

**DEPARTMENT OF SPACE**

## DEMAND NO.89

**Department of Space**

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

| <i>(In crores of Rupees)</i>  |                  |                |                |                   |                |                |                  |                |                |                |
|---|------------------|----------------|----------------|-------------------|----------------|----------------|------------------|----------------|----------------|----------------|
| Major Head  | Budget 2009-2010 |                |                | Revised 2009-2010 |                |                | Budget 2010-2011 |                |                |                |
|   | Plan             | Non-Plan       | Total          | Plan              | Non-Plan       | Total          | Plan             | Non-Plan       | Total          |                |
| Revenue   | 2048.88          | 859.00         | 2907.88        | 1906.02           | 995.00         | 2901.02        | 2322.76          | 778.00         | 3100.76        |                |
| Capital   | 2051.12          | ...            | 2051.12        | 1265.98           | ...            | 1265.98        | 2677.24          | ...            | 2677.24        |                |
| <b>Total</b>  | <b>4100.00</b>   | <b>859.00</b>  | <b>4959.00</b> | <b>3172.00</b>    | <b>995.00</b>  | <b>4167.00</b> | <b>5000.00</b>   | <b>778.00</b>  | <b>5778.00</b> |                |
| 1. Secretariat - Economic Services                                  | 3451             | ...            | 7.45           | 7.45              | ...            | 9.09           | 9.09             | ...            | 8.00           | 8.00           |
| <b>Space Research</b>   |                  |                |                |                   |                |                |                  |                |                |                |
| <b>Space Technology</b>   |                  |                |                |                   |                |                |                  |                |                |                |
| <b>Launch Vehicle Technology</b>                                    |                  |                |                |                   |                |                |                  |                |                |                |
| 2. GSLV MK-III Development  | 3402             | 135.86         | ...            | 135.86            | 117.52         | ...            | 117.52           | 101.96         | ...            | 101.96         |
|   | 5402             | 81.14          | ...            | 81.14             | 82.68          | ...            | 82.68            | 51.00          | ...            | 51.00          |
|   | <i>Total</i>     | <i>217.00</i>  | ...            | <i>217.00</i>     | <i>200.20</i>  | ...            | <i>200.20</i>    | <i>152.96</i>  | ...            | <i>152.96</i>  |
| 3. Cryogenic Upper Stage Project (CUSP)                             | 3402             | 0.37           | ...            | 0.37              | 0.27           | ...            | 0.27             | 0.10           | ...            | 0.10           |
| 4. Polar Satellite Launch Vehicle - Continuation (PSLV-C) Project   | 3402             | 202.00         | ...            | 202.00            | 187.82         | ...            | 187.82           | 239.00         | ...            | 239.00         |
|   | 5402             | 18.00          | ...            | 18.00             | 12.18          | ...            | 12.18            | 11.00          | ...            | 11.00          |
|   | <i>Total</i>     | <i>220.00</i>  | ...            | <i>220.00</i>     | <i>200.00</i>  | ...            | <i>200.00</i>    | <i>250.00</i>  | ...            | <i>250.00</i>  |
| 5. Vikram Sarabhai Space Centre (VSSC)                              | 3402             | 173.72         | 273.26         | 446.98            | 173.47         | 297.78         | 471.25           | 226.43         | 200.54         | 426.97         |
|   | 5402             | 166.44         | ...            | 166.44            | 154.18         | ...            | 154.18           | 156.69         | ...            | 156.69         |
|   | <i>Total</i>     | <i>340.16</i>  | <i>273.26</i>  | <i>613.42</i>     | <i>327.65</i>  | <i>297.78</i>  | <i>625.43</i>    | <i>383.12</i>  | <i>200.54</i>  | <i>583.66</i>  |
| 6. Indian Space Research Organisation - Inertial Systems Unit(IISU) | 3402             | 14.20          | ...            | 14.20             | 13.31          | ...            | 13.31            | 15.18          | ...            | 15.18          |
|   | 5402             | 16.64          | ...            | 16.64             | 16.40          | ...            | 16.40            | 13.60          | ...            | 13.60          |
|   | <i>Total</i>     | <i>30.84</i>   | ...            | <i>30.84</i>      | <i>29.71</i>   | ...            | <i>29.71</i>     | <i>28.78</i>   | ...            | <i>28.78</i>   |
| 7. Liquid Propulsion Systems Centre                                 | 3402             | 160.99         | 73.70          | 234.69            | 168.36         | 84.08          | 252.44           | 162.19         | 58.92          | 221.11         |
|   | 5402             | 51.24          | ...            | 51.24             | 33.11          | ...            | 33.11            | 82.43          | ...            | 82.43          |
