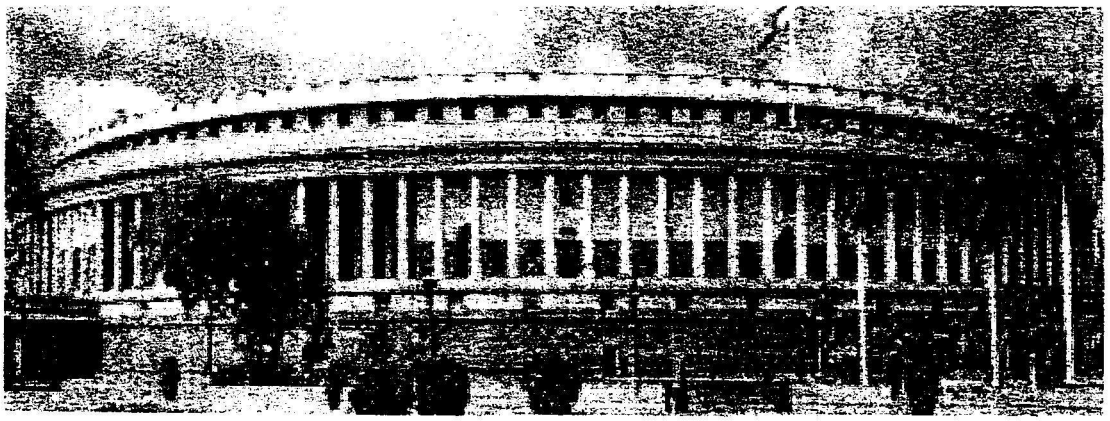
GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

"SPACE IN PARLIAMENT"



BUDGET SESSION OF PARLIAMENT 2016
(FEBRUARY – MAY 2016)

COMPILATION OF REPLIES GIVEN IN PARLIAMENT DURING 2016

Government of India
Department of Space
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PARLIAMENT QUESTIONS – BUDGET SESSION OF PARLIAMENT 2016

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
STARRED QUESTION NO. 14

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

LAUNCH OF SATELLITES

*14. **SHRI A.ARUNMOZHITHEVAN:**

Will the PRIME MINISTER be pleased to state:

(a) **the details of the satellites launched by the Indian Space Research Organisation (ISRO) during the year 2015 and the ones lined up for 2016;**

(b) **the details of the foreign satellites therein;**

(c) **whether ISRO is contemplating a solar mission to study the Sun and if so, the details thereof;**

(d) **whether the Antrix Corporation has signed agreements with other countries for launch of satellites; and**

(e) **if so, the details thereof?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) to (e) A Statement is laid on the Table of the House.

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STATEMENT LAID ON THE TABLE OF THE LOK SABHA IN REPLY TO STARRED QUESTION NO.14 REGARDING "LAUNCH OF SATELLITES" ASKED BY SHRI A.ARUNMOZHITHEVAN FOR ANSWER ON WEDNESDAY FEBRUARY 24, 2016.

(a) During the year 2015, Indian Space Research Organization (ISRO) has launched 4 Indian satellites (weighing about 8500 Kg) and 17 foreign satellites (weighing about 2100 Kg) from five countries. ISRO proposes to launch 8 Indian satellites (weighing about 12000 Kg) and 19 foreign satellites (weighing about 850 Kg) from five countries in the year 2016. The details are enclosed in Annexure-I.

(b) The 17 foreign satellites from five countries (Canada , Indonesia, Singapore, United Kingdom and USA) were launched during the year 2015 on-board ISRO's Polar Satellite Launch Vehicle (PSLV) from Sriharikota, under commercial agreements between Antrix Corporation Limited (Antrix) and respective foreign customer. The 19 foreign satellites from five countries (Algeria, Canada, Germany, Indonesia and USA) are proposed to be launched in the year 2016.

(c) Yes Madam. ISRO is working towards the development, realization and launch of the first Indian solar mission, Aditya-L1. In this mission, Aditya-L1 satellite will be placed in a halo orbit around the Sun-Earth Lagrangian point-1 (L1), which is about 1.5 million kilometer from the Earth. The primary objective of the mission is to study the solar corona in different wavebands.

(d) Yes Madam.

(e) **Antrix Corporation Limited has signed agreements with customers from 7 (seven) countries for launching 25 satellites viz., Algeria (3), Canada (3), Germany (4), Indonesia (1), Japan (1), Malaysia (1) and USA (12), on-board PSLV, during 2016-17 time period.**

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ANNEXURE-I

DETAILS OF INDIAN SATELLITES LAUNCHED DURING THE YEAR 2015			
SN	**Satellite**	**Launch Date**	**Purpose of Satellite**
1.	IRNSS-1D	28-03-2015	Navigation
2.	GSAT-6	27-08-2015	Communication
3.	ASTROSAT	28-09-2015	Space Science
4.	GSAT-15*	11-11-2015	Communication
** Procured Launch using foreign launcher*			

DETAILS OF FOREIGN SATELLITES LAUNCHED DURING THE YEAR 2015				
SN	**Satellite**	**Country**	**Mass (kg)**	**Date of Launch**
1	DMC-3/1	United Kingdom	447	10/07/2015
2	DMC-3/2		447	
3	DMC-3/3		447	
4	CBNT-1		91	
5	De-orbitsail		7	
6	LAPAN-A2	Indonesia	76	28/09/2015
7	NLS-14	Canada	14	28/09/2015
8	LEMUR-2/1	USA	7	28/09/2015
9	LEMUR-2/2		7	
10	LEMUR-2/3		7	
11	LEMUR-2/4		7	
12	TeLEOS-1	Singapore	400	16/12/2015
13	VELOX-C1		123	
14	KentRidge-1		78	
15	VELOX-II		13	
16	Athenoxat-1		7	
17	Galassia		4	

INDIAN SATELLITES PROPOSED TO BE LAUNCHED IN THE YEAR 2016		
SN	**Satellite**	**Purpose of Satellite**
1.	IRNSS-1E (Already Launched)	Navigation
2.	IRNSS-1F	Navigation
3.	IRNSS-1G	Navigation
4.	CARTOSAT-2C	Earth Observation
5.	GSAT-18*	Communication
6.	SCATSAT-1	Wind vector measurements
7.	RESOURCESAT-2A	Earth Observation
8.	INSAT-3DR	Meteorology
** Procured Launch using foreign launcher*		

FOREIGN SATELLITES PROPOSED FOR LAUNCH IN THE YEAR 2016			
SN	**Satellite**	**Country**	**Mass (kg)**
1	BIROS	Germany	135
2	SkySat-Gen2-1	USA	110
3	LAPAN-A3	Indonesia	120
4	M3M	Canada	85
5	Maxvalier	Germany	20
6	Venta-1	Germany	
7	GHGSat-D	Canada	28
8	DOVE	USA	27
9	DOVE		
10	DOVE		
11	DOVE		
12	DOVE	USA	30
13	DOVE		
14	DOVE		

FOREIGN SATELLITES PROPOSED FOR LAUNCH IN THE YEAR 2016			
SN	Satellite	Country	Mass (kg)
15	DOVE		
16	ALSAT-2B	Algeria	120
17	ALSAT-1B		110
18	ALSAT-1N		7
19	Pathfinder-1	USA	50

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.65

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

SATELLITE CENTRE IN VIETNAM

65. **SHRI DILIPKUMAR MANSUKHLAL GANDHI:**
SHRI NARANBHAI KACHHADIYA:
SHRI CHANDRA PRAKASH JOSHI:
SHRI P.P. CHAUDHARY:

Will the PRIME MINISTER be pleased to state:

(a) **whether India is developing a satellite tracking and imaging centre in Vietnam;**

(b) **if so, the details thereof;**

(c) **whether India will allow Vietnam to access pictures and data from this centre, if so, the details thereof;**

(d) **whether any safeguards are being undertaken to ensure that Indian data is not accessed by other countries and if so, the details thereof; and**

(e) **if not, the reasons and consequences thereof?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) **As part of Space Cooperation between India and Association of South East Asian Nations (ASEAN), Indian**

Space Research Organization (ISRO), at the behest of Government of India, is working towards the establishment of a Satellite Tracking & Data Reception Station and Data Processing Facility in Vietnam for ASEAN Member countries. This facility is intended to acquire and process Indian Remote Sensing Satellite data pertaining to ASEAN region and disseminate to ASEAN Member countries.

(c) Yes Madam. Under this initiative, all ASEAN member countries, including Vietnam will be allowed to access processed remote sensing data pertaining to their country.

(d) Yes Madam. Ground facility is designed in such a way that it will not allow Indian data to be accessed and processed by the system.

(e) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.125

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

LAUNCH OF IRNSS-1E

125. SHRI SATAV RAJEEV:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) has launched the fifth (IRNSS-1E) navigation satellite in the Indian Regional Navigation Satellite system;

(b) if so, the details thereof;

(c) the time by which this navigation system will be fully operational;

(d) whether some countries have shown interest for cooperation in developing satellite navigation system; and

(e) if so, the details thereof and the response of the Government thereto?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) Yes Madam.

(b) IRNSS-1E, the fifth navigation satellite in IRNSS constellation of 7 satellites, was successfully launched onboard Polar Satellite Launch Vehicle 'PSLV-C31' on January 20, 2016 from Satish Dhawan Space Centre SHAR, Sriharikota.

(c) **The space segment comprising of 7 navigation satellites will be in place by first half of 2016.**

(d)&(e) **The discussions with Russia are underway to locate suitable Ground support system for enhancing the utility of navigation.**

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.159

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

NEW LAUNCH ORDERS

159. SHRI RAM CHARITRA NISHAD:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has bagged two more US launch orders;

(b) if so, the details thereof;

(c) whether the Antrix Corporation, ISRO's marketing arm, has signed a deal with commercial weather satellite operators abroad; and

(d) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)to(d) During October 2015, Antrix Corporation Limited (Antrix), the commercial arm of Indian Space Research Organisation (ISRO), has signed Launch Services Agreement with M/s. PlanetIQ, an American Company, for launching two of their satellites on-board ISRO's Polar Satellite Launch Vehicle (PSLV). These satellites are meant for studying certain weather parameters.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.174

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

SMART CITY PROGRAMME

174. SHRI A. ARUNMOZHITHEVAN:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has plans to map 500 towns for smart city programme;

(b) if so, the details thereof;

(c) whether it is also true that the ISRO has tied up with many Government departments for mapping of these locations; and

(d) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) ISRO is working with Minstry of Urban Development for enabling preparation of large scale GIS database using satellite data for 500 towns under Atal Mission for Rejuvenation and Urban Transformation (AMRUT). These 500 towns include 100 towns under Smart city Programme announced by the Government of india.

(c) No Madam.

(d) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.200

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

COMMERCIALISATION OF SATELLITE MANUFACTURING TECHNOLOGY

200. SHRIMATI POONAM MAHAJAN:
SHRI PRAHLAD SINGH PATEL:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) plans to share satellite manufacturing technology with private Indian companies so that they can tap the market for small commercial satellite, if so, the details of the companies involved, including the revenue sharing model finalised;

(b) whether ISRO will also share the knowhow for ground equipment that capture satellite data and process it for specific local applications, if so, the details thereof;

(c) whether the proposed plans will boost India's space competitiveness globally and if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam. No firm action plan is yet in place.

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(b) **No Madam. Antrix Corporation Limited, the commercial arm of ISRO, establishes the ground stations for receiving and processing the data from Indian Remote Sensing (IRS) Satellites for customers as and when requested on commercial basis.**

(c) **Does not arise.**

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.204

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

INTERNATIONAL SPACE TREATY

204. SHRI NAGAR RODMAL:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government proposes to introduce new schemes for recovery of waste in the outer space;

(b) if so, the details thereof;

(c) whether the Government proposes to demand an international treaty regarding space law; and

(d) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam.

(b) Does not arise.

(c) No Madam.

(d) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.212

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 24, 2016

SPACE MISSIONS PLANNED AHEAD

212. **SHRI CHANDRA PRAKASH JOSHI:**

DR. MANOJ RAJORIA:

SHRI ANURAG SINGH THAKUR:

SHRI P.P. CHAUDHARY:

SHRI DILIPKUMAR MANSUKHLAL GANDHI:

SHRI NARANBHAI KACHHADIYA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has received any proposal from Indian Space Research Organisation (ISRO) for inter-planetary missions over the last year, if so, the details thereof;

(b) the amount of funds released for the same;

(c) whether the Government has any proposal pending, if so, the reasons for the delay;

(d) whether the Government plans to export indigenously built technologies related to inter-planetary missions, if so, the details thereof, if not, the reasons therefor;

(e) the list of the other countries or space agencies involved and the types of collaborations made for these projects; and

(f) the details of inter-planetary/space projects planned by ISRO in the next five years?

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ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam. Indian Space Research Organization (ISRO) has not submitted any proposal to the Government for inter-planetary missions over the last year.

(b) Does not arise.

(c) No Madam. No such proposal of ISRO is pending with the Government.

(d) At present there are no plans to export indigenously built technologies related to inter-planetary missions. No proposal has been received in this regard.

(e) Collaborations with other countries or space agencies for future inter-planetary technologies have not yet been planned.

(f) The projects planned to be realised in the next five years include – (i) Chandrayaan-2, mission to Moon, comprising of indigenous Orbiter, Lander & rover and (ii) Aditya-L1, first Indian solar mission. In this mission, Aditya-L1 satellite will be placed in a halo orbit around the Sun-Earth Lagrangian point-1 (L1), which is about 1.5 million kilometer from the Earth. The primary objective of the mission is to study the solar corona in different wavebands.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1043

TO BE ANSWERED ON WEDNESDAY, MARCH 2, 2016

FDI IN SPACE RESEARCH

1043. SHRI FAGGAN SINGH KULASTE:

SHRI KALIKESH N. SINGH DEO:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government plans to declare a comprehensive policy for space research, if so, the details thereof and timeline for the same and if not, the reasons therefor;

(b) whether the Government has put forth its agenda in the discussion to create international norms and rules for space activities, if so, the details thereof and if not, the reasons therefor;

(c) whether the Government envisages allowing of FDI in outer space research, if so, the details thereof and if not, the reasons therefor; and

(d) whether a tri-service aerospace command is expected to be developed to increase coordination among military and civilian departments, if so, the details thereof and the timeline for the same and if not, the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam.

