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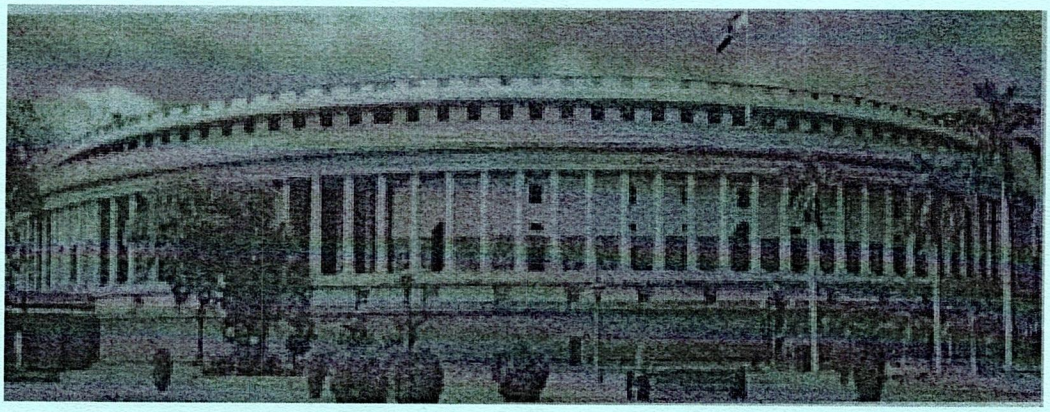
GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

"SPACE IN PARLIAMENT"



WINTER SESSION OF PARLIAMENT 2017
(DECEMBER 2017 - JANUARY 2018)

COMPILATION OF REPLIES GIVEN IN PARLIAMENT DURING 2017

Government of India
Department of Space
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PARLIAMENT QUESTIONS – WINTER SESSION OF PARLIAMENT 2017

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.708

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2017

SOLAR MISSION

708. DR. A. SAMPATH:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) is set to launch its first solar mission;

(b) if so, the details thereof;

(c) whether the mission is a joint venture;

(d) if so, the details thereof along with the list of institutions participating in the mission; and

(e) the details of objectives of the mission?

ANSWER

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

(a) Yes Sir. The Indian Space Research Organisation (ISRO) is planning to launch the first solar mission, Aditya-L1.

(b) Aditya-L1 mission is aimed at studying the Sun from an orbit around the Sun-Earth Lagrangian point 1 (L1) which is about 1.5 million kilometres from the Earth. It carries seven payloads

to observe the photosphere, chromosphere and the outermost layers of the Sun, the corona in different wavebands.

(c) Aditya-L1 is a fully indigenous effort with the participation of national institutions.

(d) Indian Institute of Astrophysics (IIA), Bengaluru is the lead institute for the development of Visible Emission Line Coronagraph (VELC) and Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune is developing the Solar Ultraviolet Imager (SUIT) payload for Aditya-L1 mission.

(e) Aditya-L1 can provide observations on the corona and in addition can provide observations on the solar Chromosphere using the UV payload and on the flares using the X-ray payloads. The particle detectors and the magnetometer payload can provide information on charged particles and the magnetic field reaching the halo orbit around L1.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.738

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2017

INDIGENOUS GPS

738. SHRI HARIOM SINGH RATHORE:

Will the PRIME MINISTER be pleased to state:

(a) whether the work is going on to develop indigenous Global Positioning System (GPS) in the country;

(b) if so, the details thereof;

(c) the manner in which the indigenous GPS will be beneficial;

(d) the number of GPS on which work is going on at private and Government level Separately at present in the country; and

(e) whether the Government is likely to discontinue external GPS after indigenous GPS is fully developed 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) Yes, Madam.

(b) India has deployed its own regional navigational system, namely NavIC comprising of a constellation of seven navigational satellites and associated ground segment for providing position, navigation and timing services to Indian region.