|   | <i>Total</i>     | <i>212.23</i>  | <i>73.70</i>   | <i>285.93</i>     | <i>201.47</i>  | <i>84.08</i>   | <i>285.55</i>    | <i>244.62</i>  | <i>58.92</i>   | <i>303.54</i>  |
| 8. GSLV Operational Project (Including MK-III Operational)          | 3402             | 257.71         | ...            | 257.71            | 222.45         | ...            | 222.45           | 236.52         | ...            | 236.52         |
|   | 5402             | 17.29          | ...            | 17.29             | 12.55          | ...            | 12.55            | 13.48          | ...            | 13.48          |
|   | <i>Total</i>     | <i>275.00</i>  | ...            | <i>275.00</i>     | <i>235.00</i>  | ...            | <i>235.00</i>    | <i>250.00</i>  | ...            | <i>250.00</i>  |
| 9. Space Capsule Recovery Experiment (SRE)                          | 3402             | 12.00          | ...            | 12.00             | 9.00           | ...            | 9.00             | 4.93           | ...            | 4.93           |
| 10. Manned Mission Initiatives/ Human Space Flight Programme        | 3402             | 20.00          | ...            | 20.00             | 28.00          | ...            | 28.00            | 100.00         | ...            | 100.00         |
|   | 5402             | 210.00         | ...            | 210.00            | 2.00           | ...            | 2.00             | 50.00          | ...            | 50.00          |
|   | <i>Total</i>     | <i>230.00</i>  | ...            | <i>230.00</i>     | <i>30.00</i>   | ...            | <i>30.00</i>     | <i>150.00</i>  | ...            | <i>150.00</i>  |
| 11. Indian Institute of Space Science & Technology                  | 3402             | 175.00         | ...            | 175.00            | 145.00         | ...            | 145.00           | 140.00         | ...            | 140.00         |
| 12. Semi Cryogenic Engine Development                               | 3402             | 15.00          | ...            | 15.00             | 16.96          | ...            | 16.96            | 41.82          | ...            | 41.82          |
|   | 5402             | 140.00         | ...            | 140.00            | 19.04          | ...            | 19.04            | 208.18         | ...            | 208.18         |
|   | <i>Total</i>     | <i>155.00</i>  | ...            | <i>155.00</i>     | <i>36.00</i>   | ...            | <i>36.00</i>     | <i>250.00</i>  | ...            | <i>250.00</i>  |
| <b>Total - Launch Vehicle Technology</b>                            |                  | <b>1867.60</b> | <b>346.96</b>  | <b>2214.56</b>    | <b>1414.30</b> | <b>381.86</b>  | <b>1796.16</b>   | <b>1854.51</b> | <b>259.46</b>  | <b>2113.97</b> |
| <b>Satellite Technology</b>   |                  |                |                |                   |                |                |                  |                |                |                |
| 13. Oceansat-2 and 3  | 3402             | 2.30           | ...            | 2.30              | 1.50           | ...            | 1.50             | 0.50           | ...            | 0.50           |
|   | 5402             | 3.70           | ...            | 3.70              | 4.50           | ...            | 4.50             | 1.10           | ...            | 1.10           |
|   | <i>Total</i>     | <i>6.00</i>    | ...            | <i>6.00</i>       | <i>6.00</i>    | ...            | <i>6.00</i>      | <i>1.60</i>    | ...            | <i>1.60</i>    |
| 14. Resourcesat-2 and 3   | 3402             | 3.16           | ...            | 3.16              | 2.42           | ...            | 2.42             | 2.73           | ...            | 2.73           |
|   | 5402             | 31.84          | ...            | 31.84             | 22.58          | ...            | 22.58            | 19.27          | ...            | 19.27          |
|   | <i>Total</i>     | <i>35.00</i>   | ...            | <i>35.00</i>      | <i>25.00</i>   | ...            | <i>25.00</i>     | <i>22.00</i>   | ...            | <i>22.00</i>   |
| 15. ISRO Satellite Centre (ISAC)                                    | 3402             | 147.83         | 111.80         | 259.63            | 123.54         | 142.99         | 266.53           | 157.60         | 93.07          | 250.67         |
|   | 5402             | 45.24          | ...            | 45.24             | 65.92          | ...            | 65.92            | 169.52         | ...            | 169.52         |
|   | <i>Total</i>     | <i>193.07</i>  | <i>111.80</i>  | <i>304.87</i>     | <i>189.46</i>  | <i>142.99</i>  | <i>332.45</i>    | <i>327.12</i>  | <i>93.07</i>   | <i>420.19</i>  |
| 16. Laboratory for Electro-Optics System(LEOS)                      | 3402             | 24.48          | ...            | 24.48             | 27.52          | ...            | 27.52            | 25.13          | ...            | 25.13          |
|   | 5402             | 20.11          | ...            | 20.11             | 9.57           | ...            | 9.57             | 15.01          | ...            | 15.01          |
|   | <i>Total</i>     | <i>44.59</i>   | ...            | <i>44.59</i>      | <i>37.09</i>   | ...            | <i>37.09</i>     | <i>40.14</i>   | ...            | <i>40.14</i>   |