(b) No Madam. However, ISRO has been engaged in a few multilateral negotiation processes under various international and UN forums, in order to protect the interests of the nation in its pursuance of space activities. These multilateral negotiation processes include International Code of Conduct for Outer space activities (led by European Union), formulation of a set of guidelines for Long Term Sustainability of Outer Space Activities discussed under United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).

(c) No Madam. Outer space research activities are carried out on cooperation basis with the space agencies of other countries.

(d) Department of Space is mandated for harnessing the benefits of space technology for national development.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1142

TO BE ANSWERED ON WEDNESDAY, MARCH 2, 2016

GSLV

1142. SHRI S. RAJENDRAN:

Will the PRIME MINISTER be pleased to state:

(a) whether there is ample demand for GSLV from the satellite manufacturers across the world;

(b) if so, the details thereof;

(c) whether US companies are also bidding for our GSLV launch pad; and

(d) if so, the details thereof including the list of other countries interested for the same?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) Antrix Corporation Limited (Antrix), the commercial arm of ISRO, is holding preliminary discussions with some of the space agencies / companies across the world for providing GSLV launch services for the foreign customer satellites.

(c)&(d) No Madam. The launch pads at Satish Dhawan Space Centre, Sriharikota are used exclusively for launch vehicles developed by ISRO.

However, one of the leading space company from USA is under initial phase of discussion with Antrix, to utilise the GSLV launch services for one of their communication satellite. The other countries that have shown interest in utilising GSLV launch services include space agencies/ companies from Canada, France, Republic of Korea and Turkey.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1878

TO BE ANSWERED ON WEDNESDAY, MARCH 9, 2016

ASTROBIOLOGY MISSION

1878. SHRI KONAKALLA NARAYANA RAO:

Will the PRIME MINISTER be pleased to state:

(a) whether India in association with NASA is planning to launch astrobiology mission; and

(b) if so, the details and the salient features thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) At present, no such mission is planned.

(b) Does not arise

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1890

TO BE ANSWERED ON WEDNESDAY, MARCH 9, 2016

SPACE INDUSTRY PARK/ENCLAVE

1890. SHRI RAM CHARITRA NISHAD:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government plans to establish two new space industry enclaves/parks;

(b) if so, the details thereof;

(c) whether the Government intends to privatize its space research programmes in the near future; and

(d) if so, the details and the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam.

(b) Does not arise.

(c)&(d) ISRO has been engaging the Indian industry, since 1976, with appropriate transfer of technology and hand-holding for the manufacturing and production of the various components and sub-assemblies required for the development of space technology. Commensurate with the scope of space activities and increased demands for space

based services in the country, ISRO is making focussed efforts to consolidate and enhance participation of Indian industries in the manufacture of space related hardware such as rocket engine & stages, propellant tanks, spacecraft structures, solar panels, thermal control systems etc., required for satellites and launch vehicles. It is envisaged that the industry will have enhanced contribution towards manufacture of standardised components as well as integrated systems /subsystems through appropriate consortium.

The enhanced role of industry in realisation of majority of manufacturing requirements of Launch Vehicles and Satellites will enable meeting the growing demand of space based services in the country.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1907

TO BE ANSWERED ON WEDNESDAY, MARCH 9, 2016

GOOD GOVERNANCE

1907. SHRI NANA PATOLE:

Will the PRIME MINISTER be pleased to state:

(a) whether the Prime Minister recently stressed on the maximum use of space technology for good Governance;

(b) if so, the details thereof;

(c) the manner in which space technologies are being utilized by various departments of the Government; and

(d) the steps being taken to further integrate space technologies with the working of Government to achieve good Governance?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) Yes Madam.

(b) A one day National Meet on "Promoting Space Technology based tools and Applications in Governance & Development" was organized on September 07, 2015 at Vigyan Bhavan, New Delhi with the participation of Central Ministries/Departments and State Governments. Secretaries

of 58 Ministries/ Departments have presented the action plans jointly prepared with Indian Space Research Organisation (ISRO) to enhance functional effectiveness, facilitate planning and decision making.

While addressing during the special session, the Prime Minister emphasized on the need for new initiatives for governance and development, using space technology applications.

(c) Space technology is being used by various Ministries/Departments in planning, monitoring and evaluation of developmental activities in various sectors, which include agriculture, forestry & environment, water resources, urban planning, infrastructure development, asset mapping, mineral prospecting, ocean resources, meteorology, satellite communication, location based services, tele-education, Tele-medicine and disaster management support. Some of the important applications being carried out by the Ministries/Departments are given in Annexure-I.

(d) The steps taken by ISRO to further integrate space technologies with the working of the Government to enable good governance include:

i) Formation of expert working groups in ISRO to have regular interaction with the departments

ii) Preparation of joint action plan for short term & long term space technology applications

iii) Conduct of Proof of Concept or Pilot projects

iv) Development of customised tools and applications

v) **Institutionalisation of space applications and enabling formation of space technology cells in the Ministries / Departments**

vi) **Capacity building of the officials of Ministries / Departments.**

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Annexure-I

Ministry/ Department	Application
M/o Agriculture & Farmers Welfare	• Crop Acreage Estimation & Production Forecasting • Agricultural Drought Assessment • Inventory and Management of Horticulture crops
M/o Environment Forests & Climate Change	• Biennial Forest Cover Mapping • Monitoring Snow & Glaciers and Snow-Melt Runoff in Himalayan Region • Coastal Zone Monitoring
M/o Water Resources, River Development & Ganga Rejuvenation	• Command Area Development and Assessment of Irrigation Potential • Repair, Renovation and Restoration of Water Bodies • Reservoir sedimentation assessment
M/o Urban Development	• National Urban Information System • Enabling Master plan preparation for 500 cities / towns
M/o Culture	• Inventory and site management plans for 4000 heritage enabling ease of business
M/o Drinking Water and Sanitation	• Ground Water Prospects Zones and Suitable sites for constructing recharge structures
M/o Civil Aviation	• Dedicated Satellite Communication Network (DSCN), linking several operational airports for exchange of voice and data for various services • GAGAN (GPS Aided GEO Augmented Navigation) for safety of life applications and en-route navigation
D/o Post	• Geo-tagging of post offices • Postman beat maps
M/o Earth Sciences	• Space derived inputs for operational weather forecast, tropical cyclone tracking & Ocean State Forecast

Ministry/ Department	Application
	• Potential Fishing Zone Advisory
M/o Petroleum & Natural Gas	• Planning pipeline corridor
M/o Rural Development	• Wasteland change monitoring • Monitoring & Evaluation of Watershed development
M/o Information and Broadcasting	• Satellite based communication services for broadcasting
M/o Power	• Environmental impact assessment of Power projects
M/o Panchayati Raj	• Space Based Information Support for Decentralized Planning at Panchayat level • SATCOM centres at every block for training.
M/o Tribal Affairs	• Potential Pond Identification for developing fish culture in village ponds. • Identifying sites for new ponds for harvesting runoff
D/o Health & Family Welfare	• Telemedicine Centres at pilgrimage sites and remote areas

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1944

TO BE ANSWERED ON WEDNESDAY, MARCH 9, 2016

PRIVATE PARTNERSHIP IN SPACE INDUSTRY

1944. **SHRI VINAYAK BHAURAO RAUT:**

DR. SHRIKANT EKNATH SHINDE:

SHRI RAHUL SHEWALE:

SHRI NAGENDRA KUMAR PRADHAN:

Will the PRIME MINISTER be pleased to state:

(a) **whether the Indian Research Organisation plans to garner assistance from private companies to make space and satellite components for Government run enterprises;**

(b) **if so, the details thereof;**

(c) **whether the Government has prepared any plan in this regard and if so, the details thereof; and**

(d) **the response received from the private companies in this regard, so far?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) **Indian Space Research Organisation (ISRO) has been engaging the Indian industry with appropriate transfer of the technology and hand-holding for the manufacturing and**

production of the various components and sub-assemblies required for the development of space technology. Commensurate with the scope of space activities and increased demands for space based services in the country, ISRO is making focussed efforts to consolidate and enhance participation of Indian industries in the manufacture of space related hardware such as rocket engine & stages, propellant tanks, spacecraft structures, solar panels, thermal control systems etc., required for satellites and launch vehicles. It is envisaged that the industry will have enhanced contribution towards manufacture of standardised components as well as integrated systems /subsystems through appropriate consortium.

(c)&(d) ISRO is planning to magnify the role of industry partners by increasing the scope of work from sub-system / hardware level to system level in a phased manner. At present, ISRO is interacting with the industries and planning to evolve a plan to involve the Indian industry as an industrial consortium. However, No firm action plan is yet in place.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1995

TO BE ANSWERED ON WEDNESDAY, MARCH 9, 2016

SPACE TECHNOLOGY FOR PUBLIC WELFARE

1995. SHRI RAHUL SHEWALE:
DR. SHRIKANT EKNATH SHINDE:
SHRI VINAYAK BHAURAO RAUT:
SHRI NAGENDRA KUMAR PRADHAN:

Will the PRIME MINISTER be pleased to state:

(a) **whether the Government has decided to use space technologies for a variety of public services and set an ambition in this regard and if so, the details thereof;**

(b) **whether the Government has prepared any roadmap in this regard and if so, the details thereof; and**

(c) **the details of the funding and other research and development initiatives taken by the Government to achieve the above said objectives?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) **In India, space technology is being primarily used as a tool to enable variety of public services by various Central Ministries/Departments, State Governments, Public &**

Private enterprises. A few of such public services include – (i) Television, Direct-To-Home (DTH) & Radio broadcasting, (ii) Telecommunication, (iii) Weather forecasting and Disaster early warning for Cyclone & Tsunami, (iv) Emergency Communication during disaster events, (v) Agriculture and fishing zone advisories, (vi) Tele-education and Tele-medicine services. Also, many governmental programmes / schemes utilising space technology as input offer direct / indirect benefits to public. A few of these include – Ground Water Prospect zones, watershed development, urban & rural infrastructure planning and development, rural connectivity etc.

(b) The roadmap includes providing the continuity of space technology tools for the existing public service with improved technological capabilities and development of technology for enabling newer services viz. location based services, geospatial services for ease of doing business and synergy of satellite communication, navigation & earth observation in planning, monitoring and evaluation of developmental activities in various sectors.

(c) To enable the above activities, ISRO plans to realise communication satellites and earth observation satellites, associated ground segments and development of application tools/techniques. The funds for the above are the integral part of the annual plan of the department.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2027

TO BE ANSWERED ON WEDNESDAY, MARCH 9, 2016

COLLABORATION FOR MARS EXPLORATION

2027. **SHRI M.I. SHANAVAS:**

DR. SHRIKANT EKNATH SHINDE:

SHRI VINAYAK BHAURAO RAUT:

SHRI RAHUL SHEWALE:

Will the PRIME MINISTER be pleased to state:

(a) whether India and the United States have agreed to cooperate on future exploration of the Red Planet;

(b) if so, the details thereof;

(c) whether any charter has been signed between NASA and ISRO on Mars Working Group for cooperation between the two countries in this regard;

(d) if so, the details and the salient features thereof; and

(e) the time by which the work on the joint project is likely to start?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) ISRO-NASA Mars Working Group (INMWG) has been formed, under the US-India Civil Space Joint Working Group. Under INMWG, ISRO and NASA are having discussions on the possibility of co-operations in Mars Science and exploration.

(c) Yes Madam.

(d) The Charter for the ISRO-NASA Mars Working Group was signed during September 2014. This group will seek to identify, define and implement those scientific, programmatic, and technological goals that ISRO and NASA have in common in regard to the exploration of Mars. This working group will explore possibilities for enhanced cooperation between the two countries in the exploration of Mars.

(e) No action plan is yet in place.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 3044

TO BE ANSWERED ON WEDNESDAY, MARCH 16, 2016

REGIONAL CENTRES OF ISRO

3044. SHRI KESHAV PRASAD MAURYA:

Will the PRIME MINISTER be pleased to state:

(a) the total number of Regional Centres of Indian Space Research Organisation (ISRO) in the country and the number of persons working in these organisations;

(b) whether the Department of Space proposes to set up more centres in the country and if so, the details thereof State-wise; and

(c) the time by which these centres are likely to be started?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) The Regional Centres of ISRO along with number of persons working in these Centres is given as under:

SN	Name of the Centre / Location	Approved manpower
1.	Vikram Sarabhai Space Centre, Thiruvananthapuram, Kerala	4722
2.	ISRO Satellite Centre, Bangalore, Karnataka	2549
3.	Space Applications Centre, Ahmedabad, Gujarat	2274

4.	Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh	2116
5.	Liquid Propulsion Systems Centre, Valiamala, Kerala	1000
6.	National Remote Sensing Centre, Hyderabad, Telangana	976
7.	ISRO Propulsion Complex, Mahendragiri, Tamil Nadu	679
8.	Master Control Facility, Hassan	397
9.	ISRO Telemetry, Tracking & Command Network, Bangalore, Karnataka	367
10.	ISRO Inertial Systems Unit, Thiruvananthapuram, Kerala	346
11.	Liquid Propulsion Systems Centre, Bangalore, Karnataka	292
12.	Laboratory for Electro-optical Systems, Bangalore, Karnataka	188
13.	Indian Institute of Remote Sensing, Dehradun, Uttarakhand	147
14.	Development & Educational Communication Unit, Ahmedabad, Gujarat	78
15.	ISRO Telemetry, Tracking and Command Network, Lucknow, Uttar Pradesh	46
16.	Regional Remote Sensing Centre, Bangalore, Karnataka	34
17.	Regional Remote Sensing Centre, Jodhpur, Rajasthan	29
18.	Regional Remote Sensing Centre, Nagpur, Maharasthra	28
19.	Regional Remote Sensing Centre, Kolkata, West Bengal	26
20.	INSAT Master Control Facility, Bhopal	26
21.	ISRO Telemetry, Tracking and Command Network, Port Blair, Andaman & Nicobar Islands	6

(b) No Madam. At present, Department of Space does not have any plan to set up more centres in the country.