(c) The IRNSS (NavIC) enables providing position, navigation and timing information that could be utilised for a large range of civil and strategic applications and services that include terrestrial, aerial and marine navigation; precise timing; disaster management and alert messages; mapping and Geodetic data capture; vehicle tracking and fleet management; visual & voice navigation for drivers, etc.

(d) Seven satellites of NavIC constellation is currently in orbit, the realization of IRNSS-1I, by DOS/ISRO is under progress using a contract to a consortium of private companies for carrying out assembly, integration and testing of this satellite. The satellite is planned for launch during first quarter of 2018.

(e) NavIC provides signals in a space covering India and its surroundings, this could be utilised by using receivers on ground to determine position and time accurately. Signal in space is provided globally by GPS of USA, GLONASS of Russia, Galileo of Europe and Beiden of China. Current global trend is to make use of ground receivers which utilises as many signals as available for providing timing and position solutions.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.800

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2017

ISRO AND NASA COLLABORATION

800. SHRI B. SENGUTTUVAN:

Will the PRIME MINISTER be pleased to state:

(a) **whether ISRO and NASA are undertaking a joint study of the global ecosystem and climate change and if so, the details thereof;**

(b) **whether ISRO and NASA have any proposal to jointly undertake the development of a synthetic aperture radar satellite to observe and monitor disturbances to the ecosystems, ice-sheet collapses and natural hazards and if so, the details thereof;**

(c) **whether the data gathered from this mission will help build climate resilience with the potential of saving human lives in the event of natural calamities and if so, the details thereof; and**

(d) **whether the Indian Institute of Tropical Meteorology is also working in tandem with National Oceanographic and Atmospheric Administration (NOAA) to develop high resolution seasonal and longterm climate forecasts 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) Yes Madam. ISRO and Jet Propulsion Laboratory (JPL)/ NASA are jointly working on the development of Dual Frequency (L&S band) Synthetic Aperture Radar Imaging Satellite named as NASA-ISRO Synthetic Aperture Radar (NISAR). The L-band SAR is being developed by JPL/NASA, while ISRO is developing S-band SAR. The L & S band microwave data obtained from this satellite will be useful for variety of application, which include natural resources mapping & monitoring; estimating agricultural biomass over full duration of crop cycle; assessing soil moisture; monitoring of floods and oil slicks; coastal erosion, coastline changes & variation of winds in coastal waters; assessment of mangroves; surface deformation studies, ice sheet collapses & dynamics etc.

(c) The data obtained from NISAR mission is not meant for building climate resilience. However, the data acquired from this mission will be useful in developing certain applications, which include - (i) identifying crevasses in the glaciers hidden by fresh snow, where human movement takes place, (ii) identifying the snowpack parameters as an input in Avalanche forecasts, (iii) studying Glacial Lake Outburst Floods (GLOF) hazards,

(iv) identifying inundated area due to floods/ cyclones. These applications could help in taking measures to minimise loss of human lives.

(d) Yes Madam. As per the information received, Indian Institute of Tropical Meteorology (IITM) under Ministry of Earth Sciences (MoES) has been working in tandem with National Oceanographic and Atmospheric Administration (NOAA, USA) for development of high resolution seasonal and long-term climate forecasts through Monsoon Mission and Centre for Climate Change Research (CCCR) Programmes. During 2010 to 2015, IITM and NOAA together developed high resolution models for seasonal predictions of Indian Summer Monsoon and long term climate forecasts under a Memorandum of Understanding (MoU). This MoU, concerning the study of "Dynamical Short range, Extended Range and seasonal Prediction of Indian Summer Monsoon Rainfall", has been extended till 2020, within the framework of the MoES-NOAA Partnership.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.815

TO BE ANSWERED ON WEDNESDAY, DECEMBER 20, 2017

BUILDING OF PSLV

815. SHRIMATI KOTHAPALLI GEETHA:

Will the PRIME MINISTER be pleased to state:

(a) whether PSLV will be built by domestic industry by 2020 and if so, the details thereof;

(b) whether ISRO proposes to outsource launch vehicle production and if so, the details thereof and the manner in which safety will be ensured;

(c) whether ISRO has opened doors to private sector and if so, the details thereof and the response of the private sector thereto; and

(d) the action plan prepared for safety in case of privatisation?