**No.89/ Department of Space**

|   |                  | <i>(In crores of Rupees)</i> |               |                   |                |               |                  |                |               |                |
|---|------------------|------------------------------|---------------|-------------------|----------------|---------------|------------------|----------------|---------------|----------------|
| Major Head  | Budget 2009-2010 |                              |               | Revised 2009-2010 |                |               | Budget 2010-2011 |                |               |                |
|   | Plan             | Non-Plan                     | Total         | Plan              | Non-Plan       | Total         | Plan             | Non-Plan       | Total         |                |
| 17. Radar Imaging Satellite-1 (RISAT-1)   | 3402             | 1.96                         | ...           | 1.96              | 1.40           | ...           | 1.40             | 0.96           | ...           | 0.96           |
|   | 5402             | 3.04                         | ...           | 3.04              | 5.10           | ...           | 5.10             | 2.54           | ...           | 2.54           |
|   | <i>Total</i>     | <i>5.00</i>                  | <i>...</i>    | <i>5.00</i>       | <i>6.50</i>    | <i>...</i>    | <i>6.50</i>      | <i>3.50</i>    | <i>...</i>    | <i>3.50</i>    |
| 18. G.SAT-4   | 3402             | 2.90                         | ...           | 2.90              | 2.40           | ...           | 2.40             | ...            | ...           | ...            |
| 19. Navigational Satellite System (NSS)   | 3402             | 21.96                        | ...           | 21.96             | 19.34          | ...           | 19.34            | 34.39          | ...           | 34.39          |
|   | 5402             | 248.04                       | ...           | 248.04            | 200.66         | ...           | 200.66           | 227.71         | ...           | 227.71         |
|   | <i>Total</i>     | <i>270.00</i>                | <i>...</i>    | <i>270.00</i>     | <i>220.00</i>  | <i>...</i>    | <i>220.00</i>    | <i>262.10</i>  | <i>...</i>    | <i>262.10</i>  |
| 20. Semi-conductor Laboratory (SCL)   | 3402             | 45.00                        | ...           | 45.00             | 46.67          | ...           | 46.67            | 24.89          | 28.96         | 53.85          |
| 21. Advanced Communication Satellite (G-SAT 11 including Launch Services)                 | 3402             | 1.00                         | ...           | 1.00              | 2.05           | ...           | 2.05             | 8.00           | ...           | 8.00           |
|   | 5402             | 4.00                         | ...           | 4.00              | 8.95           | ...           | 8.95             | 117.00         | ...           | 117.00         |
|   | <i>Total</i>     | <i>5.00</i>                  | <i>...</i>    | <i>5.00</i>       | <i>11.00</i>   | <i>...</i>    | <i>11.00</i>     | <i>125.00</i>  | <i>...</i>    | <i>125.00</i>  |
| 22. Earth Observation - New Missions (Cartosat-3, TES Hyperspectral, DMSAR-1 and GISAT)   | 3402             | 3.00                         | ...           | 3.00              | 0.71           | ...           | 0.71             | 1.50           | ...           | 1.50           |
|   | 5402             | 10.00                        | ...           | 10.00             | 3.29           | ...           | 3.29             | 34.00          | ...           | 34.00          |
|   | <i>Total</i>     | <i>13.00</i>                 | <i>...</i>    | <i>13.00</i>      | <i>4.00</i>    | <i>...</i>    | <i>4.00</i>      | <i>35.50</i>   | <i>...</i>    | <i>35.50</i>   |
| 23. SARAL *   | 3402             | ...                          | ...           | ...               | ...            | ...           | ...              | 1.03           | ...           | 1.03           |
|   | 5402             | ...                          | ...           | ...               | ...            | ...           | ...              | 38.97          | ...           | 38.97          |
|   | <i>Total</i>     | <i>...</i>                   | <i>...</i>    | <i>...</i>        | <i>...</i>     | <i>...</i>    | <i>...</i>       | <i>40.00</i>   | <i>...</i>    | <i>40.00</i>   |
| <b>Total - Satellite Technology Launch Support, Tracking Network &amp; Range Facility</b> |                  | <b>619.56</b>                | <b>111.80</b> | <b>731.36</b>     | <b>548.12</b>  | <b>142.99</b> | <b>691.11</b>    | <b>881.85</b>  | <b>122.03</b> | <b>1003.88</b> |
| 24. Satish Dhawan Space Centre - SHAR (SDSC-SHAR)   | 3402             | 121.38                       | 99.91         | 221.29            | 133.86         | 102.15        | 236.01           | 121.05         | 70.50         | 191.55         |
|   | 5402             | 119.12                       | ...           | 119.12            | 125.23         | ...           | 125.23           | 195.35         | ...           | 195.35         |
|   | <i>Total</i>     | <i>240.50</i>                | <i>99.91</i>  | <i>340.41</i>     | <i>259.09</i>  | <i>102.15</i> | <i>361.24</i>    | <i>316.40</i>  | <i>70.50</i>  | <i>386.90</i>  |