(c) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 3051

TO BE ANSWERED ON WEDNESDAY, MARCH 16, 2016

NEMO-AM

3051. SHRI ASADUDDIN OWAISI:

Will the PRIME MINISTER be pleased to state:

(a) **whether Space Application Centre (SAC) of ISRO and Space Flight Laboratory (SFL) Institute for Aerospace Studies of Toronto University are working on development of Next Generation Earth Monitoring and Observation and Aerosol Monitoring (NEMO-AM) satellite;**

(b) **if so, the details thereof;**

(c) **the main benefits from this satellite after its positioning;**

(d) **the time by which satellite is likely to be launched; and**

(e) **the total expenditure likely to be incurred on this project?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) **Space Flight Laboratory (SFL), Institute for Aerospace Studies of Toronto University is developing a Nanosatellite for Earth Monitoring and Observation – Aerosol Monitoring (NEMO-AM) on a turnkey basis as per the agreement entered with Indian Space Research Organisation (ISRO).**

(b) An agreement was entered into between the Governing Council of University of Toronto represented by the Institute for Aerospace Studies (Space Flight Laboratory) and ISRO for the development of NEMO-AM. The satellite will have a science instrument for recording light reflected from earth surface and atmospheric aerosol in three different spectral channels and in two polarizations from different viewing angles.

(c) The main benefits from this satellite include - development of space based aerosol optical thickness retrieval technique, study of spatial variability of aerosol over selected regions, utilisation of aerosol properties in atmospheric correction scheme in land and ocean applications.

(d) The launch of NEMO-AM satellite is expected by 2018-19 timeframe.

(e) The expenditure likely to be incurred towards NEMO-AM satellite is 2,668,066 Canadian Dollar.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

410

LOK SABHA
UNSTARRED QUESTION NO. 3109

TO BE ANSWERED ON WEDNESDAY, MARCH 16, 2016

SPACE PROJECTS

3109. SHRIMATI V. SATHYA BAMA:

Will the PRIME MINISTER be pleased to state:

(a) the details of the space projects initiated in the last three years along with those which are pending;

(b) the amount allocated, disbursed and utilised for these projects, project-wise;

(c) whether the Government has any plan to launch dedicated satellites for States like Tamil Nadu, Gujarat, Maharashtra, Orissa, West Bengal and North Eastern States in the country; and

(d) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) The space projects initiated by Department of Space during the last three years i.e. 2012-13, 2013-14 & 2014-15 include (i) five communication satellites viz. GSAT-15, GSAT-16, GSAT-17, GSAT-18 and GSAT-19; (ii) seven remote sensing satellites viz. Resourcesat-2A, Cartosat-2E, SCATSAT-1, NISAR (NASA-ISRO Synthetic Aperture Radar), Cartosat-3, Oceansat-3 & 3A; (iii) fifteen continuation flights of PSLV

(C36-C50) and (iv) India's first mission to planet Mars – Mars Orbiter Mission. The projects pending completion in the last three years include Chandrayaan-2 and GSAT-11.

The space projects namely GSAT-15, GSAT-16 and Mars Orbiter Mission have been completed.

(b) the details of amount allocated, disbursed and utilised for these projects, project-wise, are given below:

[₹ in Crore]

Sl No	Project	Amount Allocated	Amount Disbursed (including BE 2015-16)	Amount utilised till 29.2.2016
1.	GSAT-15 (including launch services)	892.69	824.07	793.59
2.	GSAT-16 (including launch services)	897.94	865.50	852.60
3.	GSAT-17 (including launch services)	1013.20	330.00	211.86
4.	GSAT-18 (including launch services)	1022.00	507.00	532.88
5.	GSAT-19	94.00	25.00	5.63
6.	Resourcesat-2A	200.00	100.24	99.40
7.	Cartosat-2E	160.00	25.00	25.46
8.	SCATSAT	80.00	30.00	7.86
9.	NISAR	513.00	50.00	1.91
10.	Cartosat-3	351.16	50.00	17.63
11.	Oceansat-3 & 3A	797.17	25.00	0.00
12.	PSLV C36-C50	3090.00	203.25	45.66
13.	Mars Orbiter Mission	450.00	420.90	447.00
14.	Chandrayaan-2	603.00	252.45	272.12
15.	GSAT-11	500.00	494.27	490.10

(c) No Madam.

(d) Does not arise

*****

O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 3165

TO BE ANSWERED ON WEDNESDAY, MARCH 16, 2016

FORECASTING OF NATURAL DISASTERS

3165. SHRI KUNWAR PUSHPENDRA SINGH CHANDEL:

Will the PRIME MINISTER be pleased to state:

(a) whether any pilot project is running or is proposed in the country especially in the Himalayan regions to develop technology for forecasting natural disasters by Indian Space Research Organisation; and

(b) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) Yes Madam.

(b) Indian Space Research Organisation (ISRO) is carrying out the following pilot projects in the Himalayan region on experimental basis to develop methodology for enabling forewarning of natural disasters.

i. <u>Heavy Rainfall/ cloud burst alerts for western Himalaya:</u> Space Applications Centre (SAC) of ISRO has developed a model, for heavy rainfall / cloud burst alerts, which is being experimentally carried out for Uttarakhand and Himachal

Pradesh regions. The information is made available on ISRO's MOSDAC (Meteorological & Oceanographic Satellite Data Archival Centre) website.

ii. Rainfall triggered landslide alerts for the Uttarakhand Region: An experimental early warning system for rainfall triggered landslides is developed for use along the pilgrimage route corridors leading to Gangotri, Badrinath and Kedarnath as well as along the Pithoragarh-Malpa route in Uttarakhand. The forewarning is generated based on the statistical relation between the terrain (geological, morphological) and temporal (primarily long term rainfall events) factors.

iii. Flood Early Warning System for Assam State: The North Eastern Space Applications Centre (NESAC) of ISRO has developed the Flood Early Warning System (FLEWS) as a Research & Development (R&D) project in Assam State in association with Assam State Disaster Management Authority (ASDMA). FLEWS, is a terrain-specific model, which employs satellite based inputs, in-situ data on rainfall and river discharge data at critical locations to provide advance information on flood events as an input to disaster preparedness. The FLEWS model is being used in all 25 flood prone districts of Assam.

iv. Snow-melt run-off: ISRO has developed snow melt runoff models for Alaknanda, Bhagirathi, Yamuna, Sutlej, Beas and Chenab basins to provide information on short-term (16 day) snow melt runoff during summer months i.e. April to June.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 3169

TO BE ANSWERED ON WEDNESDAY, MARCH 16, 2016

PARTICIPATION OF IIT/IIM STUDENTS IN SPACE RESEARCH

3169. SHRI KESHAV PRASAD MAURYA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Department of Space proposes to include students of Indian Institutes of Technology (IITs) and the Indian Institutes of Management (IIMs) in its missions; and

(b) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) Indian Space Research Organisation (ISRO) has set up Space Technology Cells at four IITs - Bombay, Kanpur, Kharagpur and Madras to carry out research activities in the areas of space technology and applications, wherein the PG and doctoral students contribute towards space research.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 497

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

FUNDS ALLOCATED FOR SPACE PROGRAMME

497. SHRI RAGHAV LAKHANPAL:

Will the PRIME MINISTER be pleased to state:

(a) the details of funds allocated for various space programmes during the last two years; and

(b) the amount earned through various space programmes during the said period?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) The details of funds allocated for various space programmes during last two years i.e. 2014-15 & 2015-16 are given below:

(₹ in crores)

S.N.	Programmes/ Projects	Funds Allocated 2014-2015	Funds Allocated 2015-2016
1	Launch Vehicle Technology	1996.02	2498.52
2	Satellite Technology	852.09	971.28
3	Satellite Tracking/ Launch Support	666.50	881.98
4	Space Applications	736.20	967.63

5	Space Sciences	305.85	297.75
6	Direction & Administration/ Other Programmes	145.31	174.53
7	INSAT Operational	1124.03	1167.75
GRAND TOTAL : GROSS		5826.00	6959.44

(b) The Indian Space Programme generates revenue mainly through leasing of INSAT/ GSAT transponders, sale of Indian Remote Sensing satellite data and other commercial services carried out by Antrix Corporation Ltd., the commercial arm of Department of Space. The amount earned through the above activities during last two years is given below:

Financial Year	Amount Earned (₹ in crores)
2014-15	669.21
2015-16	775.01

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 536

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

LAUNCHING OF GSAT-11

536. SHRI DUSHYANT SINGH:

Will the PRIME MINISTER be pleased to state:

(a) whether India is planning to launch GSAT-11 spacecraft by the end of 2016 and if so, the details thereof;

(b) whether it will be launched using launch vehicle procured from outside the country;

(c) if so, the details thereof along with the reasons therefor;

(d) the details of the in-orbit testing support which will be provided by the GSAT-11;

(e) whether the spacecraft will also be equipped to render broadband connectivity specially for the rural areas; and

(f) if so, the details thereof ?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) India has plan to realise GSAT-11 spacecraft for launch during the end of 2016 or first quarter of 2017. GSAT-11 is a first generation high throughput communication satellite with a lift-off mass of about 5600 kg, operating in Ka/Ku bands. It is a multi-beam satellite with 32 user beams and 8 hub beams over India.

(b) Yes Madam.

(c) It is planned to launch GSAT-11 spacecraft using procured launch services. At present, the indigenous capability to launch this weight class of satellite is not available.

(d) The in-orbit testing of GSAT-11 satellite is planned to be conducted from the Master Control Facility (MCF) in Hassan, Karnataka and other suitable locations of ISRO Centres.

(e)&(f) The spacecraft capability includes providing broadband connectivity to rural areas with higher bandwidth as compared to traditional communication satellites.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 539

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

SATELLITE LAUNCHING TECHNOLOGY

539. **SHRI RAM MOHAN NAIDU KINJARAPU:**

Will the PRIME MINISTER be pleased to state:

(a) **whether the Department of Space and the Indian Space Research Organisation (ISRO) is leveraging the advancement of our technological knowledge in launching economically viable payloads into space;**

(b) **if so, the details thereof;**

(c) **whether the Government proposes to open up ISRO's activities to enable it to launch commercial satellites into space in order to reap some economic benefits; and**

(d) **if so, the details thereof and if not, the reasons therefor?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) **In 1992, Department of Space established Antrix Corporation Limited (Antrix), as its commercial arm, for providing indigenously developed space technology and services on a commercial basis. The Department of Space provides launch services through Antrix for launching satellites of foreign**

customers onboard Indian Launch Vehicles, either as a dedicated commercial missions or as co-passengers with Indian Satellite missions.

(c)&(d) Indian Space Research Organisation (ISRO) has been providing launch services through Antrix, on a commercial basis for launching satellites of foreign customers onboard its Polar Satellite Launch Vehicle (PSLV). Till date, ISRO has launched 57 satellites from 20 countries, including six dedicated commercial launches.

The Number of satellites launched by PSLV for foreign countries are: Algeria (1), Argentina (1), Austria (2), Belgium(1), Canada (8), Denmark (2), France (2), Germany (9), Indonesia (2), Israel (1), Italy (1), Japan (3), Luxembourg (1), Republic of Korea (1), Switzerland (2), Singapore (8), Netherlands (1), Turkey (1) & United Kingdom (6), USA (4).

Antrix has signed agreements with customers from 7 (seven) countries for launching 25 satellites viz., Algeria (3), Canada (3), Germany (4), Indonesia (1), Japan (1), Malaysia (1) and USA (12), on-board PSLV, during 2016-17 time period.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 569

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

BRICS SATELLITES

569. **SHRI P.P. CHAUDHARY:**

SHRI DILIPKUMAR MANSUKHLAL GANDHI:

Will the PRIME MINISTER be pleased to state:

(a) **whether BRICS nations including India intend to establish a joint BRICS network of space satellites;**

(b) **if so, the details thereof; and**

(c) **if not, the reasons therefor?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) **Yes Madam.**

(b) **As part of BRICS (Brazil, Russia, India, China and South Africa) Cooperation, space agencies of respective nations, including India, are pursuing technical discussions to realise a virtual constellation (network of remote sensing satellites provided by space agencies) in a phased manner, wherein space agencies could provide data from their existing remote sensing satellites. Such virtual constellation is intended to deal with challenges of the mankind such as global climate change, natural disasters and environmental protection.**

(c) **Does not arise.**

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 623

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

REUSABLE ROCKET

623. SHRI S. SELVAKUMARA CHINNAYAN:
SHRI DUSHYANT CHAUTALA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation is planning to launch reusable vehicle namely the Reusable Launch Vehicle-Technology Demonstrator (RLVTD) in near future;

(b) if so, the details thereof and whether the Government has also planned to extend the programme for the commercial purpose to other countries; and

(c) if so, the details thereof and the follow up actions proposed by the Government in this regard?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) Yes Madam.

(b) Reusable Launch Vehicle – Technology Demonstrator (RLV-TD) is envisaged as a flying test bed to evaluate the critical technologies required for a hypersonic re-entry vehicle. The sub-systems for the RLV-TD, such as, the

solid propellant booster and the winged body vehicle have been developed . The infrastructure for hardware and software has been established. The first flight test of the RLV-TD is expected in 2016, which would demonstrate the hypersonic aerodynamic characteristics, Avionics system, Thermal protection system, Control system and Mission management.

The Development of Reusable Launch Vehicle is a technical challenge and it involves the development of many cutting edge technologies. Presently, it is in the preliminary stage of total developmental process. A series of technology demonstration missions would be required before it could be used for launching.

(c) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 643

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

HIGH RESOLUTION SATELLITE

643. **SHRI RAGHAV LAKHANPAL:**

Will the PRIME MINISTER be pleased to state:

(a) **whether high resolution satellites capable of continuously monitoring major swathes along India's borders have been launched in the last two years and if so, the details thereof; and**

(b) **whether these satellites are transmitting continuous and uninterrupted live pictures and if so, the details thereof ?**

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) **No Madam.**

(b) **Does not arise.**

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 645

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

THIRTY METRE TELESCOPE

645. SHRI JAYADEV GALLA:

Will the PRIME MINISTER be pleased to state:

(a) whether Thirty Metre Telescope International Observatory Board has shortlisted Ladakh for setting up world's largest telescope;

(b) if so, the details thereof;

(c) the total cost of the project and the share of India; and

(d) the manner in which Thirty Metre Telescope may assist to explore new vistas in the universe?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) The Thirty Meter Telescope (TMT) project is the joint responsibility of the Department of Science & Technology (DST) and the Department of Atomic Energy (DAE) from India. As per the information provided by Indian Institute of Astrophysics (IIA) under DST, the TMT is an international project being funded by scientific organisations of Canada, China, India, Japan and USA. The Evaluation process for an appropriate site includes scientific suitability (water vapour in the atmosphere, atmospheric turbulence and number of cloud-free nights in a year), infrastructure and logistics for

setting-up of such a large international scientific project. While Mauna Kea, Hawaii is the preferred choice for the TMT project, given the large investments that have already been made and committed, the project is also looking at alternate sites both in the northern and southern hemispheres. Hanle, Ladakh is one of the sites being evaluated for hosting the telescope. Hanle being the protected area in the state of J&K, the project requires clearances from State and Central agencies such as environmental, defence, external affairs and home affairs.