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. In order to

step up the launch capacity within the country, ISRO is in the process of involving Indian industry in a greater role to meet the increased national requirements and enable commercial launch services in order to enhance the capacity and capability of managing the PSLV programme on an end-to-end basis. This is proposed to be carried out through the formulation of a plan to empower Indian Industry including the quality assurance and safety procedures.

(c) ISRO has been utilising the Indian industry in both the public and private sector for the development of space technology since 1976. In order to ensure the smooth supply chain of hardware, components and sub-systems to the Indian Space Programme, ISRO has been continuously engaged in technology development and hand-holding several industries within the country. This has enabled ISRO to realise the majority of the manufacturing requirements of the ISRO's launch vehicles and satellites through industry. The industry participation has shown continuing growth both in addressing technological complexity and quantum of work.

(d) The relevant process documents and safety documents for carrying out the various activities are in place and are being followed meticulously, which will be utilised along with training, in the event of the industry undertaking these activities.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
STARRED QUESTION NO.135

TO BE ANSWERED ON WEDNESDAY, DECEMBER 27, 2017

ROADMAP FOR SPACE PROGRAMME

*135. **SHRI KAPIL MORESHWAR PATIL:**

Will the PRIME MINISTER be pleased to state:

(a) whether a new roadmap for the space programme is being prepared by the Government which will provide long term vision besides fulfilling short term needs of the country;

(b) if so, the details thereof;

(c) whether a concrete action plan in this regard will come up only in the next six months since the Indian Space Research Organisation (ISRO) has been entrusted with several tasks for the next two or three years; 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) 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.135 REGARDING "ROADMAP FOR SPACE PROGRAMME" ASKED BY SHRI KAPIL MORESHWAR PATIL FOR ANSWER ON WEDNESDAY, DECEMBER 27, 2017.

(a) **Yes, Madam.**

(b) **Department of Space has a roadmap for the Country's space programme addressing the short-term and long-term needs in the areas of Space Transportation Systems, Space Infrastructure, Space Applications and Capacity Building.**

(c) & (d)

Yes, Madam. As desired by NITI Aayog, ISRO has evolved a 3 year action plan, 7 year strategy and 15 year long-term vision for Space Programme.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1381

TO BE ANSWERED ON WEDNESDAY, DECEMBER 27, 2017

DEVELOPMENT OF SPACE SCIENCE

1381. SHRI TEJ PRATAP SINGH YADAV:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has developed any new innovative technology, products and services for the development of space science, research and technology;

(b) if so, the details of the innovative projects undertaken in the last three years, year-wise;

(c) whether the Government has drawn-up a long-term plan 'Space Vision 2025' for Space Research Programmes and if so, the details thereof;

(d) whether there is need for bilateral cooperation with foreign countries/institutes in the field of space science and research and if so, the details thereof; and

(e) the steps taken by the Government to improve research and development in space technology?

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) Year wise details of innovative projects undertaken in the last three years are as below:

2014-15 Mars Orbiter Mission (MOM): Launched on September 24, 2014, has made ISRO, the fourth Space agency in the world to reach Mars orbit. Initially designed for six months is still continuing and sending important data for scientific studies.

2015-16 AstroSat: Launched on September 28, 2015, is a unique satellite providing common platform for simultaneous multi-wavelength observations of celestial sources. It has completed more than two years and performing.

2016-17 RLV-TD: It was successfully flight tested on May 23, 2016. It is the most technologically challenging endeavors of ISRO towards developing essential technologies for a fully reusable launch vehicle to enable low cost access to space.

2016-17 ScramJet: The first experimental mission of ISRO's Scramjet engine towards the realisation of an Air Breathing Propulsion System was successfully conducted on August 28, 2016. Future Reusable launch vehicle together with Air Breathing propulsion system will bring down the cost of access to space far low.