| 25. ISRO Telemetry, Tracking & Command Network (ISTRAC)                                   | 3402             | 36.23                        | 31.31         | 67.54             | 33.07          | 33.91         | 66.98            | 27.38          | 37.22         | 64.60          |
|   | 5402             | 33.48                        | ...           | 33.48             | 35.00          | ...           | 35.00            | 23.41          | ...           | 23.41          |
|   | <i>Total</i>     | <i>69.71</i>                 | <i>31.31</i>  | <i>101.02</i>     | <i>68.07</i>   | <i>33.91</i>  | <i>101.98</i>    | <i>50.79</i>   | <i>37.22</i>  | <i>88.01</i>   |
| <b>Total-Launch Support, Tracking Network &amp; Range Facility</b>                        |                  | <b>310.21</b>                | <b>131.22</b> | <b>441.43</b>     | <b>327.16</b>  | <b>136.06</b> | <b>463.22</b>    | <b>367.19</b>  | <b>107.72</b> | <b>474.91</b>  |
| <b>Total-Space Technology Space Applications</b>  |                  | <b>2797.37</b>               | <b>589.98</b> | <b>3387.35</b>    | <b>2289.58</b> | <b>660.91</b> | <b>2950.49</b>   | <b>3103.55</b> | <b>489.21</b> | <b>3592.76</b> |
| 26. Space Applications Centre (SAC)   | 3402             | 72.65                        | 119.37        | 192.02            | 70.40          | 138.89        | 209.29           | 100.43         | 100.44        | 200.87         |
|   | 5402             | 62.08                        | ...           | 62.08             | 86.88          | ...           | 86.88            | 96.54          | ...           | 96.54          |
|   | <i>Total</i>     | <i>134.73</i>                | <i>119.37</i> | <i>254.10</i>     | <i>157.28</i>  | <i>138.89</i> | <i>296.17</i>    | <i>196.97</i>  | <i>100.44</i> | <i>297.41</i>  |
| 27. Development and Educational Communication Unit (DECU)                                 | 3402             | 49.16                        | 7.72          | 56.88             | 26.75          | 7.90          | 34.65            | 73.74          | 7.85          | 81.59          |
|   | 5402             | 1.25                         | ...           | 1.25              | 1.64           | ...           | 1.64             | 1.43           | ...           | 1.43           |
|   | <i>Total</i>     | <i>50.41</i>                 | <i>7.72</i>   | <i>58.13</i>      | <i>28.39</i>   | <i>7.90</i>   | <i>36.29</i>     | <i>75.17</i>   | <i>7.85</i>   | <i>83.02</i>   |
| 28. National Natural Resources Management System (NNRMS)                                  | 3402             | 20.00                        | ...           | 20.00             | 18.36          | ...           | 18.36            | 87.62          | ...           | 87.62          |
| 29. Earth Observation Application Mission (EOAM)  | 3402             | 4.40                         | ...           | 4.40              | 3.18           | ...           | 3.18             | 2.31           | ...           | 2.31           |
| 30. Regional Remote Sensing Service Centres (RRSSCs)                                      | 3402             | 10.82                        | ...           | 10.82             | 13.90          | ...           | 13.90            | ...            | ...           | ...            |
|   | 5402             | 11.07                        | ...           | 11.07             | 21.24          | ...           | 21.24            | ...            | ...           | ...            |
|   | <i>Total</i>     | <i>21.89</i>                 | <i>...</i>    | <i>21.89</i>      | <i>35.14</i>   | <i>...</i>    | <i>35.14</i>     | <i>...</i>     | <i>...</i>    | <i>...</i>     |
| 31. National Remote Sensing Centre (NRSC)   | 3402             | 68.96                        | 35.30         | 104.26            | 63.01          | 62.81         | 125.82           | 63.16          | 62.05         | 125.21         |
|   | 5402             | 36.90                        | ...           | 36.90             | 35.29          | ...           | 35.29            | 104.94         | ...           | 104.94         |
|   | <i>Total</i>     | <i>105.86</i>                | <i>35.30</i>  | <i>141.16</i>     | <i>98.30</i>   | <i>62.81</i>  | <i>161.11</i>    | <i>168.10</i>  | <i>62.05</i>  | <i>230.15</i>  |
| 32. Disaster Management Support (DMS)   | 3402             | 30.00                        | ...           | 30.00             | 10.48          | ...           | 10.48            | 31.07          | ...           | 31.07          |
|   | 5402             | 10.00                        | ...           | 10.00             | 15.53          | ...           | 15.53            | 7.55           | ...           | 7.55           |
|   | <i>Total</i>     | <i>40.00</i>                 | <i>...</i>    | <i>40.00</i>      | <i>26.01</i>   | <i>...</i>    | <i>26.01</i>     | <i>38.62</i>   | <i>...</i>    | <i>38.62</i>   |
| 33. North Eastern Space Applications Centre (NE-SAC)                                      | 3402             | 5.90                         | 1.10          | 7.00              | 5.33           | 1.67          | 7.00             | 6.25           | 1.75          | 8.00           |
| <b>Total - Space Applications</b>   |                  | <b>383.19</b>                | <b>163.49</b> | <b>546.68</b>     | <b>371.99</b>  | <b>211.27</b> | <b>583.26</b>    | <b>575.04</b>  | <b>172.09</b> | <b>747.13</b>  |