(c) The total cost of TMT project is about 1.5 billion US dollars. The Union Cabinet has given its approval for India's participation in the Thirty Metre Telescope (TMT) project at Mauna Kea, Hawaii, USA at a total cost of ₹ 1299.8 crores from 2014-2023. From the Indian side, this will be a joint project of the Department of Science and Technology (DST) and the Department of Atomic Energy (DAE) with a DST share of ₹ 675.25 crores and DAE share of ₹ 624.55 crores.

(d) TMT will enable scientists to study fainter objects far away from us in the Universe, which gives information about early stages of evolution of the Universe. Also, it will give us finer details of not-so-far-away objects like undiscovered planets and other objects in the Solar System and planets around other stars. TMT being the largest optical and infrared telescope in the northern hemisphere will enable several discoveries which will surely inspire future generations. Project will also provide state-of-the-art high end technologies to the country, which would benefit a number of industries and R&D centers in the country.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 651

TO BE ANSWERED ON WEDNESDAY, APRIL 27, 2016

SPACE ACT

651. DR. P. VENUGOPAL:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government is considering to come out with a Space Act soon;

(b) if so, the details thereof;

(c) the objective of the said Space Act; and

(d) whether any suggestion has been sought from all concerned in this regard and if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) The Department of Space is currently engaged in preparation of National Space Act for India for supporting the overall growth of space activities, with enhanced level of private sector participation. After consultations with internal experts and experts on space law, a draft version of the Act has been prepared, which has been taken up for consultations.

(c) **The objective of this Act is to support the overall growth of space activities in India, with enhanced levels of private sector participation in space activities and services, through appropriate regulations.**

(d) **Necessary consultations would be made as per the prevailing Parliamentary Procedures. Currently, approval process for pre-legislative consultations on the Draft Space Act is being pursued. This would be followed by inter-ministerial consultations through Draft Cabinet Note.**

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1698

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

PRIVATE INVESTMENT IN SPACE TECHNOLOGY

1698. SHRI RABINDRA KUMAR JENA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government is encouraging private investment in space technology; and

(b) if so, the details thereof including the details of such investments in the previous three years?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) The activities undertaken by Indian Space Research Organisation / Department of Space are fully funded through Union Budget.

(b) Does not arise.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1706

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

LAUNCH OF SATELLITES

1706. DR. KIRIT P. SOLANKI:

Will the PRIME MINISTER be pleased to state:

(a) the number of indigenously built satellites successfully placed in their orbit during the last three years and number of satellites which got destroyed before being placed in their orbit;

(b) whether the information provided by these satellites has been used by other countries for their own interest without the knowledge of the Government;

(c) if so, the details thereof;

(d) the number of satellites launched by the Government of India with the assistance of other countries and the details of cost incurred on these satellites and their present status; and

(e) whether some countries want to take the services of Indian satellite launching stations to launch their own satellites and if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

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(a) During last three years i.e. during 2013-14, 2014-15 and 2015-16, fourteen (14) indigenously built satellites have been successfully placed in their orbit. During the above said period, no satellite got destroyed before being placed in the desired orbit or in the orbit.

(b) No, Madam.

(c) Does not arise.

(d) As on date, 28 satellites have been launched from outside the country. Out of these, for 3 satellites (Aryabhatta, Bhaskara-1 & Bhaskara-2) launch assistance was provided by Russia as part of Indo-Soviet friendship and 1 satellite (Apple) was assisted for launch by France as part of the development of their launch vehicle. Remaining satellites were launched by hiring launch services on a commercial basis. The details are attached in Annexure -1.

(e) The Indian satellite launching stations are used exclusively for launch vehicles developed by ISRO. While 57 foreign satellites from 20 countries have already been launched into orbit using ISRO's Polar Satellite Launch Vehicle under commercial arrangements with Antrix Corporation Limited (Antrix), agreements have been signed for launching 28 more foreign satellites from 7 countries viz. Algeria, Canada, Germany, Indonesia, Japan Malaysia and USA. The launches of these foreign satellites are envisaged during 2016-2017 time period. The details are attached in Annexure-2.

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Annexure-1

Satellites launched with the support from other countries

SN	Satellite	Country	Launch Date	Launch Cost (₹ in Crores)	Present Status
1	Aryabhatta	Russia	19-04-1975	free	India's first experimental satellite. Mission completed
2	Bhaskara-1	Russia	07-06-1979	free	Mission completed
3	Bhaskara-2		20-11-1981	free	Mission completed
4	Apple	France	19-06-1981	free	Mission completed
5	INSAT-1A	United States of America	10-04-1982	468.57	Failed in Orbit
6	INSAT-1B		30-08-1983		Mission Completed
7	INSAT-1C		22-07-1988		Mission Completed
8	INSAT-1D		12-06-1990		Mission Completed
9	IRS-1A	Russia	17-03-1988	7.50	Mission Completed
10	IRS-1B		29-08-1991	31.80	Mission Completed
11	INSAT-2A	France	10-07-1992	785.10	Mission Completed
12	INSAT-2B		23-07-1993		Mission Completed
13	INSAT-2C		07-12-1995		Mission Completed
14	INSAT-2D		04-06-1997		Failed in orbit
15	INSAT-2E		03-04-1999		Mission Completed
16	IRS-1C	Russia	28-12-1995	60.31	Mission Completed

SN	Satellite	Country	Launch Date	Launch Cost (₹ in Crores)	Present Status
17	INSAT-3A	France	10-04-2003	2273.63	Working 10 months beyond Designed Life
18	INSAT-3B		22-03-2000		Mission Completed
19	INSAT-3C		24-01-2002		Working 2 years beyond Designed Life
20	INSAT-3D		26-07-2013		Expected life 4 ½ more Years
21	INSAT-3E		28-09-2003		Mission Completed
22	INSAT-4A	France	22-12-2005	875.00	Expected life 2 more Years
23	INSAT-4B		12-03-2007		Expected life 3 more Years
24	GSAT-7	France	30-08-2013	485.29	Expected life 4 ½ more Years
25	GSAT-8	France	21-05-2011	297.00	Expected life 7 more Years
26	GSAT-10	France	29-09-2012	406.82	Expected life 11 ½ moreYears
27	GSAT-15	France	11-11-2015	601.19	Expected life 11 ½ moreYears
28	GSAT-16	France	07-12-2014	581.00	Expected life 11 more Years

Annexure-2

FOREIGN SATELLITES PROPOSED TO BE LAUNCHED DURING 2016-17

SN	Satellite	Country	Mass(kg)	Tentative Launch schedule
1.	BIROS	Germany	135	
2.	SkySat-Gen2-1	USA	110	
3.	LAPAN-A3	Indonesia	120	
4.	M3M	Canada	85	
5.	Maxvalier	Germany	20	
6.	Venta-1	Germany		
7.	GHGSat-D	Canada	28	
8.	NLS-19	Canada	7	
9.	DOVE			
10.	DOVE			
11.	DOVE			2016
12.	DOVE			
13.	DOVE			
14.	DOVE	USA	85	
15.	DOVE			
16.	DOVE			
17.	DOVE			
18.	DOVE			
19.	DOVE			
20.	DOVE			
21.	Pathfinder-1	USA	50	
22.	ALSAT-2B	Algeria	120	
23.	ALSAT-1B		110	
24.	ALSAT-1N		7	
25.	PlanetiQ	USA	30	2017
26.	PlanetiQ			
27.	CE-SAT1	Japan	65	
28.	InnoSat-2	Malaysia	7	2017

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1722

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

MOU WITH FOREIGN COUNTRIES

1722. SHRI M.K. RAGHAVAN:

Will the PRIME MINISTER be pleased to state:

(a) the names of countries with which ISRO has entered into a MoU on cooperation in the exploration and use of outer space; and

(b) the fields included to explore newer research activities and application possibilities in the field of remote sensing under these MoUs?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) Indian Space Research Organisation (ISRO) of Department of Space, Government of India has signed MoU/ Cooperative agreements for exploration and use of outer space with 37 countries viz. Argentina, Australia, Brazil, Brunei Darussalam, Bulgaria, Canada, Chile, China, Egypt, France, Germany, Hungary, Indonesia, Israel, Italy, Japan, Kazakhstan, Kuwait, Mauritius, Mexico, Mongolia, Myanmar, Norway, Peru, Republic of Korea, Russian Federation, Saudi Arabia, Spain, Sweden, Syria, Thailand, The Netherlands,

Ukraine, United Kingdom, United Arab Emirates, United States of America and Venezuela.

(b) The fields to explore newer research activities addressed in these MoUs include - Joint development of advanced scientific instruments to observe earth and universe; joint realization of satellite missions; jointly carrying out calibration and validation experiments; conducting airborne campaign with advanced instruments; deep space navigation and communication support for space science missions; development of advanced technologies for building and launching of spacecrafts for earth observation and space science exploration.

Application possibilities in the field of remote sensing addressed in these MoUs include - natural resource management; vegetation biomass estimation; meteorological & oceanographic applications; atmospheric parameter retrieval & modelling; climate monitoring and weather forecasting; disaster management support.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1732

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

MANNED SPACE MISSION

1732. SHRI RAM MOHAN NAIDU KINJARAPU:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government is planning to launch a manned space mission in the near future;

(b) if so, the details thereof; and

(c) if not, the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)to(c) No Madam. However, Indian Space Research Organisation (ISRO) has undertaken the development of a few critical technologies relevant for manned space mission, as part of R & D activities. This includes development of a few enabling technologies viz. space suit, environment controlled crew module, thermal protection system.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1749

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

VACANT POSTS

1749. SHRI BHARAT SINGH:

SHRI VIJAY KUMAR HANSDAK:

DR. RAMESH POKHRIYAL "NISHANK":

Will the PRIME MINISTER be pleased to state:

(a) whether many important posts are lying vacant in top space research organisations;

(b) if so, the total number of such posts lying vacant at present;

(c) the time since when these posts are lying vacant and the steps being taken by the Government to fill these vacancies;

(d) whether in view of capacity development in the country, the Government has signed any agreement with certain institutes in regard to education and research sector; and

(e) if so, the names of those organisations along with the salient features of the agreements?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam. At present, all important posts in Indian Space Research Organisation (ISRO) have been filled. All the

existing vacancies are at the induction level, wherein freshers are inducted and processes of recruitment for all these posts have been initiated.

(b) Does not arise.

(c) Does not arise.

(d)&(e) ISRO has established Space Technology Cells at four IITs (Bombay, Kanpur, Kharagpur and Madras), Indian Institute of Science (IISc) and University of Pune to take up Joint Research Programme, as a part of extra-mural research activities in the areas of Space Science, Space Technology and Space Applications.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1766

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

SATELLITE PROGRAMME

1766. SHRI DUSHYANT SINGH:
SHRIMATI KAMLA DEVI PAATLE:

Will the PRIME MINISTER be pleased to state:

(a) the details of satellites launched by Indian Space Research Organisation (ISRO) during the last twenty years including both Indian and foreign satellites; and

(b) the details of the space programmes proposed to be executed by the year 2022?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) During the last 20 years i.e. from April 1996 to April 2016, Indian Space Research Organisation (ISRO) has launched 56 Indian satellites, which include - (i) 24 Communication Satellites; (ii) 14 Earth Observation satellites; (iii) 7 Navigational Satellites; (iv) 3 Weather & Atmosphere satellites; (v) 4 Space science & Planetary exploration satellites and (vi) 4 satellites built by students of Indian Universities / Institutions.

During the said period, ISRO has launched 57 foreign satellites from 20 countries, under commercial agreements between Antrix Corporation Limited (Antrix) and respective foreign customer. The number of satellites launched by ISRO for foreign countries are: Algeria (1), Argentina (1), Austria (2), Belgium (1), Canada (8), Denmark (2), France (2), Germany (9), Indonesia (2), Israel (1), Italy (1), Japan (3), Luxembourg (1), Republic of Korea (1), Singapore (8), Switzerland (2), Netherlands (1), Turkey (1), United Kingdom (6) and USA (4).

(b) The space programme proposed to be executed by the year 2022 envisages (i) development & operationalisation of advanced launch vehicle systems; (ii) high-resolution / thematic earth observational satellites with improved capabilities; (iii) Geo-imaging satellites for near real time imaging under cloud free conditions; (iv) microwave multi-spectral remote sensing satellites; (v) high-power/ high-throughput communication satellites; (vi) satellites for weather & atmosphere; (vii) operationalisation of regional navigation services; (viii) satellites for space science & planetary exploration; (ix) development of critical technologies for human spaceflight and (x) space applications in the area of remote sensing, communication and navigation, including societal services.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 1788

TO BE ANSWERED ON WEDNESDAY, MAY 4, 2016

PRIVATISING PSLV OPERATIONS

1788. SHRI ASADUDDIN OWAISI:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO proposes to privatise some space operations for Polar Satellite Launch Vehicle (PSLV) by 2020;

(b) if so, the details thereof and main idea behind this move;

(c) whether some foreign countries have privatised their space mission and have gained young talent and less dependence on Government agencies; and

(d) if so, the extent to which this step of the Government is likely to reduce India's total dependence on foreign purchases?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a),(b)&(d)

ISRO has been pursuing a conscious approach of building up and nurturing the industrial capabilities in the country to maximally support the Indian Space Programme. In order to step up the launch capacity within the country, ISRO is in the process of exploring the possibility of involving Indian

industry in a greater role to meet the increased national requirements and possible commercial demand for launch services. Discussions are being held with the Indian industry towards formulating a well conceived plan & strategy to enhance the capacity and capability of managing the Polar Satellite Launch Vehicle (PSLV) programme on an end to end basis.

