources etc.

35. **National Remote Sensing Agency (NRSA):** NRSA, an autonomous body under the Department of Space, is responsible for acquisition, processing and dissemination of satellite and aerial remote sensing data, training of user scientists in various applications/studies for resource mapping/disaster

monitoring and essential research and development activities in all its areas of operations.

36. **Disaster Management System:** ISRO/DOS during the last few years has closely worked with several Central & State agencies towards evolving a suitable Disaster Management System and is in the process of establishing a Decision Support System for providing Operational Services. The capacity building activities will include (i) satellite/aerial data acquisition strategy, (ii) improved turn-around-time for data analysis and output generation, (iii) dissemination to users through appropriate networking, (iv) digital data base creation for use in hazard zonation, modeling and query-based services, and (v) generation of close-contour data over disaster-prone areas using ALTM based surveys for use in flood-plain zoning and hazard zonation.

38. **North Eastern – Space Applications Centre (NE-SAC):** The NE-SAC, an autonomous institution under the Department of Space, has the responsibility to provide an operational high-technology infrastructure to enable the North Eastern States to adopt space technology inputs into their developmental activities and to blend space science with human resource development. The Centre will address areas in natural resources management and developmental communications, besides encouraging space science research in the region.

39. **Physical Research Laboratory (PRL):** The PRL, an autonomous institution under the Department of Space, is the premier institution for research in space and allied sciences.

40. **Sensor Development:** Advanced activities related to scientific payloads development for space science and planetary mission in different institutions and universities are covered under sensor development.

41. **Megha Tropiques:** Megha Tropiques, an ISRO-CNES (France) joint mission, has been formulated as a result of detailed studies carried out on global observation of climate. The prime responsibility of ISRO will be the development of micro-wave multi frequency imaging radiometer payload along with the associated structural interface and thermal control, besides launching the satellite on-board PSLV.

43. **Space Sciences - Others:** Under Space Applications - Others, provisions are made for the funding of research projects of interest to the Department of Space in universities and academic institutions, and include the following:

a) National Mesosphere Stratosphere & Troposphere Radar Facility (NMRF) to continuously monitor winds, waves, turbulences & atmospheric stability in the middle atmosphere and to promote advanced research in atmospheric, space sciences and related disciplines.
b) ISRO-Geosphere, Biosphere Programme (ISRO-GBP) encompasses the study of land-air-ocean interaction, past climate, changes in atmospheric composition, aerosols, carbon cycle, biomass estimation, bio-diversity and other related areas of scientific investigation.
c) Indian Middle Atmosphere Programme - Continuation (IMAP-C)
c) Research Sponsored by the Indian Space Research Organisation
d) Balloon Facility
e) IRS Promotional Efforts
f) Symposia/Conferences
g) Space Science Promotion and Inter-Agency Space Science Projects
h) ISRO Computer Network/Software Development
i) Value Added Services
j) Multi Agency Funded Projects
k) Acoustic Test Facility
l) Micro gravity research application recovery modules
m) Acquisition of data from foreign satellites
n) Space Station Experiments

44. **Other Programmes:** Provisions are made for the following:

(a) ISRO Headquarters, Bangalore, with Liaison Offices at Delhi, Mumbai, Paris and Washington, provide overall direction and scientific, technical & managerial support to ISRO Centres/Units and co-ordination of the Projects and Programmes of the Department.
(b) International Co-operation includes the provisions for the Centre for Space Services and Technology Education in Asia and the Pacific (CSSTE-AP) and Search & Rescue Project.
(c) Civil Engineering Division (CED) is responsible for all civil, electrical and air-conditioning works required for the various programmes of the Department of Space.
(d) Procurement of critical materials/components which have long procurement/ manufacture lead times and for indigenous development of strategic items.

45. **INSAT Master Control Facility (INSAT-MCF):** INSAT MCF is responsible for control and operation of INSAT and G-SAT satellites in orbit including monitoring the health of the satellites, orbit maneuvers, station keeping and on orbit operation of the satellites.

46. **Indian National Satellite-2 (INSAT-2) Satellites:** The provision under INSAT-2 Satellites includes provision for INSAT-2 C, D, E Operational Satellites and operation of INSAT- 2DT.

47. **Indian National Satellite-3 (INSAT-3) Satellites (including launch services):** INSAT-3 Spacecraft Project envisages building five INSAT-3 satellites (INSAT-3A to 3E) for providing continuity in services, expansion of capacity and improving the capabilities of INSAT System. The INSAT-3B satellite, launched on March 22, 2000, is operational. The INSAT-3C has been successfully launched on January 24, 2002. INSAT-3A & 3E are planned for launch during 2002-2003.

48. **Indian National Satellite-4 (INSAT-4) Satellites (including launch services):** The fourth generation INSAT-4 satellite series has been planned to meet the capacity & service requirements projected for the Tenth Five Year Plan. One of the primary considerations in configuring the INSAT-4 has been the plan availability of GSLV MK-II with a lift-off capability of 2 tonne satellite. A total of 7 Satellites are planned to be launched during 2002-2007 time frame.