|  |                  | (In crores of Rupees) |               |                   |                |               |                  |                |               |                |
|--|------------------|-----------------------|---------------|-------------------|----------------|---------------|------------------|----------------|---------------|----------------|
| Major Head   | Budget 2009-2010 |                       |               | Revised 2009-2010 |                |               | Budget 2010-2011 |                |               |                |
|  | Plan             | Non-Plan              | Total         | Plan              | Non-Plan       | Total         | Plan             | Non-Plan       | Total         |                |
| <b>Space Sciences</b>  |                  |                       |               |                   |                |               |                  |                |               |                |
| 34. Physical Research Laboratory(PRL)  | 3402             | 38.49                 | 23.83         | 62.32             | 39.04          | 28.06         | 67.10            | 45.70          | 26.00         | 71.70          |
| 35. National Atmospheric Research Laboratory(NARL)                             | 3402             | 13.13                 | 2.30          | 15.43             | 9.10           | 2.75          | 11.85            | 12.00          | 2.45          | 14.45          |
| 36. National Institute of Climate change and Environment Studies (NICES)       | 3402             | ...                   | ...           | ...               | ...            | ...           | ...              | 1.00           | ...           | 1.00           |
| 37. RESPOND  | 3402             | 13.00                 | ...           | 13.00             | 16.50          | ...           | 16.50            | 15.00          | ...           | 15.00          |
| 38. Sensor Payload Development / Planetary Science Programme                   | 3402             | 5.00                  | ...           | 5.00              | 2.34           | ...           | 2.34             | 16.00          | ...           | 16.00          |
| 39. Megha-tropiques Project  | 3402             | 2.38                  | ...           | 2.38              | 2.44           | ...           | 2.44             | 2.37           | ...           | 2.37           |
|  | 5402             | 12.62                 | ...           | 12.62             | 12.56          | ...           | 12.56            | 7.63           | ...           | 7.63           |
|  | <i>Total</i>     | <i>15.00</i>          | <i>...</i>    | <i>15.00</i>      | <i>15.00</i>   | <i>...</i>    | <i>15.00</i>     | <i>10.00</i>   | <i>...</i>    | <i>10.00</i>   |
| 40. ADITYA   | 3402             | ...                   | ...           | ...               | ...            | ...           | ...              | 3.70           | ...           | 3.70           |
|  | 5402             | ...                   | ...           | ...               | ...            | ...           | ...              | 36.30          | ...           | 36.30          |
|  | <i>Total</i>     | <i>...</i>            | <i>...</i>    | <i>...</i>        | <i>...</i>     | <i>...</i>    | <i>...</i>       | <i>40.00</i>   | <i>...</i>    | <i>40.00</i>   |
| 41. Astrosat 1 & 2   | 3402             | 1.17                  | ...           | 1.17              | 1.37           | ...           | 1.37             | 1.59           | ...           | 1.59           |
|  | 5402             | 18.83                 | ...           | 18.83             | 12.33          | ...           | 12.33            | 8.41           | ...           | 8.41           |
|  | <i>Total</i>     | <i>20.00</i>          | <i>...</i>    | <i>20.00</i>      | <i>13.70</i>   | <i>...</i>    | <i>13.70</i>     | <i>10.00</i>   | <i>...</i>    | <i>10.00</i>   |
| 42. Indian Lunar Mission - Chandrayan - 1 & 2                                  | 3402             | 5.38                  | ...           | 5.38              | 11.73          | ...           | 11.73            | 4.63           | ...           | 4.63           |
|  | 5402             | 84.62                 | ...           | 84.62             | 7.77           | ...           | 7.77             | 95.37          | ...           | 95.37          |
|  | <i>Total</i>     | <i>90.00</i>          | <i>...</i>    | <i>90.00</i>      | <i>19.50</i>   | <i>...</i>    | <i>19.50</i>     | <i>100.00</i>  | <i>...</i>    | <i>100.00</i>  |
| 43. ISRO Geosphere Biosphere Programme (ISRO GBP)                              | 3402             | 25.78                 | ...           | 25.78             | 21.63          | ...           | 21.63            | 28.96          | ...           | 28.96          |
| 44. Atmospheric Science Programmes   | 3402             | 20.96                 | ...           | 20.96             | 27.47          | ...           | 27.47            | 28.45          | ...           | 28.45          |