(c) Yes Madam, ISRO has worked out a 3 year action plan, 7 year strategy and 15 year long term vision for Space Programme, under four vertical, namely, (i) Space transportation system,

(ii) Space infrastructure, (iii) Space applications, (iv) Capacity building.

(d) Yes Madam, International cooperation is a part of India's space programme since its inception. In the past, ISRO has developed Meghatropiques and SARAL satellites in cooperation with French space agency CNES. Currently ISRO and NASA are working jointly on NISAR (NASA ISRO Synthetic Aperture Radar) project. Bilateral cooperation with foreign countries/institutions in the field of space science and research helps in analysis of data, identification of key areas for future missions and utilisation of space and ground based resources.

(e) Indian Space Research Organisation (ISRO) has taken several measures to promote scientific research by the Indian scientists especially the youth, which include:

a. ISRO Space Science Promotion Scheme (ISRO-SSPS) intended towards supporting and strengthening of research in space science in universities.
b. ISRO's Sponsored Research (RESPOND) Programme involves academic institutions for joint research to meet specific requirements in area of space technology, space science and space applications.
c. Indian Institute of Space Science and Technology (IIST), Physical Research Laboratory (PRL) and National Atmospheric Research laboratory (NARL) established

under Department of Space encourages young researchers to undertake research in space science and technology.

d. Space Technology Cell was set up by ISRO at premiere institutions like IIT Bombay, IIT Kanpur, IIT Kharagpur, IIT Madras, IISc Bangalore and University of Pune to carry out research activities in the areas of space technology and applications.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1432

TO BE ANSWERED ON WEDNESDAY, DECEMBER 27, 2017

LAUNCH OF IRNSS-1H

1432. ADV. JOICE GEORGE:

Will the PRIME MINISTER be pleased to state:

(a) whether the launch of ISRO's eight navigation satellite IRNSS-1H on board of PSLV-C39 recently was unsuccessful;

(b) if so, the details thereof and the reasons therefor;

(c) whether ISRO has been facing numerous such failures in recent years; and0

(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) Yes, Madam. The launch of the IRNSS-1H navigation satellite by the Polar Satellite Launch Vehicle on August 31, 2017 (PSLV-C39/IRNSS-1H Mission) was unsuccessful.

(b) The cause of the failure was understood after analysing the various flight and ground test data in more detail. The cause for the malfunctioning was the non-initiation of detonation in the vertical jettisoning system.

Towards enhancing the robustness of the jettisoning system, changes have been incorporated in the vertical jettisoning system of the Payload Fairing, and has been validated through extensive simulations including the full scale Payload Fairing separation test.

(c) & (d)

No, Madam. In the last seven years there were 29 successful launches. The previous launch failure was in December 2010, when the Geosynchronous Satellite Launch Vehicle (GSLV-F06) failed to place the GSAT-5P communication satellite in orbit. Since January 2011, 23 PSLV, 4 GSLV and 2 GSLV Mk-III has been launched successfully.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1437

TO BE ANSWERED ON WEDNESDAY, DECEMBER 27, 2017

FAILURE IN LAUNCH OF SATELLITE

1437. SHRI DIBYENDU ADHIKARI:

Will the PRIME MINISTER be pleased to state:

(a) **whether recently India's mission to launch satellite has failed;**

(b) **if so, the details thereof and the reasons therefor along with the technical participation with financial involvement therein;**

(c) **whether failure of this mission is a huge loss of technological support to the country; and**

(d) **if so, the details thereof and the reaction of ISRO 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. The forty first flight of India's Polar Satellite Launch Vehicle (PSLV-C39/IRNSS-1H Mission), launched on August 31, 2017 was unsuccessful.**

(b) **The cause of the failure was understood after analysing the various flight and ground test data in more detail. The cause for the malfunctioning was the non-initiation of detonation in the vertical jettisoning system.**

Towards enhancing the robustness of the jettisoning system, changes have been incorporated in the vertical jettisoning system of the Payload Fairing, and has been validated through extensive simulations including the full scale Payload Fairing separation test.