(c) Yes Madam. In USA, Japan and Europe, the launch vehicles and satellites are built by private industry.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
STARRED QUESTION NO. 253

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

INDUSTRY PARTICIPATION IN SPACE PROGRAMMES

***253. SHRIMATI VANAROJA R.:**

Will the PRIME MINISTER be pleased to state:

(a) the extent of industry/private sector's participation in the Indian Space Research Organisation's (ISRO) space programmes;

(b) whether the Government has set up two high-power steering committees to promote industry/private sector participation in the space programmes of ISRO;

(c) if so, the details thereof;

(d) the terms of reference of the committees; and

(e) the time by which the committees are likely to give their reports?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) to (e) A Statement is laid on the Table of the House.

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STATEMENT LAID ON THE TABLE OF THE LOK SABHA IN REPLY TO STARRED QUESTION NO.253 REGARDING "INDUSTRY PARTICIPATION IN SPACE PROGRAMMES" ASKED BY SHRIMATI VANAROJA R. FOR ANSWER ON WEDNESDAY MAY 11, 2016.

(a) ISRO has been engaging the Indian industry since 1976, with appropriate transfer of technology and hand-holding for the manufacturing and production of various components and sub-assemblies required for the development of space technology. The Indian industries have been realising several sub-systems including motor cases, structures, propellant tanks, liquid engines, control components and electronic packages, while ISRO plays the lead role in carrying out the mission design, assembly & testing, quality assurance, integration and launch.

(b)&(c) Yes Madam. ISRO has set up two steering committees to delineate a comprehensive strategy for production with industry partnership.

(d) The terms of reference of the Steering Committee for stepping up the Launch Capacity include – (i) establishing the production profile of the launch vehicles; (ii) assessing the gaps in meeting the production requirement and (iii) arriving at a strategy for production including industry linkages, infrastructure build-up, technology sharing methods, quality assurance support.

The terms of reference of the Steering Committee for stepping up the Satellite/ Payload capacity include – (i) establishing the production profile of the Satellites and Payloads; (ii) assessing the gaps in meeting the production needs and (iii) creating a "Strategy Map" for production, industry linkages, joint ventures, infrastructure build-up, quality assurance support.

(e) The Committees are expected to submit their reports by Second half of 2016.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2794

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

MEGHA-TROPIQUES SATELLITE

2794. SHRI NANA PATOLE:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) have launched a satellite named Megha-Tropiques for the study of monsoon;

(b) if so, the details thereof;

(c) the details of the use of the Satellite for tracking weather and climate changes of tropical and non-tropical areas of the country;

(d) the relevance of the said satellite in agriculture sector, if any; and

(e) whether the National Highways Authority of India (NHAI) has entered into any agreement with National Remote Servicing Centre (NRSC) and North East Centre for Technology Application and Research (NECTAR) for the monitoring and management of traffic on National Highways and if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) Indian Space Research Organisation (ISRO) has launched Megha-Tropiques (MT) satellite [a joint mission of ISRO and French National Space Agency (CNES)], on October 12, 2011. The primary objective of the satellite is towards study of the tropical atmosphere and the convective cloud systems that profoundly influence both weather and climate. The satellite is placed in a

highly inclined orbit (~ 20° latitude) to enable frequent temporal sampling of 3 to 6 visits per day depending on the latitude. It carries three payloads – MADRAS (Microwave Analysis and Detection of Rain and Atmospheric Structures), SAPHIR (Sounder for Atmospheric Profiling of Humidity in the Inter-tropics by Radiometry), SCARAB (Scanner for Radiation Budget) and ROSA (Radio Occultation Sounder for Atmosphere).

(c) The humidity profile data of SAPHIR is being operationally assimilated in the numerical weather models by India Meteorology Department for weather forecasting. Observations of radiation from SCARAB instrument provide valuable information about the radiation balance over the tropical region. The monitoring and analysis of the Earth's radiation is of prime concern due to its direct linkage with global warming and climate change.

(d) The improved weather prediction by using horizontal and vertical distribution of humidity profiles from SAPHIR and solar radiation data from SCARAB along with data from INSAT are helpful in generation of agro-meteorological advisories and pre-harvest wheat yield forecasts.

(e) National Highways Authority of India (NHAI) has signed Memorandum of Understanding (MoU) with National Remote Sensing Centre (NRSC) under ISRO and North East Centre for Technology Application and Research (NECTAR) under Department of Science & Technology (DST). NRSC would facilitate satellite data and Geospatial technology support to provide inputs for prefeasibility status in new alignments, preparation of Detailed Project Reports, monitoring of road segments under construction. As understood, NECTAR would help NHAI in planning the roads and monitor its construction progress/activity.

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O.I.H. 78

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2845

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

MECHANISM TO DEAL WITH DISASTERS

2845. DR. RAMESH POKHRIYAL "NISHANK":
SHRI VIJAY KUMAR HANSDAK:

Will the PRIME MINISTER be pleased to state:

(a) whether any mechanism has been developed by Indian Space Research Organisation (ISRO) to deal with disasters;

(b) if so, the details thereof;

(c) the agencies with which coordination has been developed at the State-level in this regard;

(d) the special efforts made by the Government for promotion and propagation of education on disaster management in inaccessible and remote areas; and

(e) the details of research and skill development programmes in disaster management in the country?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a)&(b) Under its Disaster Management Support (DMS) Programme, Indian Space Research Organisation (ISRO) supports the disaster management activities in the country by means of providing – (i) Aerial and Space based data & information services and (ii) Satellite based emergency communication services.

To enable these services, ISRO has set up a Decision Support Centre (DSC) in 2005 at National Remote Sensing Centre (NRSC), Hyderabad for providing data, value added products and information services in near-real time to concerned Central and State departments. The DSC presently supports the needs of various natural disasters such as Cyclone, Flood, Earthquake, Tsunami, Landslide and Forest Fire. In respect of agricultural drought, ISRO has developed and transferred the methodology to Mahalanobis National Centre for Crop Forecasting (MNCFC) under Department of Agriculture and Cooperation & Farmers Welfare (DAC&FW). ISRO also enables satellite based emergency communication services through portable satellite phones and transportable satellite terminals to facilitate data and voice transfer between inaccessible areas. Further, in association with India Meteorological Department (IMD) more than 200 Cyclone Warning Dissemination Systems are installed in the coastal areas.

(c) ISRO works in close coordination with State Disaster Management Authorities (SDMAs), State Disaster Management (Relief) Departments (DMD), Water Resources Departments (WRDs), Forest Departments, State Remote Sensing Application Centres (SRSACs) and other nodal agencies associated with disaster management in the States. Also, at the behest of Ministry of Home Affairs (MHA), ISRO has established a satellite based Virtual Private Network (VPN) comprising of 44 nodes, which link-ups National Emergency Operations Centre (NEOC), State Emergency Operations Centres (SEOCs), Data providing agency nodes and Observational nodes.

(d) National Institute of Disaster Management (NIDM), Delhi has been conducting training programmes on disaster management through satellite communication technology to reach remote and inaccessible areas, web based online courses on disaster management and conducts training on Community Based Disaster Management. Further, NIDM is working on development of Disaster Management courses through e-pathshala programme of UGC.

ISRO/DOS is conducting training programmes to State Government officials, National Disaster Response Force (NDRF) and central nodal departments on utilisation of geospatial products and services for Disaster Management including north-eastern States. During 2015 and 2016 NRSC has trained 483 officers on utilisation of NDEM portal comprising of geospatial database, value added products and services in support of emergency management.

(e) Under its DMS programme, ISRO undertakes research towards the development of methodology for early warning systems, tools & techniques for generating value added products; geospatial modeling techniques, web & mobile based applications and satellite based emergency communication systems.

Towards skill development, DSC regularly conducts orientation trainings for the state level disaster management functionaries to familiarise them with space technology, value added products & services and its utilisation during disaster relief and mitigation. Also, Indian Institute of Remote Sensing (IIRS) at Dehradun regularly conducts capacity building programmes for the disaster management professionals at senior, middle and field levels.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2858

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

INTERNATIONAL SPACE STATION

2858. SHRI NARANBHAI KACHHADIYA:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) has been formally invited to become a member of the International Space Station (ISS) and if so, the details thereof;

(b) whether ISRO has accepted the same and is taking part in the ISS development;

(c) if so, the budgetary allocations made thereof and the technical work required therefor;

(d) if not, whether ISRO desires to be a part of the ISS in the near future;

(e) if so, the details thereof; and

(f) if not, the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) No Madam.

(b) Does not arise.

(c) Does not arise.

(d)to(f) The studies on the possibilities of conducting Earth Observation experiments, utilising International Space Station (ISS) as platform, for Earth's environment and climate are underway.

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O.I.H.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2876

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

LAUNCH OF SATELLITES

2876. DR. KIRIT P. SOLANKI:

Will the PRIME MINISTER be pleased to state:

(a) whether recently PSLV C3 and GPRS/Navigation Satellites have been launched and if so, the details thereof;

(b) whether they are able to find out new planets and stars and the details of other areas in which they are useful and if so, the details thereof;

(c) the total cost of the satellites launched;

(d) whether separate allocation is required in the budget for this; and

(e) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) The seventh indigenous navigation satellite IRNSS-1G, of Indian Regional Navigation Satellite System (IRNSS rechristened as NavIC), has been successfully launched on April 28, 2016 onboard PSLV C-33 from Satish Dhawan Space Centre, Sriharikota.

(b) No Madam. The IRNSS (NavIC) will provide position, navigation and timing information, which could be utilised for a large range of applications and services that include terrestrial, aerial and marine navigation. The signals from IRNSS (NavIC) through ground receivers will determine latitude, longitude & time, which could be utilised for variety of Location Based Services.

(c), (d)& (e)

A budget of ₹1420 Crore has been approved by the Government in 2006 for the realisation of IRNSS programme including space segment and associated ground segment.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2914

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

SATELLITES OF FOREIGN COUNTRIES

2914. SHRI RAGHAV LAKHANPAL:

Will the PRIME MINISTER be pleased to state:

(a) the details of satellites of private companies and universities of foreign countries launched by Indian Space Research Organisation (ISRO) during the last three years; and

(b) the revenue earned from the said launches during the said period, year-wise?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) During the last three years i.e. starting from January 2013 until December 2015, Indian Space Research Organisation (ISRO) has launched 28 international customer satellites belonging to foreign companies/ Space agencies/ Universities from 9 countries namely Austria, Canada, Denmark, France, Germany, Indonesia, Singapore, United Kingdom and United States of America. These satellites were launched under a commercial arrangement entered into between Antrix Corporation Limited (Antrix), the commercial arm of ISRO and the foreign customer. The details of satellites are given in Annexure-I.

(b) Antrix has earned total revenue of 80.6 Million Euros through launching of these 28 foreign customer satellites. The details of the revenue earned year-wise are given under:

Year 2013	:	6.9 Million Euros
Year 2014	:	18.2 Million Euros
Year 2015	:	55.5 Million Euros

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Annexure-I

Satellites of Foreign Countries launched by ISRO				
SN	Name of satellite	Country	Mass (kg)	Launch Date
1	SAPPHIRE	Canada	148	25/02/2013
2	NEOSSAT	Canada	74	25/02/2013
3	NLS-8.1	Austria	14	25/02/2013
4	NLS-8.2	Austria	14	25/02/2013
5	NLS-8.3	Denmark	3	25/02/2013
6	STRAND-1	United Kingdom	6.5	25/02/2013
7	SPOT-7	France	714	30/06/2014
8	AISAT	Germany	14	30/06/2014
9	NLS 7.1 (CAN-X4)	Canada	15	30/06/2014
10	NLS 7.2 (CAN-X5)	Canada	15	30/06/2014
11	VELOX-1	Singapore	7	30/06/2014
12	DMC-3/1	United Kingdom	460	10/07/2015
13	DMC-3/2		460	
14	DMC-3/3		460	
15	CBNT-1		85	
16	De-orbitsail		7	
17	LAPAN-A2	Indonesia	76	28/09/2015
18	NLS-14	Canada	14	28/09/2015
19	LEMUR	USA	7	28/09/2015
20	LEMUR		7	
21	LEMUR		7	
22	LEMUR		7	
23	TeLEOS-1	Singapore	400	16/12/2015
24	VELOX-C1		123	
25	KentRidge-1		78	
26	VELOX-II		13	
27	Athenoxat-1		7	
28	Galassia		4	

*****

O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO. 2947

TO BE ANSWERED ON WEDNESDAY, MAY 11, 2016

SPACE RESEARCH CENTRES

2947. DR. MANOJ RAJORIA:

Will the PRIME MINISTER be pleased to state:

(a) the number of space research centres in the country, location-wise;

(b) the details of amount spent for space research during the last three years, yearwise;

(c) if so, the details thereof;

(d) whether the Government proposes to increase the grants for space research centres in the next Budget and if so, the details thereof; and

(e) whether the Government proposes to open new space research centres and if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE

(DR. JITENDRA SINGH):

(a) The Space Research Centres/ Units in India, location-wise, are given below:

SN	Location	Number of Space Research Centres
1	Ahmedabad	3
2	Bangalore	5
3	Bhopal	1
4	Chandigarh	1
5	Dehra Dun	1
6	Gadanki	1
7	Hassan	1
8	Hyderabad	1
9	Jodhpur	1
10	Kolkata	1
11	Mahendragiri	1
12	Nagpur	1
13	Shillong	1
14	Shriharikota	1
15	Thiruvananthapuram	4

(b)&(c) The details of amount spent on space research for the last three years, year-wise are given below:

Financial Year	Amount Spent [₹ in crore]
2013-14	5168.95
2014-15	5823.45
2015-16	6919.87

(d) Yes, Madam. The Government proposes to increase the budget for Space research to ₹7509.14 crore during 2016-17. This amount is about 8% increase compared to the RE allocations made during 2015-16.

(e) No, Madam. At present there are no plans to set up new space research centres in the country.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 285

TO BE ANSWERED ON THURSDAY, FEBRUARY 25, 2016

SPACE INDUSTRY ENCLAVES/PARKS IN THE COUNTRY

285. DR. T. SUBBARAMI REDDY:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) has conceived space industry enclaves/parks in the country, if so, the details thereof;

(b) what are the facilities and systems that would be developed in the space parks; and

(c) whether domestic industry would be involved as joint venture or Business Process Outsourcing (BPO) and what would be the estimated expenditure required for the parks in the next five years with the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) No Sir.

(b) Does not arise.