| 45. Small Satellites for Atmospheric Studies and Astronomy                     | 3402             | 2.00                  | ...           | 2.00              | 12.00          | ...           | 12.00            | 8.00           | ...           | 8.00           |
|  | 5402             | ...                   | ...           | ...               | ...            | ...           | ...              | 2.00           | ...           | 2.00           |
|  | <i>Total</i>     | <i>2.00</i>           | <i>...</i>    | <i>2.00</i>       | <i>12.00</i>   | <i>...</i>    | <i>12.00</i>     | <i>10.00</i>   | <i>...</i>    | <i>10.00</i>   |
| 46. Other Schemes  | 3402             | 12.50                 | 1.75          | 14.25             | 11.39          | 1.75          | 13.14            | 13.70          | 2.00          | 15.70          |
| <b>Total - Space Sciences</b>  |                  | <b>255.86</b>         | <b>27.88</b>  | <b>283.74</b>     | <b>187.67</b>  | <b>32.56</b>  | <b>220.23</b>    | <b>330.81</b>  | <b>30.45</b>  | <b>361.26</b>  |
| <b>Direction &amp; Administration / Other Programmes</b>                       |                  |                       |               |                   |                |               |                  |                |               |                |
| 47. Special Indigenisation/ Advance Ordering                                   | 3402             | 12.86                 | ...           | 12.86             | 14.41          | ...           | 14.41            | 31.79          | ...           | 31.79          |
|  | 5402             | 201.00                | ...           | 201.00            | 1.06           | ...           | 1.06             | 200.00         | ...           | 200.00         |
|  | <i>Total</i>     | <i>213.86</i>         | <i>...</i>    | <i>213.86</i>     | <i>15.47</i>   | <i>...</i>    | <i>15.47</i>     | <i>231.79</i>  | <i>...</i>    | <i>231.79</i>  |
| 48. Others   | 3402             | 3.17                  | 51.28         | 54.45             | 3.40           | 59.28         | 62.68            | 3.40           | 52.39         | 55.79          |
|  | 5402             | 19.21                 | ...           | 19.21             | 80.60          | ...           | 80.60            | 74.34          | ...           | 74.34          |
|  | <i>Total</i>     | <i>22.38</i>          | <i>51.28</i>  | <i>73.66</i>      | <i>84.00</i>   | <i>59.28</i>  | <i>143.28</i>    | <i>77.74</i>   | <i>52.39</i>  | <i>130.13</i>  |
| <b>Total - Direction &amp; Administration / Other Programmes</b>               |                  | <b>236.24</b>         | <b>51.28</b>  | <b>287.52</b>     | <b>99.47</b>   | <b>59.28</b>  | <b>158.75</b>    | <b>309.53</b>  | <b>52.39</b>  | <b>361.92</b>  |
| <b>INSAT Operational</b>   |                  |                       |               |                   |                |               |                  |                |               |                |
| 49. Master Control Facility(MCF)   | 3252             | 10.40                 | 18.92         | 29.32             | 11.88          | 21.89         | 33.77            | 7.76           | 25.86         | 33.62          |
|  | 5252             | 35.24                 | ...           | 35.24             | 18.11          | ...           | 18.11            | 21.41          | ...           | 21.41          |
|  | <i>Total</i>     | <i>45.64</i>          | <i>18.92</i>  | <i>64.56</i>      | <i>29.99</i>   | <i>21.89</i>  | <i>51.88</i>     | <i>29.17</i>   | <i>25.86</i>  | <i>55.03</i>   |
| 50. INSAT-3 Satellites (Including Launch Services)                             | 3252             | 1.76                  | ...           | 1.76              | 0.34           | ...           | 0.34             | 0.80           | ...           | 0.80           |
|  | 5252             | 6.94                  | ...           | 6.94              | 5.16           | ...           | 5.16             | 76.80          | ...           | 76.80          |
|  | <i>Total</i>     | <i>8.70</i>           | <i>...</i>    | <i>8.70</i>       | <i>5.50</i>    | <i>...</i>    | <i>5.50</i>      | <i>77.60</i>   | <i>...</i>    | <i>77.60</i>   |
| 51. INSAT-4 Satellites (Including Launch Services and Leasing of Transponders) | 3252             | 40.96                 | ...           | 40.96             | 32.93          | ...           | 32.93            | 60.04          | ...           | 60.04          |
|  | 5252             | 332.04                | ...           | 332.04            | 154.87         | ...           | 154.87           | 514.26         | ...           | 514.26         |
|  | <i>Total</i>     | <i>373.00</i>         | <i>...</i>    | <i>373.00</i>     | <i>187.80</i>  | <i>...</i>    | <i>187.80</i>    | <i>574.30</i>  | <i>...</i>    | <i>574.30</i>  |
| <b>Total - INSAT Operational</b>   |                  | <b>427.34</b>         | <b>18.92</b>  | <b>446.26</b>     | <b>223.29</b>  | <b>21.89</b>  | <b>245.18</b>    | <b>681.07</b>  | <b>25.86</b>  | <b>706.93</b>  |
| <b>Grand Total</b>   |                  | <b>4100.00</b>        | <b>859.00</b> | <b>4959.00</b>    | <b>3172.00</b> | <b>995.00</b> | <b>4167.00</b>   | <b>5000.00</b> | <b>778.00</b> | <b>5778.00</b> |