(c) & (d)

No, Madam. The failure of PSLV to launch the IRNSS-1H navigation satellite has not resulted in loss of technological support to the country. The next launch of PSLV (PSLV-C40) carrying 3 national and 28 customers' satellites is scheduled in January 2018.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1439

TO BE ANSWERED ON WEDNESDAY, DECEMBER 27, 2017

TRANSPONDERS OF SATELLITES

1439. SHRI RADHESHYAM BISWAS:

Will the PRIME MINISTER be pleased to state:

(a) the details of transponders available with Indian Satellites as on date;

(b) whether there is a requirement for more transponders and if so, the details thereof;

(c) the number and details of Communication Satellites reaching the end of their service life and the action taken to provide them with sufficient number of transponders to extend their life;

(d) whether sufficient slots are available in the space for positioning Indian 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) On indigenous commercial communication INSAT/GSAT satellites, there are about 289 transponders, in various

frequency bands like C, extended-C, Ku, S etc.; and about 4 Gbps HTS capacity.

(b) As on date, all confirmed demands up to December, 2018 are being fulfilled, except for DTH requirements and three transponders in C and extended-C bands. Requirements for C and extended-C bands are being addressed. DTH requirements are expected to be addressed through upcoming planned satellites over a period of next 2-3 years.

(c) Two satellites are likely to reach end of life in about next 24 months. The replacement satellites are planned to be available in time as replace capacity.

(d) & (e)

In addition to 7 orbital slots that are currently in use, to operate 15 satellites, actions are initiated with International Telecommunication Union (ITU) to acquire additional orbital slots to address future requirements.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1554

TO BE ANSWERED ON WEDNESDAY, DECEMBER 27, 2017

TELEMEDICINE PROGRAMME

1554. SHRIMATI V. SATHYA BAMA:

Will the PRIME MINISTER be pleased to state:

(a) the status of ISRO's telemedicine programme in various States including Tamil Nadu;

(b) the major services provided under the programme;

(c) the amount allocated for the programme and the disbursement thereof, State-wise;

(d) whether safeguards have been put in place to ensure that trained healthcare professionals follow the advice received from remotely located doctors correctly; 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) Satellite based telemedicine project was implemented by ISRO since 2001 and gradually extended to several hospitals across the country over the years. Telemedicine facilities are established in various States and Union Territories including Jammu & Kashmir, Andaman & Nicobar Islands, Lakshadweep Islands, North-Eastern states and in some of the districts of mainland states. Presently, about 130 telemedicine centers are functional.

In Tamil Nadu telemedicine facilities are operational in 8 hospitals. The satellite bandwidth for telemedicine programme is provided on Indian Communication Satellites.

(b) The major services provided under the programme include regular tele-consultations in the area of General Medicine, Cardiology, Radiology, Opthalmology, Neurology, Oncology, Diabetics, Women and Child healthcare, etc. Telemedicine facility is also used for providing Continuing Medical Education to the health professionals in rural/remote hospitals to get their knowledge updated.

(c) ISRO Telemedicine Programme is conceived as National level programme and hence State level allocation are not made. Budget provision for ISRO's Telemedicine programme are met through departmental funds. The budget of ₹ 240 Lakhs is provisioned for 2017-18.