(c) ISRO has been engaging the Indian industry with appropriate support for the manufacturing and production of the various components and sub-assemblies required for the development of space technology since 1976. Commensurate with the scope of space activities and increased demands for space based services in the country, ISRO is making focussed efforts to consolidate and enhance participation of Indian industries in the manufacture of space related hardware such as rocket engine & stages, propellant tanks, spacecraft structures, solar panels, thermal control systems etc., required for satellites and launch vehicles. It is envisaged that the industry will have enhanced contribution towards manufacture of standardised components as well as integrated systems /subsystems through appropriate consortium.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 286

TO BE ANSWERED ON THURSDAY, FEBRUARY 25, 2016

US LAUNCH ORDERS TO ISRO

286. DR. K.P. RAMALINGAM:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that ISRO bagged two more US launch orders through PSLV, if so, the details thereof; and

(b) whether it is also a fact that Antrix Corporation, ISRO's marketing arm, has signed a deal with commercial weather satellite operators abroad, if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) & (b) During October 2015, Antrix Corporation Limited (Antrix), the commercial arm of Indian Space Research Organisation (ISRO), has signed Launch Services Agreement with M/s. PlanetIQ, an American Company, for launching two of their satellites on-board ISRO's Polar Satellite Launch Vehicle (PSLV). These satellites are meant for studying certain weather parameters.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 919

TO BE ANSWERED ON THURSDAY, MARCH 3, 2016

DEPLOYMENT OF REGIONAL POSITIONING SYSTEM

919. SHRIMATI JAYA BACHCHAN:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) is undertaking a project to deploy a regional positioning system for India if so, the details thereof; and

(b) what is progress and budget allocated for the project, and the details of the benefit of such project?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Yes Sir. Indian Space Research Organisation (ISRO) has undertaken a project for developing an indigenous regional positioning system for India known as Indian Regional Navigation Satellite System (IRNSS).

IRNSS consists of seven satellites in a constellation, three satellites in geostationary orbit (GEO) and four satellites in geosynchronous orbit (GSO). The objective of IRNSS is to provide positioning and navigational services for India and surrounding region up to 1500 Km, with an absolute position accuracy of better than 20 metres.

(b) Out of the 7 satellites required in the constellation, five satellites namely, IRNSS-1A, 1B, 1C, 1D & 1E have already been operationalised in-orbit. Remaining two satellites, IRNSS-1F & 1G are planned to be placed in orbit by March/April 2016. With regard to ground infrastructure to operate IRNSS constellation, all primary facilities have been established. Establishment of backup navigation and timing centres is in progress. Two ranging and integrity monitoring stations are contemplated in Indonesia and Mauritius, for which the work is under progress.

A budget of ₹1420 Crores has been approved by the Government for the realisation of IRNSS programme including satellites and associated ground segment.

The benefits of IRNSS programme include – (i) establishing India's own independent navigational satellite system providing position, navigation and timing services and (ii) enabling applications in the areas viz. terrestrial, aerial & marine navigation, vehicle tracking, fleet management, precision timing services for power grid synchronisation etc.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 920

TO BE ANSWERED ON THURSDAY, MARCH 3, 2016

OBJECTIVES OF CHANDRAYAAN-I PROJECT

920. DR. KANWAR DEEP SINGH:

Will the PRIME MINISTER be pleased to state:

(a) whether the Chandrayaan-I project has achieved its objectives, if so, the details thereof;

(b) what is the position/objectives of Chandrayaan-II and whether it has been approved; and

(c) if not, by when it is expected to be approved?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Out of the 6 objectives of Chandrayaan-1 project, 4 objectives have been fully achieved and 2 objectives have been partially achieved. The details are as given under:

(i) Planning, development & execution of Chandrayaan-1 mission – Fully achieved

(ii) Evolution & validation of several new technologies – Fully achieved

(iii) Creation of Deep Space Network – Fully achieved

(iv) Dropping of Moon Impact Probe on the Moon – Fully achieved

(v) High resolution imaging/ Mineralogical mapping of Moon – Full coverage over high latitudes & Polar Regions. At the equator and low latitudes, coverage was about 50%.

(vi) Systematic topographic mapping of the Moon - 70% of lunar topography mapped.

In addition, Chandrayaan-1 was an example of cooperation with different countries and achieving the complex technological and scientific task in a coordinated manner. One of the payloads has discovered the presence of hydroxyl and water molecules on the lunar surface. It has renewed interest of younger generation in scientific & space activities and enhanced India's prestige amongst the world scientific community.

(b) Chandrayaan-2, India's second mission to the Moon. has been approved as a totally indigenous mission comprising of Orbiter, Lander and Rover. The scientific objectives of the mission are to further improve the understanding of origin and evolution of the Moon using instruments onboard Orbiter and in-situ observations of lunar surface using Lander and Rover. The spacecraft, payloads and subsystems are under realisation.

(c) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 921

TO BE ANSWERED ON THURSDAY, MARCH 3, 2016

POPULARITY OF GOVERNMENT PORTAL BHUVAN

921. SHRI TARUN VIJAY:

Will the PRIME MINISTER be pleased to state:

(a) the reasons Government portal BHUVAN is not being able to get popularity and be an effective alternative to Google Earth whose all data is parked abroad; and

(b) what are Government's plans to empower and help gain principal position for C-DAC and Survey of India to become modernized and provide an effective Indian alternative to foreign based agencies in their respective fields?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

(a) ISRO's BHUVAN (www.bhuvan.nrsc.gov.in) is a well known national geo-portal, which is being widely, used by the Government, public, NGOs and Academia. Bhuvan is developed with a clear focus of addressing Indian requirements of satellite Images and theme-oriented services to enable planning, monitoring and evaluation of stakeholder's activities in governance and development. Bhuvan provides nation-wide seamless ortho-corrected image base, thematic datasets for many natural resources, transport network, Digital Surface Model, hydrologic base from basin to watershed, 10 Million Points of Interest (POI) data. Bhuvan services include visualisation of remote sensing data (India-centric), free satellite data download, geophysical products, host of thematic services and customised application tools for Government data collaboration and enabling G-governance. It also renders near real-time data and information support towards management of natural disasters in the country.

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Some of the basic statistics of Bhuvan usage indicates that the portal is gaining importance in the country. In less than 6 years of its existence, it has more than 70,000 registered users; 800 GB of data is transacted per month and it witnesses 60 Million hits per month. About 4.6 lakh satellite data products, including derived products, have been downloaded by users. The ortho-corrected images and seamless thematic databases are being consumed, as a service in public domain, by many organisations. The customised application tools and datasets are being used by more than 30 Central Ministries and about 20 State Governments in various sectors, which include, land & water resources, agriculture, forestry, watershed, urban & infrastructure development, environment, de-centralised planning, asset geo-tagging & mapping, including monitoring of G-governance programmes. A few examples of government data collaboration/applications are enclosed at **Annexure-1**.

Bhuvan is designed, developed, deployed and managed by a small team of scientists within ISRO. It primarily focuses on societal-benefits and is not a commercial venture. On the contrary, Google Earth is a commercial enterprise with a large investment & large resource base and makes a huge business through advertisements and products. Google has a definite business model (in positioning & maintaining very high resolution satellite images) that is directly dealt with satellite operators/ services providers. The business model that is being operated is not in the public domain. Google Earth does provide very high to high resolution remote sensing data (World-wide) for visualisation with advanced value added services, but does not provide India specific seamless multi-thematic GIS data sets, free satellite data downloads and customised application tools for government data collaboration.

Thus, Bhuvan and Google Earth are two different platforms developed for different purposes and objectives.

(b) Department of Science & Technology has taken the following measures in respect of Survey of India (SOI):

i) Indian Institute of Surveying & Mapping (IISM) infrastructure is being revamped to improve basic training/teaching in IISM, Hyderabad so as to impart training to the officers and staff of SOI to keep abreast of state-of-the-art techniques in surveying and mapping.

ii) Optimal use of space borne earth observation data for generating topographical and other geo-spatial data for use in preparing user specific products from SOI.

iii) Focus on the primary geospatial data collection with a view to maintain the temporally accurate departmental geospatial data.

Department of Electronics and Information Technology (DeitY) has taken following measures in respect of C-DAC:

i) Originally established to carry out research and to develop High Performance Computing, the R&D of C-DAC has expanded to various other areas such as grid and cloud computing, multilingual computing, heritage computing, professional electronics including VLSI and embedded systems, cyber security and cyber forensics, health informatics, software technologies and education related to these technologies.

ii) In the area of High Performance Computing (HPC) & Grid Computing, C-DAC is playing an important role in building HPC technologies and developing software parallelisation tools and solutions for Science & Engineering applications.

iii) Further, C-DAC has now been entrusted with the implementation of the National Supercomputing Mission (NSM) announced by Government of India.

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Annexure-1

A few examples of government data collaboration/applications

Bhuvan acts like Cloud for Government departments by providing standardised set of geographical data and application tools. These are being used by stakeholders in governance and development. To name a few:

- Irrigation infrastructure monitoring – Ministry of Water Resources, RD & GR
- Monitoring & Evaluation of 52,000 micro watersheds – Department of Land Resources
- National Urban Information System & Master Plan preparation - Ministry of Urban Development
- Ground water prospects – Ministry of Drinking Water & Sanitation
- Islands Information System & National Database for Emergency Management – Ministry of Home Affairs
- Site Management Plans for heritage sites - Ministry of Culture
- Geo-spatial Inventory of Post Offices - Department of Post
- De-centralised planning at Panchayat level - Ministry of Panchayati Raj
- Biennial Forest inventory & Forest Fire - Forest Survey of India
- Thunderstorm & Fog alerts - Indian Meteorological Department
- Monitoring of dwelling construction - A.P. State Housing Corporation
- Know your Forest, Forest Fire alert/regimes, Change Monitoring - State Forest departments of Karnataka, HP and Uttarakhand
- Municipal GIS (Ludhiana), Amritsar Tourism Web GIS

Bhuvan is also rendering support to many flagship programmes of Government of India viz. AMRUT, Housing for all by 2022, National Mission for Clean Ganga, PMKSY, MNREGA etc.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 922

TO BE ANSWERED ON THURSDAY, MARCH 3, 2016

LAUNCHING OF SATELLITES IN THE COUNTRY

922. SHRI VIVEK GUPTA:

Will the PRIME MINISTER be pleased to state:

(a) the total number of satellites which have been launched by India both successfully and unsuccessfully along with their break up according to their purpose into military satellites, commercial satellites and the rest during last three years;

(b) the expenditure incurred on and revenue earned from these satellites, satellite-wise;

(c) the list of existing satellites in use along with their remaining lives, satellitewise;

(d) whether these satellites are achieving their intended objectives; and

(e) if so, the details of the benefits received along with the details of their beneficiaries, satellite-wise?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) During the last three years (i.e. 2013, 2014 & 2015), Indian Space Research Organisation (ISRO) has successfully launched 13 Indian Satellites (weighing about 24,000 kg) and 28 Foreign Satellites (weighing about 3207 kg) from nine countries. The purpose of the 13 Indian satellites launched includes – earth observation (2 Nos.), navigation (4 Nos.), communication (5 Nos.), and space science & planetary exploration (2 Nos.). The 28 foreign satellites were launched on-board ISRO's Polar Satellite Launch Vehicle (PSLV) from Sriharikota, under commercial agreements between Antrix Corporation Limited (Antrix) and respective foreign customer. All satellites launched during the last three years have been successful.

(b) The expenditure incurred and revenue earned on these satellites, satellite-wise is given in **Annexure-1**.

(c) The satellite-wise details of existing Indian satellites in use, along with their remaining lives are given in **Annexure-2**.

(d) Yes Sir.

(e) The satellite-wise details of benefits received along with details of beneficiaries are enclosed in **Annexure-3**.

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Annexure-1

Expenditure incurred and revenue earned on Indian Satellites launched during the last three years (2013, 2014 & 2015)			
SN	**Satellite**	**Expenditure Incurred (in Crores)**	**Revenue Earned**
1.	SARAL	66.31	Satellite for scientific studies of ocean altimetry @
2.	IRNSS-1A	125.00	Satellite for enabling navigation services in the country @
3.	INSAT-3D	206.00	Satellite for Meteorological observations to support weather forecasting@
4.	GSAT-7	User funded satellite	Satellite for communication@
5.	Mars Orbiter Mission	446.98	Satellite for scientific studies of the planet Mars@
6.	GSAT-14	43.73	Approximately ₹ 43.94 Crores
7.	IRNSS-1B	125.00	Satellite for enabling navigation services in the country@
8.	IRNSS-1C	125.00	Satellite for enabling navigation services in the country@
9.	GSAT-16	269.55	Approximately ₹ 16.71 Crores
10.	IRNSS-1D	125.00	Satellite for enabling navigation services in the country@
11.	GSAT-6	232.96	Satellite for mobile services
12.	ASTROSAT	172.52	Satellite for scientific studies of astronomical objects@
13.	GSAT-15	209.86	Transponders recently allocated

@ Satellites are meant for scientific and societal applications

Revenue earned as Launch Fee for launching following Foreign Satellites during the last three years (2013, 2014 & 2015)			
SN	Satellite	Country	Revenue Earned as Launch Fee (in Euros)
1.	SAPPHIRE	Canada	4,280,000
2.	NEOSSAT	Canada	2,000,000
3.	NLS-8.1	Austria	525,000
4.	NLS-8.2	Austria	
5.	NLS-8.3	Denmark	
6.	STRAND-1	UK	120,000
7.	SPOT-7	France	17,500,000
8.	AISAT	Germany	175,000
9.	NLS 7.1 (CAN-X4)	Canada	375,000
10.	NLS 7.2 (CAN-X5)		
11.	VELOX-1	Singapore	140,000
12.	DMC-3/1	UK	28,000,000
13.	DMC-3/2		
14.	DMC-3/3		
15.	CBNT-1		
16.	De-orbitsail		
17.	LAPAN-A2	Indonesia	550,000
18.	NLS-14	Canada	420,000
19.	LEMUR	USA	540,000
20.	LEMUR		
21.	LEMUR		
22.	LEMUR		
23.	TeLEOS-1	Singapore	26,000,000
24.	VELOX-C1		
25.	KentRidge-1		
26.	VELOX-II		
27.	Athenoxat-1		
28.	Galassia		