\* Included in Sr No-22 in BE 2009-2010 and RE 2009-2010.

| C. Plan Outlay    | Head of Dev | Budget Support | IEBR | Total   | Budget Support | IEBR | Total   | Budget Support | IEBR | Total   |
|-------------------|-------------|----------------|------|---------|----------------|------|---------|----------------|------|---------|
| 1. Space Research | 13402       | 4100.00        | ...  | 4100.00 | 3172.00        | ...  | 3172.00 | 5000.00        | ...  | 5000.00 |

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

**2. GSLV Mk-III Development:** GSLV Mk-III is intended to develop a cost-effective launch vehicle capable of launching 4 tonne class of communication satellites 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.

**3. Cryogenic Upper Stage (CUS) Project:** The objective of the Project is to develop and qualify an indigenous restartable cryogenic stage employing liquid oxygen as oxidizer and liquid hydrogen as fuel for the upper stage of GSLV. The first flight of the indigenous cryo stage is targeted for flight testing by GSLV during 2010.

**4. 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-C11 in its fourteenth flight successfully launched Chandrayaan-1 spacecraft carrying 11 scientific payloads on October 22, 2008. PSLV-C12 has successfully launched RISAT-2 along with ANUSAT satellites on April 20, 2009. PSLV-C14 carrying Oceansat-2 along with six other nano satellites placing it in circular SSPO orbit was launched on September 23, 2009. The launch of PSLV-C15 & 16 are planned during the first quarter of 2010-2011.

**5. Vikram Sarabhai Space Centre (VSSC):** VSSC is the lead Centre for the development of satellite launch vehicles and sounding rockets and houses the major test and fabrication facilities for launch vehicles.

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

**7. 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.

**8. 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.

**9. Space Capsule Recovery Experiment (SRE):** The main objective of the Space Capsule Recovery Experiment (SRE) is to develop and demonstrate capability to recover an orbiting capsule back on earth. SRE-I was successfully launched on-board PSLV-C7 on January 10, 2007 and was also successfully recovered from Bay of Bengal on January 22, 2007. The development of SRE-II is in progress.

**10. Manned Mission Initiatives/Human Space Flight Programme:** The main objective of the Indian Manned Mission Space programme 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 Government have approved undertaking of pre-project R&D activities leading to detailed definition of the manned mission.

**11. 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.

**12. Semi Cryogenic Engine Development:** The objective of this project is to develop and qualify a high thrust Semi Cryogenic engine and stage (employing kerosene of required grade/spar as fuel and Liquid Oxygen as oxidizer) for the future advanced launch vehicle.

**13. Oceansat-2 & 3:** The main objective of Oceansat-2 is to provide continuity of data & services hitherto provided by Oceansat-1 on Oceanography and coastal studies. Oceansat-2 was successfully launched onboard PSLV-C14 on September 23, 2009. Oceansat-3, planned to be initiated towards end of 11<sup>th</sup> plan will be a follow-on satellite for Oceansat-2 to provide continuity of data on Ocean & Coastal resources.

**14. Resourcesat-2 & 3:** Taking into account the increased use of space imageries for different applications and continued Earth Observation services required from the IRS satellites, Resourcesat-2 has been conceived as a continuity mission with enhanced capabilities which will be mainly for crop applications, vegetation dynamics and natural resources census applications. The spacecraft is configured using conventional FPGA based on AOCE which is under fabrication. All electronic subsystems are under advanced stages of fabrication and testing. Resourcesat-2 is slated for launch during 2010-2011 on-board PSLV. Resourcesat-3 will provide continuity of data after Resourcesat-2.

**15. ISRO Satellite Centre (ISAC):** ISAC is the lead Centre for the design, fabrication, testing and management of satellite systems for scientific, technological and application missions.

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

**17. Radar Imaging Satellite-1 (RISAT-1):** Radar Imaging Satellite (RISAT-1) is intended to provide all-weather, day and night imaging capability providing vital inputs for various agricultural and disaster applications. The satellite is in the final stages of development and it will be launched on-board during 2010-2011.

**18. GSAT-4:** The satellite will be utilized for conducting various experiments in the communications area and early introduction of geo-based navigation system. The spacecraft integration and test activities are in advanced stages. The spacecraft close mode IST has been completed. The thermovacuum tests were completed successfully and the Spacecraft Dynamic and CATF tests are in progress. The GSAT-4 satellite is planned for launch on-board GSLV-D3 during 2010.

**19. Navigation Satellite System (NSS):** The Indian Regional Navigation Satellite System (IRNSS), is planned to be a constellation of 7 satellites – 3 in GEO and 4 in GSO orbit. This satellite is expected to provide position accuracies similar to 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 the satellites of the same constellation are being configured identically. Procurement of components and strategic material for the spacecraft has been initiated. Most of the standard hardware is productionised with the support of external vendors. The ground system augmentation has also been taken up. The first IRNSS satellite (IRNSS-1) is targeted for launch in 2011.