(d) & (e)

As a measure of safeguard, the telemedicine services are provided through well trained doctors at the patient-end hospitals such as rural/district hospitals. During tele-consultation the patient data and the treatment prescription are exchanged electronically using telemedicine software which is based on international standards like Health Level 7 (HL7) and Digital Imaging and Communications in Medicine (DICOM). The patient data and the treatment prescriptions are also stored in telemedicine servers. The doctors and specialists follow the set guidelines of medical practices for providing tele-consultations as they do for in-person consultations.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2629

TO BE ANSWERED ON WEDNESDAY, JANUARY 3, 2018

COMPACT LAUNCHERS FOR SMALL SATELLITES

2629. SHRI J.C. DIVAKAR REDDY:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO is developing a compact launcher for small satellites; 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)

ISRO is working on the design of a Small Satellite Launch Vehicle (SSLV), that is a compact launcher for small satellites.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
STARRED QUESTION NO. 62

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2017

FAILURE OF PSLV C-39 MISSION

*62. DR. T. SUBBARAMI REDDY:

Will the PRIME MINISTER be pleased to state:

(a) whether PSLV-C39 mission carrying replacement navigation satellite IRNSS-1H failed during the launch recently;

(b) if so, whether the cause of failure, was analysed and corrective action planned for further launch of PSLV and if so, the details thereof; and

(c) by when, the PSLV rocket series would be launched and what are the details of the scope of the mission?

ANSWER

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

(DR. JITENDRA SINGH):

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

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STATEMENT LAID ON THE TABLE OF THE RAJYA SABHA IN REPLY TO STARRED QUESTION NO.62 REGARDING "LAUNCH OF PSLV" ASKED BY DR. T. SUBBARAMI REDDY FOR ANSWER ON THURSDAY, DECEMBER 21, 2017.

(a) Yes, sir. The forty first flight of India's Polar Satellite Launch Vehicle (PSLV-C39/IRNSS-1H Mission), launched on August 31, 2017 was unsuccessful. Though the performance of all the four stages of the rocket including the Navigation, Guidance and Control Systems were as per design, the vehicle could not place the satellite in its final designated orbit, due to non-separation of the Payload Fairing (also known as heat shield).

(b) Yes, sir. The cause of the failure was understood after analysing the various flight and ground test data in more detail. The cause for the malfunctioning was the non-initiation of detonation in the vertical jettisoning system.

Towards enhancing the robustness of the jettisoning system, changes have been incorporated in the vertical jettisoning system of the Payload Fairing, and has been validated through extensive simulations including the full scale Payload Fairing separation test.

(c) The next mission of PSLV (PSLV-C40/Cartosat-2 Series), will launch the Cartosat – 2 Series satellite along with 30 co-passenger satellites, and is scheduled in January 2018.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 766

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2017

LAUNCHING OF SATELLITES OF FOREIGN CLIENTS

766. SHRI MAJEED MEMON:

Will the PRIME MINISTER be pleased to state:

(a) whether the foreign clients are vying to launch their satellites abroad the Polar Satellite Launch Vehicle;

(b) If so, the details of satellites launched by India for foreign countries during the last two years and the current year; and

(c) the details of commercial launches of foreign nations negotiated through Antrix and the total revenue earned during the last two years and the current year?

ANSWER

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

(a) Yes Sir.

(b) During the last two years, starting from January 2015 till December 2016, Antrix has successfully launched 39 satellites belonging to foreign clients, and 130 satellites in the current year onboard Polar Satellite Launch Vehicle (PSLV).

(c) These foreign satellites were launched under a commercial arrangement entered into between Antrix Corporation Limited (Antrix), the commercial arm of ISRO and the foreign customer. Antrix has earned a total revenue of approx. 95 Million Euros and 4.5 Million USD in Foreign Exchange through launching of these 169 satellites belonging to foreign clients.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 767

TO BE ANSWERED ON THURSDAY, DECEMBER 21, 2017

DEMAND FOR PRODUCT AND SERVICES FOR OUTER SPACE

767. SHRIMATI WANSUK SYIEM:

Will the PRIME MINISTER be pleased to state:

(a) whether buoyed-up by repeated successful launches during the last five decades ISRO has planned to tap the growing international demand for products and services for outer space;

(b) whether globally, the demand for small rockets is growing and ISRO is keen to capture this market by offering cost effective solutions; and

(c) whether, given the scale of global potential for small rockets and its own financial and manpower constraint with its budget of $1.4 billion as against NASA's $19.1 billion constraints, ISRO is seeking industry help and support?