ANNEXURE-2

EXISTING SATELLITES IN USE ALONG WITH THEIR REMAINING LIVES				
SN	**Satellite**	**Launch Date**	**Designed Life (No. of Years)**	**Remaining Life (Approx.)**
1.	INSAT-3C	24-01-2002	12	- Working 2 years beyond Designed Life
2.	KALPANA-1	12-09-2002	7	- Working 6 years beyond Designed Life
3.	INSAT-3A	10-04-2003	12	- Working 10 months beyond Designed Life
4.	CARTOSAT-1	05-05-2005	5	- Working 5 years beyond Designed Life
5.	INSAT-4A	22-12-2005	12	- Expected life 2 more Years
6.	CARTOSAT-2	10-01-2007	5	- Working 4 years beyond Designed Life
7.	INSAT-4B	12-03-2007	12	- Expected life 3 more Years
8.	INSAT-4CR	02-09-2007	12	- Expected life 3 ½ more Years
9.	CARTOSAT-2A	28-04-2008	5	- Working 2 ½ years beyond Designed Life
10.	RISAT-2	20-04-2009	5	- Working 1 ½ years beyond Designed Life
11.	OCEANSAT-2	23-09-2009	5	- OCM is working 1 ½ year beyond Designed Life
12.	CARTOSAT-2B	12-07-2010	5	- Working 7 Months beyond Designed Life
13.	RESOURCESAT-2	20-04-2011	5	- Expected life 2 more Months - likely to continue beyond designed life
14.	GSAT-8	21-05-2011	12	- Expected life 7 more Years
15.	GSAT-12	15-07-2011	8	- Expected life 3 more Years
16.	Megha Tropiques	12-10-2011	5	- Expected life 8 more Months - MADRAS payload is not working - Other payloads likely to continue beyond designed life
17.	RISAT-1	26-04-2012	5	- Expected life 1 more Year
18.	GSAT-10	29-09-2012	15	- Expected life 11 ½ moreYears
19.	SARAL	25-02-2013	5	- Expected life 2 more Years
20.	IRNSS-1A	01-07-2013	10	- Expected life 7 ½ more years

21.	INSAT-3D	26-07-2013	7	- Expected life 4 ½ more Years
22.	GSAT-7	30-08-2013	7	- Expected life 4 ½ more Years
23.	Mars Orbiter Mission	05-11-2013	6 months in Martian orbit	- Working 11 Months beyond Designed Life
24.	GSAT-14	05-01-2014	12	- Expected life 10 more Years
25.	IRNSS-1B	04-04-2014	10	- Expected life 8 more Years
26.	IRNSS-1C	16-10-2014	10	- Expected life 8 ½ more Years
27.	GSAT-16	07-12-2014	12	- Expected life 11 more Years
28.	IRNSS-1D	28-03-2015	10	- Expected life 9 more Years
29.	GSAT-6	27-08-2015	9	- Expected life 8 ½ more Years
30.	ASTROSAT	28-09-2015	5	- Expected life 4 ½ more Years
31.	GSAT-15	11-11-2015	12	- Expected life 11 ½ moreYears
32.	IRNSS-1E	20-01-2016	10	- Expected life 10 more Years

Annexure-3

SATELLITE-WISE BENEFITS RECEIVED ALONG WITH BENEFICIARIES			
SN	**Satellite**	**A Few Benefits Received**	**A Few Benefeciaries**
1.	KALPANA-1	Enabling weather forecasting and Cyclone tracking using satellite data / derived prodcuts	Operationally used by India Meteorology Department & National Centre for Medium Range Weather Forecasting, Ministry of Earth Sciences, New & Renewable Energy
2.	INSAT-3D		
3.	INSAT-3A	Enabling weather forecasting by satellite derived data / products and Cyclone tracking Telecommunication,TV uplink, Digital Satellite News Gathering (DSNG), Very Small Aperture Terminal (VSAT) services	Operationally used by India Meteorology Department & National Centre for Medium Range Weather Forecasting, Ministry of Earth Sciences Bharat Sanchar Nigam Ltd., Doordarshan, All India Radio, Television & VSAT service providers
4.	CARTOSAT-1	Cartographic mapping, Stereo data for Topographic Mapping & DEM, Urban Planning, Infrastructure development, , disaster management and host of DEM Applications – Contour, Drainage network, etc.	Survey of India, National Informatics Centre, Ministry of Urban Development, Rural Development, Panchayati Raj, Water Resources, Home Affairs
5.	CARTOSAT-2	Cartography and Large scale mapping, Urban planning and infrastructure development, disaster management support	Ministry of Urban Development, Rural Development, Panchayati Raj, Water Resources, Home Affairs, Science & Technology
6.	CARTOSAT-2A	Large scale mapping, feature detection and Disaster Management Support	Ministry of Home Affairs and Strategic Users
7.	CARTOSAT-2B		
8.	RISAT-2	All weather microwave data for topograpahic mapping and planning activities, disaster management support	Ministry of Home Affairs and Strategic Users
9.	OCEANSAT-2	Oceanographic applications like Potential Fishing zone forecast, total suspended matter, characterization of colored dissolved organic matter and aerosol optical depth Till March 2014, wind vector data from scatterometer used for Ocean state forecast, weather forecasting, cyclone detection and tracking services	Operationally used by Indian National Centre for Ocean Information Services, India Meteorology Department, National Centre for Medium Range Weather Forecasting, National Institute of Ocean Technology, National Institute of Oceanography, National Centre for Antarctic & Ocean Research

10.	RESOURCESAT-2	Natural Resources Inventory & Monitoring, Crop production forecast, Forest cover mapping, wasteland inventory, Land &Water Resources development, Ground water prospects, Infrastructure planning, and Disaster Management Support. Data Support for natural disaster occuring globally through International Charters	Ministry of Agriculture, Environment & Forest, Urban Development, Rural Development, Drinking Water &Sanitation, Water Resources, Mines, Culture, Tribal Affairs, Home Affairs.
11.	RISAT-1	All weather microwave data for Crop acreage and production estimate studies, drought monitoring, Spatial information support during Flood/ cyclone. Data Support for natural disaster occuring globally through International Charters	Ministry of Agriculture, Water Resources, Home Affairs
12.	Megha Tropiques	Temperature and Humidity profiles as well as solar insolation for weather forecast.	India Meteorology Department, National Centre for Medium Range Weather Forecasting and Academia & International Users
13.	SARAL	Oceanographic applications like ocean state forecast, inland river water monitoring, climate scale sea level variation, Significant Wave Height estimation, Geoid Computation and polar ice studies	Ministry of Earth Science, Environment & Forest, Shipping, Indian Navy
14.	INSAT-3C	Telecommunication,TV uplink, DSNG, VSAT services	Bharat Sanchar Nigam Ltd., Doordarshan, All India Radio, Strategic users, Television operators and VSAT service providers
15.	INSAT-4A	TV uplink, DSNG, Direct-To-Home (DTH) services	DTH operators, Television operators, Strategic users.
16.	INSAT-4B	TV uplink, DSNG, DTH services, VSAT services	Doordarshan, Television operators, Strategic users.
17.	INSAT-4CR	VSAT services, DSNG, Tele-education services	VSAT operators, Strategic & Government users, students
18.	GSAT-8	VSAT services, DSNG, Tele-education services, safety of life applications/ enroute navigation for civil aviation	VSAT operators, Strategic & Government users, Students, Directorate General of Civil Aviation

19.	GSAT-12	VSAT services, Tele-education & Tele-medicine services	VSAT operators, Strategic & Government users, Students
20.	GSAT-10	VSAT services, TV uplink, DSNG, DTH services, safety of life applications/ enroute navigation for civil aviation	VSAT operators, DTH operators, Television operators and Strategic users, Directorate General of Civil Aviation
21.	GSAT-14	VSAT services	VSAT operators
22.	GSAT-7	Telecommunication services	Strategic users
23.	GSAT-16	Telecommunication,,DSNG, VSAT services	BSNL, Strategic users, Television operators and VSAT service providers
24.	GSAT-6	Mobile Satelite Services	Strategic and Governemnt users
25.	GSAT-15	DTH services, safety of life applications/ enroute navigation for civil aviation	Doordarshan, Directorate General of Civil Aviation
26.	IRNSS-1A	Position, navigation & timing services, location based services, tracking services	All Govt. / private users needing location based services
27.	IRNSS-1B		
28.	IRNSS-1C		
29.	IRNSS-1D		
30.	IRNSS-1E		
31.	Mars Orbiter Mission (MOM)	Mars Orbit Insertion and orbiting space craft around Mars Orbiter Came out of solar conjunction using onboard autonomy Imaging of Martian surface and science data for scientific study of Martian surface & atmosphere	Scientific Community in the field of planetary sciences
32.	ASTROSAT	Study the stars and galaxies in ultraviolet, optical and X-ray wavelength bands to enhance understanding of the universe.	Astronomy Community, academia and institutions involved in the field of astronomy

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 923

TO BE ANSWERED ON THURSDAY, MARCH 3, 2016

ENCOURAGEMENT OF YOUNG MINDS TO STUDY SPACE

923. SHRI TARUN VIJAY:

Will the PRIME MINISTER be pleased to state:

(a) Government's plan for encouraging young minds to study space science; and

(b) whether there are any plans to establish an exclusive university for space sciences, if so, the details thereof, if not, the reason and whether this could be considered in future?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Department of Space (DOS) has taken the following measures for encouraging young minds towards space science research:

i) ISRO Space Science Promotion Scheme (ISRO-SSPS) is an initiative intended towards supporting and strengthening of research in space science in universities. The scheme, initiated during 2008-09 period, includes - M.Sc / M.Tech fellowships to meritorious students, one time grant for laboratory augmentation and support for visiting scientists / guest faculties.

ii) ISRO's Sponsored Research (RESPOND) Programme is intended for encouraging academia, Junior Research Fellows, young researchers to participate & contribute in various space programme related research activities in Indian universities and institutes.

iii) The space science and planetary missions, viz. Chandrayaan-1, Mars Orbiter Mission, ASTROSAT, undertaken by ISRO renew the interest of young minds towards space science.

iv) Department of Space regularly organises workshops, exhibitions and outreach programmes to create excitement amongst students in space science and technology.

(b) Department of Space has established Indian Institute of Space Science and Technology (IIST), Deemed University at Thiruvananthapuram, to provide specialised education in the areas of space technology. The institute is the first of its kind in the country to offer high quality education at the undergraduate, graduate, doctoral and post-doctoral levels in the areas related to space science & technology and its applications.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1562

TO BE ANSWERED ON THURSDAY, MARCH 10, 2016

IMPROVING NATIONAL SPACE PROGRAMME

1562. SHRI PAUL MANOJ PANDIAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the year 2016 is all set to see the national space programme slowly shift gears towards large satellites, a heavy lift launcher and improved earth observation capabilities, if so, the details thereof; and

(b) whether the space agency would complete on priority the Seven-Satellite Regional Navigational Loop, in the first three months?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) In the year 2016, Indian Space Research Organisation (ISRO) plans to realise (i) the constellation of Indian Regional Navigation Satellite System, (ii) two earth observation satellites with improved capabilities viz. Cartosat-2C & Resourcesat-2A, (iii) an advanced communication satellite GSAT-18, (iv) two weather satellites namely INSAT-3DR for meteorological observations and SCATSAT-1 for wind vector measurements and (v) development of heavy lift launcher GSLV Mk III to build indigenous capability in launching 4-tonne class satellites.

(b) Out of the 7 navigation satellites required in the Indian Regional Navigation Satellite System (IRNSS) constellation, five navigation satellites (IRNSS-1A,1B, 1C, 1D & 1E) have already been operationalised in the orbit. The sixth satellite 'IRNSS-1F' is scheduled for launch on March 10, 2016. The seventh satellite 'IRNSS-1G' is likely to be launched by April 2016.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1563

TO BE ANSWERED ON THURSDAY, MARCH 10, 2016

ISRO DEVELOPING STATION IN VIETNAM

1563. SHRI AMAR SHANKAR SABLE:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) is developing a station in Vietnam;

(b) whether India would allow other nations to access pictures from our satellites;

(c) if so, the safeguards that are being put in place to ensure that Indian data is not accessed by other nations; and

(d) if not, the reasons therefor and consequences thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) As part of Space Cooperation between India and Association of South East Asian Nations (ASEAN), Indian Space Research Organisation (ISRO), at the behest of Government of India, is working towards the establishment of a Satellite Tracking & Data Reception Station and Data Processing Facility in Vietnam for ASEAN Member countries. This facility is intended to acquire and process Indian Remote Sensing Satellite data pertaining to ASEAN region and disseminate to ASEAN Member countries.

(b) Yes Sir. Under this initiative, all ASEAN member countries will be allowed to access processed remote sensing data pertaining to their country.

(c) Ground facility is designed in such a way that it will not allow Indian data to be accessed and processed by the system.

(d) Does not arise.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1564

TO BE ANSWERED ON THURSDAY, MARCH 10, 2016

SATELLITES OF OTHER COUNTRIES LAUNCHED BY ISRO

1564. SHRI AMBETH RAJAN:

Will the PRIME MINISTER be pleased to state:

(a) the details of the satellites of other countries which were launched by Indian Space Research Organisation (ISRO) during last three years;

(b) the details of the revenue earned through these launches; and

(c) the details of the revenue earmarked from this revenue earning for Cryogenic Rocket Development Programmes?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) During the last three years starting from January 2013 until December 2015, a total of 28 International customer satellites belonging to 9 countries were launched viz. Austria (2), Canada (5), Denmark (1), France (1), Germany (1), Indonesia (1), Singapore (7), UK (6), USA (4). These satellites were launched onboard India's Polar Satellite Launch Vehicle (PSLV) under the commercial arrangement entered into between Antrix Corporation Limited (Antrix), the commercial arm of ISRO and the international customer. The details of the satellites are enclosed in **Annexure-1**.

(b) Antrix has earned revenue of 80.6 Million Euros through launching of these 28 international customer satellites.

(c) The Cryogenic Rocket Development Programme is funded by the Government.