**20. Semi-conductor Laboratory (SCL):** SCL is engaged in the Design, Development and Manufacture of Very Large Scale Integrated (VLSIs) devices and Board Level Products to meet the stringent quality requirement of strategic sectors. SCL is to undertake radiation hardened devices and about more than 60 types of ASICs have been identified for development by SCL for Space Programme.

**21. Advanced Communication Satellite (GSAT-11 - including Launch Services):** The main objective is to develop a 4 tonne class communication satellite incorporating advanced technologies of relevance for future. The configuration of the satellite is under finalisation.

**22. Earth Observation – New Missions (TES-Hyp, DMSAR-1, Carto-3 & GISAT):** Indian Earth Observation programme is directed towards providing continuity of EO data for resource management applications and enhancing the imaging capability. Towards this, it is planned to undertake development of Technology Experiment Satellite in Hyper Spectral Imaging (TES-HYP), Radar Imaging Satellite for Disaster Management (DMSAR) & advanced cartography satellite (Carto-3) & GISAT.

**23. SARAL:** The objective of the Satellite with Argos and Altika (SARAL) mission are to design and develop satellite bus in the weight range of 400 Kg and to establish required ground infrastructure for receiving and processing of the data within India for ocean related applications. Two payloads namely Altika and ARGOS are planned in this mission. Altika is a Ka band altimeter for ocean applications and ARGOS is a data collection platform for collecting variety of data from ocean buoys to animal behaviour. SARAL is a co-operative mission between DOS/ISRO and CNES, France with payloads from CNES and the spacecraft bus from DOS/ISRO. SARAL is part of international continuing missions using these payloads. The design and development work on the satellite & payloads has been initiated.

**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 Centre 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 Bengaluru, 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. (RRSSCs have been amalgamated with NRSC in December 2009).

**31. National Remote Sensing Centre (NRSC):** NRSC is responsible for acquisition, processing, distribution and archiving of data from remote sensing satellites and is continuously exploring the practical uses of remote sensing technology for multilevel (global to local applications). NRSA has been converted from a Registered society to a Government entity called "National Remote Sensing Centre" (NRSC) w.e.f. 1.9.2008.

**32. 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.

**33. 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.

**34. Physical Research Laboratory (PRL):** PRL, an autonomous institution funded by the DoS 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.

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

**36. National Institute of Climate Change & Environment Studies (NICES):** It is envisaged to set up an Institute to carryout focused research in Climate Change & Environment.

**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 aspects such as monsoons, cyclones, etc., using a satellite platform.

**40. ADITYA:** The ADITYA-1 Project will be the first Indian Space based solar coronagraph, which will be available for solar coronal observation to all the Indian researchers in the field of Solar Astronomy. The major scientific objective of the ADITYA-1 is to achieve a fundamental understanding of the physical processes that heat the solar corona (base to the extended), accelerate the solar wind and produce Coronal Mass Ejections (CMEs). Work on ADITYA-1 has been initiated. The payload specifications and interface details are being worked. Procurement plan for long lead/critical materials & components is in progress.

**41. Astrosat 1 & 2:** The objective of the Astrosat project is to build and launch an astronomical observatory satellite for expanding the scientific knowledge about the evolution of stellar objects and gather valuable scientific data on high energy Astronomy and Astrophysics research. The satellite is planned to be launched on-board PSLV during 2010-2011.

**42. 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 data collected from various payloads of Chandrayaan-1 were analysed by scientists world wide and the final products were presented and discussed in Chandrayaan-1 Science meets held at Bengaluru on 29<sup>th</sup> January 2009 and subsequently at Goa on 7<sup>th</sup> September 2009. The follow-on mission Chandrayaan-2 has been planned to be launched during 2012. The baseline mission objective of Chandrayaan-2 is to soft land at a suitable site on the lunar surface and to carry out in-situ chemical analysis.

**43. 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.

**44. Atmospheric Science Programmes:** Atmospheric Science Programmes are intended to develop advanced

observation tools & techniques of atmospheric modeling, leading to operational end user products in different domains of atmospheric science.

**45. 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.

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

**47. Special Indigenisation/Advance Ordering:** Indigenisation envisages ISRO to have interface with the Indian Industry to develop various electronic components, materials, chemicals, etc., for the space programme. The scope of the scheme also includes procurement of certain long lead and critical items for futuristic missions and upgradation of VLSI fabrication facilities at SCL.

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

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

**50. 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 has been configured as an advanced meteorological Satellite with new payloads such as Imager and Sounder. The Spacecraft is targeted for launch during 2010-2011.

**51. INSAT-4 Satellites (including Launch Services and Leasing of Transponders):** 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 and 4CR satellite in the INSAT-4 series have been launched and operationalised. Work on INSAT-4D, 4E, 4F (User funded) and INSAT-4G, GSAT-9, GSAT-10 & GSAT-12 is in progress.