ANSWER

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

(a) Yes Sir. ISRO has been providing commercial launch services for international customers on its PSLV since 1999 through its commercial arm, Antrix Corporation Ltd. Till date, PSLV has launched 209 satellites for 29 countries.

(b) Yes Sir. The increasing number of small satellites has resulted in a global demand for rockets with quick turn-around time between launches. ISRO is putting efforts to increase the number of PSLV launches per year and use spare capacity for commercial launches.

(c) World scenario for the launch services indicates that at least 6200 small satellites (upto 500 kg) are expected to be launched worldwide in the next ten years (Euroconsult, July 2017). ISRO is working on increased industry participation in the development & production of its launch vehicles and will continue to enable industry participation.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2048

TO BE ANSWERED ON THURSDAY, JANUARY 04, 2018

INDIGENOUS LAUNCHING OF SATELLITES

2048. SHRI K. RAHMAN KHAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the success of GSLV Mark-III has paved way for indigenously launching of our own communication satellites in the future without any foreign help;

(b) whether it would be a step ahead in the direction towards launching of satellites of other countries on commercial basis; and

(c) whether the funds generated through such commercial launches would help ISRO in funding and furthering its ongoing and future projects, if so, the details thereof and list of such projects?

ANSWER

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

(a) Yes, Sir. The success of the first developmental flight of GSLV Mark III will enable indigenous launching up to 4 tonne class of communication satellites in the future.

(b) Yes, Sir. ISRO has been providing commercial launch services for earth observation satellites and small satellites onboard the Polar Satellite Launch Vehicle (PSLV) through Antrix Corporation Limited since 1999. The successful launch of GSLV Mark III is a step ahead in building credibility in launching.

(c) ISRO has just completed one launch of GSLV-MK III. Next developmental launch is in first half of 2018. Some more launches of GSLV-MK III will be needed before GSLV MK III gets recognised internationally as a vehicle for transportation to space.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2049

TO BE ANSWERED ON THURSDAY, JANUARY 04, 2018

MILESTONE ACHIEVED BY SPACE TECHNOLOGY

2049. SHRI A. VIJAYAKUMAR:

Will the PRIME MINISTER be pleased to state:

(a) the number of milestone achieved by Indian space technology during recent years;

(b) whether there is any aim to achieve which is Internationally not achieved by the Indian Spacecraft;

(c) the status of Spacecraft for mars and whether it would reach at the schedule time to Mars; 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) In the recent years ISRO has achieved major milestones as below:

- In April 2016, Seven satellite constellation for Navigation system NavIC was established.
- In August 2016, first experimental mission of Scramjet engine towards realisation of Air Breathing system was successfully tested.
- In February 2017, 104 satellites were placed in a single launch.
- In May 2017, South Asia satellite was launched, which was a gift to neighbouring countries.
- In June 2017, GSLV Mk-III was launched successfully carrying GSAT 19 communication satellite.
- In June 2017, Cartosat satellite was launched successfully by PSLV C-38

(b) Indian Space Program has placed Astrosat, a multi wavelength observatory in August 2015. It observes universe in optical, Ultraviolet, low and high energy X-ray region of the electromagnetic spectrum, whereas most other scientific satellites are capable of observing a narrow range of wavelength band.

(c) & (d)

Mars Orbiter Mission (MOM) is designed to orbit Mars. It is functioning well since it's positioning in Mars orbit in September 24, 2014. The designed mission life of MOM was six months but has successfully completed more than three years and is expected to function further. All Scientific payloads continue to perform well.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2050

TO BE ANSWERED ON THURSDAY, JANUARY 04, 2018

RECOMMENDATION BY SPACE AGENCY FORUM

2050. SHRI N. GOKULAKRISHNAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Asia Pacific Regional Space Agency Forum has recommended that the established space agencies in the region should promote space applications, including rice crop monitoring, global rainfall monitoring, fire hotspot, haze monitoring and disaster management;

(b) if so, the details thereof;

(c) what are the areas now the ISRO has been concentrating as far as the above said areas mentioned by Asia Pacific Regional Space Agency concerning the country are concerned;

(d) whether it is also a fact that ISRO shares the information it gathers with other neighbouring countries; 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) & (b)

Space Applications Working Group, one of the four Working Groups of Asia Pacific Regional Space Agency Forum (APRSAF), has recommended to further promote space applications, including rice crop monitoring, global rainfall monitoring, fire hotspot, haze monitoring and disaster management, at the 24th session of APRSAF held at Bengaluru in November 2017.