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Annexure-1

FOREIGN SATELLITES LAUNCHED DURING LAST THREE YEARS			
S. N.	**Satellite Name**	**Country**	**Date of Launch**
1.	SAPPHIRE	Canada	25-02-2013
2.	NEOSSAT		
3.	NLS-8.1	Austria	25-02-2013
4.	NLS-8.2		
5.	NLS-8.3	Denmark	25-02-2013
6.	STRAND-1	United Kingdom	25-02-2013
7.	SPOT-7	France	30-06-2014
8.	AISAT	Germany	30-06-2014
9.	NLS 7.1	Canada	30-06-2014
10.	NLS 7.2		
11.	VELOX-1	Singapore	30-06-2014
12.	DMC-3/1	United Kingdom	10-07-2015
13.	DMC-3/2		
14.	DMC-3/3		
15.	Carbonite-1		
16.	De-orbitsail		
17.	LAPAN-A2	Indonesia	28-09-2015
18.	NLS-14	Canada	28-09-2015
19.	LEMUR-1	USA	28-09-2015
20.	LEMUR-2		
21.	LEMUR-3		
22.	LEMUR-4		
23.	TeLEOS-1	Singapore	16-12-2015
24.	VELOX-C1		
25.	KentRidge-1		
26.	VELOX-II		
27.	Athenoxat-1		
28.	Galassia		

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1565

TO BE ANSWERED ON THURSDAY, MARCH 10, 2016

LAUNCHING OF SATELLITES OF FOREIGN CLIENTS

1565. DR. K.P. RAMALINGAM:

Will the PRIME MINISTER be pleased to state:

(a) whether foreign clients are vying to launch their satellites abroad the Polar Satellite Launch Vehicle, if so, the details thereof; and

(b) whether Indian Space Research Organisation (ISRO) has successfully placed six Singapore satellite in orbit *i.e.* PSLV C-29 mission, if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Yes Sir. Polar Satellite Launch Vehicle (PSLV) with its string of successful flights has emerged as one of the most reliable launch vehicles in the world. Till date, 57 foreign satellites from 21 countries have been successfully launched onboard PSLV, under the commercial arrangement between Antrix Corporation Limited (Antrix) and the foreign clients.

In addition, Antrix has in-hand, signed agreements with foreign clients from seven countries for launching 25 international satellites viz. Algeria (3), Canada (3), Germany (4), Indonesia (1), Japan (1), Malaysia (1) and USA (12), on-board PSLV, during 2016-2017 time period.

(b) Yes Sir. On 16th December 2015, six satellites from Singapore were successfully launched on-board PSLV-C29 from Satish Dhawan Space Centre, Sriharikota. In this dedicated commercial mission, in addition to TeLEOS-1 (earth observation satellite weighing 401 kg), which was the primary satellite built by ST Electronics, there were 5 co-passenger satellites belonging to universities in Singapore viz. Velox-C1 weighing 123 kg, KentRidge-1 weighing 78 kg, Velox-II weighing 15 kg, Athenoxat-1 weighing 7 kg and Galassia weighing 4 kg.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

115

RAJYA SABHA
UNSTARRED QUESTION NO. 596

TO BE ANSWERED ON THURSDAY, APRIL 28, 2016

PREPARATION OF SPACE POLICY

596. SHRI A.U. SINGH DEO:

Will the PRIME MINISTER be pleased to state:

(a) whether a space policy has been prepared, if so, the details thereof and timeline for the same, if not, the reasons therefor;

(b) whether India has put forth its agenda in the discussion to create international norms and rules for space activities, if so, the details thereof and if not, reasons therefor;

(c) whether Foreign Direct Investment (FDI) in outer space would be allowed, if so, the details thereof and if not, reasons therefor; and

(d) whether a tri-service aerospace command is expected to be developed and introduced to increase coordination among military and civilian departments, if so, the details thereof and time line for the same, if not reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) The Department of Space has policy guidelines approved by the Cabinet in terms of Remote Sensing Data Policy-2011 (RSDP-2011) and Satellite Communication Policy-1997 (SATCOM Policy-1997). RSDP-2011 contains modalities for managing and/or permitting the acquisition/dissemination of remote sensing data in support of developmental activities. SATCOM Policy-1997 was followed by a detailed norms and guidelines to address use of INSAT/GSAT system by private users, for managing INSAT/GSAT system, establishing Indian Satellite System by private entities.

Also, the Department of Space is currently engaged in preparation of National Space Act for India for supporting the overall growth of space activities, with enhanced level of private sector participation and offering more commercial opportunities. After consultations with internal experts and experts on space law, a draft version has been prepared. Currently, approval process for pre-legislative consultations on the draft space act is being pursued.

(b) No Sir. However, ISRO has been engaged in a few multilateral negotiation processes under various international and UN forums, in order to protect the interests of the nation in its pursuance of space activities. These multilateral negotiation processes include International Code of Conduct for Outer space activities (led by European Union), formulation of a set of guidelines for Long Term Sustainability of Outer Space Activities discussed under United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).

(c) No Sir. Outer space research activities are carried out on cooperation basis with the space agencies of other countries.

(d) Department of Space is mandated for harnessing the benefits of space technology for national development.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 597

TO BE ANSWERED ON THURSDAY, APRIL 28, 2016

POLICY FOR SPACE TOURISM

597. PROF.M.V.RAJEEV GOWDA:

Will the PRIME MINISTER be pleased to state:

(a) whether there is a policy for space tourism in India if so, the details thereof; and

(b) if not, whether the Ministry is planning to promote space tourism in India and if so, the steps taken in this regard?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) No Sir.

(b) No Sir.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 598

TO BE ANSWERED ON THURSDAY, APRIL 28, 2016

PREPARATION OF SPACE ACT

598. DR. K. P. RAMALINGAM:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that Government is considering to come out with a Space Act soon;

(b) whether Indian Space Research Organisation (ISRO) had submitted papers to Government in this regard way back in 2015;

(c) whether now-a-days space related activities are done as per business rules and therefore, it has become necessary to have a law since Government is responsible for any object put up in space and for what happens to it in orbit or because of it; and

(d) if so, the views of Government in this regard?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) The Department of Space (DOS) is currently engaged in preparation of National Space Act for India for supporting the overall growth of space activities, with enhanced level of private sector participation and offering more commercial opportunities. After consultations with internal experts and experts on space law, a draft version of the Act has been prepared, which has been taken up for consultations.

(b) During the year 2015, DOS/ISRO has pursued the preparation of space act and reached a draft version. This has been taken up for approval process for pre-legislative consultations. This would be followed by Inter-Ministerial consultations through Draft Cabinet Note, before putting up as a Bill to Parliament.

(c)&(d) Currently the space related activities in India are performed by the Department of Space as per the Allocation of Business Rules. India has been a State Party to major Treaties / Conventions on outer space activities under United Nations and complies with the obligations of these treaties in performing outer space activities. Further, the current process of formulation of National Space Act would address these aspects, including the obligations arising out of non-governmental stakeholders in space activities and services.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 599

TO BE ANSWERED ON THURSDAY, APRIL 28, 2016

LAUNCHING OF SATELLITE BY ISRO

599. SHRI T. RATHINAVEL:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) would launch 22 satellites on one rocket, if so, the details thereof

(b) whether as many as 18 satellites are being launched for foreign agencies, including those from US, Canada, Germany and Indonesia; and

(c) whether two of the nano-satellites have been developed by the Pune Engineering College and Sathyabhama University, if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a)&(b) Yes Sir. Indian Space Research Organisation (ISRO) plans to launch 22 satellites onboard Polar Satellite Launch Vehicle, PSLV-C34. These satellites include a earth observation satellite of India (weighing about 710 kg) as primary payload, two nano satellites developed by Indian students (weighing about 2.5 kg) and 19 satellites from four foreign countries viz. Canada (2 Nos., weighing 115 kg), Germany (3 Nos., weighing 155 kg), Indonesia (1 No., weighing 120 kg) & USA (13 Nos., weighing 195 kg) as co-passengers.

(c) Yes Sir. Swayam and Satyabamasat are the two nano-satellites developed by College of Engineering, Pune and Sathyabama University, Chennai respectively. Swayam satellite has a payload mass of 1 kg and Satyabamasat has a payload mass of 1.5 kg.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1411

TO BE ANSWERED ON THURSDAY, MAY 5, 2016

DOUBLING OF SATELLITE LAUNCHES

1411. DR. T. SUBBARAMI REDDY:

SHRIMATI AMBIKA SONI:

Will the PRIME MINISTER be pleased to state:

(a) whether Indian Space Research Organisation (ISRO) has proposed to double its satellite launches in space in the coming years, if so, the details thereof;

(b) whether private industries would be involved in the space projects to augment capacity-building, the details thereof;

(c) the areas to be covered by private industries in terms of investment, co-development and co-innovation, the details thereof; and

(d) whether ISRO is seeking collaboration with other institutes in foreign countries, as part of Make in India campaign, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Considering the enhanced national requirements for launching satellites for earth observation, communication & navigation, the present capacity of launches is constrained. Therefore, an increase in the satellite launching frequency is needed in the coming years.

(b)&(c) ISRO has been pursuing a conscious approach of building up and nurturing the industrial capabilities in the country to maximally support the Indian Space

Programme. Until now, the Indian industries have been realizing several sub-systems including motor cases, structures, propellant tanks, liquid engines, control components and electronic packages. However, ISRO plays the lead role in carrying out the mission design, assembly & testing, quality assurance, integration and launch. In order to achieve substantial increase in the launch frequency, ISRO is in the process of exploring the possibility of involving Indian industry towards stepping up the launch capacity within the country.

(d) No Sir.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1412

TO BE ANSWERED ON THURSDAY, MAY 5, 2016

SATELLITES UNDER OPERATION IN COUNTRY

1412. SHRI AAYANUR MANJUNATHA:

Will the PRIME MINISTER be pleased to state:

(a) the details of satellites which are under operation in the country;

(b) whether Government is seeking foreign assistance/collaboration for satellite operations and if so, the expenditure incurred for use of foreign satellites each year;

(c) the extent to which indigenous satellites like K-Band satellites are being used; and

(d) the action plan of Government to develop indigenous satellites in the country?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Currently, 34 satellites are operational in the country comprising of: -

(i) 13 Communication Satellites namely, INSAT-3A, INSAT-3C, INSAT-4A, INSAT-4B, INSAT-4CR, GSAT-6, GSAT-7, GSAT-8, GSAT-10, GSAT-12, GSAT-14, GSAT-15 and GSAT-16.

(ii) 12 Earth Observation Satellites namely, Resourcesat-2, RISAT-1, RISAT-2, Cartosat-1, Cartosat-2, Cartosat-2A, Cartosat-2B, Oceansat-2, SARAL, Kalpana-1, Megha-Tropiques and INSAT-3D.

(iii) 7 Navigational Satellites namely, IRNSS-1A, 1B, 1C, 1D, 1E, 1F & 1G.

(iv) 2 Space science Satellites namely Mars Orbiter Mission & Astrosat.

(b) No Sir. Government is not seeking any foreign assistance/collaboration for satellite operations.

(c) About 30 service providers are utilising Ku-band (a part of K band) transponders onboard indigenous communication satellites for various communication applications, which include Direct-To-Home Television, Digital Satellite News Gathering, telecommunication, VSAT services for banking, tele-education, business communication.

(d) ISRO has an action plan in place for developing indigenous satellites, with the participation of Indian industries, for earth observation, communication, navigation and space science and planetary exploration.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2207

TO BE ANSWERED ON THURSDAY, MAY 12, 2016

INDUSTRY PARTICIPATION IN ISRO PROGRAMMES

2207. SHRI T. RATHINAVEL:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that the ISRO is considering industry participation in its programmes; if so, the details thereof; and

(b) whether it is also a fact that there are opportunities for Indian industry to participate in these satellite launching or put up activities; if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a)&(b) ISRO has been pursuing a conscious approach of building up and nurturing the industrial capabilities in the country to maximally support the Indian Space Programme. Until now, the Indian industries have been realising several sub-systems including motor cases, structures, propellant tanks, liquid engines, control components and electronic packages, while ISRO plays the lead role in carrying out the mission design, assembly & testing, quality assurance, integration and launch. ISRO is in the process of exploring the possibility of involving Indian industry in a greater role to meet the increased national requirements and possible commercial demand for launch services.

Towards this, discussions are being held with the Indian industry towards formulating a plan & strategy to enhance the capacity and capability of managing the Polar Satellite Launch Vehicle (PSLV) programme on an end to end basis.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2208

TO BE ANSWERED ON THURSDAY, MAY 12, 2016

PROGRAMMES UNDER NNRMs

2208. SHRI TIRUCHI SIVA :

Will the PRIME MINISTER be pleased to state:

(a) what is the present status of the Ministry's programme under the National Natural Resources Management System (NNRMS);

(b) the list of the Village Resource Centres (VRCs) that have been set up thus far, state-wise; and

(c) the details regarding the programmes that have been conducted by these VRCs situated in Tamil Nadu?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE
(DR. JITENDRA SINGH):

(a) Department of Space as a nodal agency for implementation of National Natural Resources Management System (NNRMS) interacts with various Ministries/ Departments through nine theme-oriented Standing Committees for operational use of space technology.

Presently under NNRMS programme, Department of Space is carrying out various national level application projects, which include - (i) Natural Resources Census encompassing periodic mapping of land use/ land cover, land degradation, Geomorphology & Lineament; (ii) Space based Information Support for De-centralised Planning (SIS-DP) at Panchayat level; (iii) Forest Cover Change Alert System; (iv) Creation of GCP Library; (v) Multi-tier/ Multi-theme capacity building programme for Ministries/Departments. In addition, under the umbrella of NNRMS, various

127 ISRO/DOS Centres are executing different application projects sponsored by various Ministries/ Departments.

(b) To demonstrate the potential of satellite technology, Indian Space Research Organisation (ISRO) had set up 456 Village Resource Centres (VRCs), on a pilot basis, in various States/ Union Territories as given below:

Andhra Pradesh (3); Assam (13); Bihar (19); Delhi (2); Gujarat (10); Jharkhand (26); Himachal Pradesh (30); Karnataka (58); Kerala (21); Madhya Pradesh (24); Maharashtra (18); Meghalaya (1); Nagaland (8); Orissa (44); Puducherry (9); Rajasthan (21); Sikkim (19); Tamil Nadu (54); Telangana (14); Uttarakhand (18); Uttar Pradesh (30); West Bengal (10) and Andaman & Nicobar Islands (4).

(c) The Village Resource Centres situated in Tamil Nadu were used to provide several space technology enabled services viz. skill development, advisories on agriculture, animal husbandry, computer learning, vocational training, etc.

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