(c) Indian Space Reseach Organisation (ISRO) is carrying out studies in the above said areas.

(d) & (e)

ISRO shares the information with other neighbouring countries, in the event of disasters, through many programmes including Sentinel Asia (APRSAF's initiative for disaster mangament support), International Charter 'Space and Major Disasters', United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP), United Nations Platform for Space based Information for Disaster management and Emergency Response (UNSPIDER), COSPAS-SARSAT system for search and rescue operations, "Severe Thunderstorms: Observations and Regional Modeling (STORM)" programme of SAARC.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2051

TO BE ANSWERED ON THURSDAY, JANUARY 04, 2018

PRIVATE SECTOR IN SPACE PROGRAMME

2051. SHRI N. GOKULAKRISHNAN:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that the India Space Research Organisation (ISRO) is considering to open its doors to private sector;

(b) whether it has also issued a tender to the private industry for assembly, integration and testing of 30-35 satellites;

(c) whether it is also a fact that under this programme, 4-5 companies would be selected after evaluation and award parallel contracts; 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) ISRO has been working with the Indian Industries for a long time in realising its satellites and launch vehicles.

(b), (c) & (d)

An Expression of Interest (EOI) was floated for assembling, integration and testing of satellites involving private sector for building satellites of different mass. After technical evaluation of EOI, Request for Proposal (RFP) has been floated. Evaluation of RFP responses is under progress.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2052

TO BE ANSWERED ON THURSDAY, JANUARY 04, 2018

COMMERCIAL LAUNCHING OF SATELLITE

2052. SHRI PARIMAL NATHWANI:

Will the PRIME MINISTER be pleased to state:

(a) the names of the countries whose satellites have been commercially launched by ISRO so far;

(b) whether Government has earned any income from the said launches;

(c) if so, the details of income earned during the last three years, year-wise and country-wise;

(d) whether Government also launches satellites of private companies; 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) As on date, Antrix Corporation Limited (Antrix), the commercial arm of Indian Space Research organisation (ISRO), has successfully launched 209 foreign satellites from 29 countries under a commercial arrangement.

The names of the countries whose satellites have been successfully launched include viz. Algeria, Argentina, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Italy, Indonesia, Israel, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Republic of Korea, Singapore, Slovakia, Switzerland, Turkey, UAE, UK and USA.

(b) & (c)

During the last three years, starting from April 2014 till March 2017, Antrix has earned revenue of approx. 107 Million Euros and 4.5 Million USD in Foreign Exchange.

Year	Countries whose satellites were launched	Revenue earned by Antrix
2014-15	Canada, France, Germany, Singapore	18 M Euro
2015-16	Canada, Indonesia, Singapore, UK, USA	55 M Euro
2016-17	Algeria, Canada, Germany, Indonesia, Israel, The Netherlands, Kazakhstan, UAE, USA	34 M Euro and 4.5 M USD

(d) & (e)

Antrix Corporation Limited has enabled launches of satellites belonging to many companies of various countries under a commercial arrangement. Some of the companies with whom such commercial launch service arrangements were executed include viz. Airbus Defense & Space, France; Comdev Ltd, Canada; Space Flight Laboratories, Canada; Surrey Satellite Technology Limited (SSTL), UK; ST Electronics, Singapore; Innovative Space Logistics, The Netherlands; Planet Inc, USA; Tyvak Inc, USA and Spaceflight Industries, USA.