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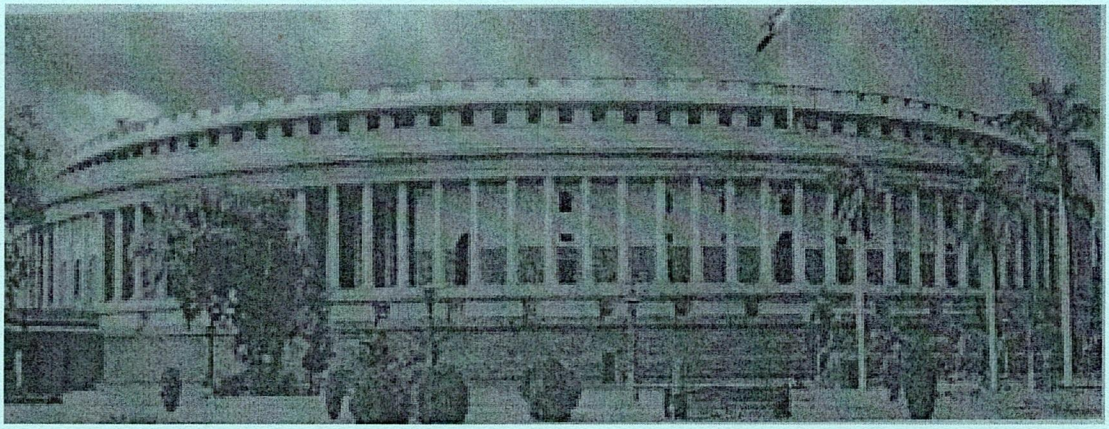
GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

"SPACE IN PARLIAMENT"



WINTER SESSION OF PARLIAMENT 2018
(DECEMBER 2018 – JANUARY 2019)

COMPILATION OF REPLIES GIVEN IN PARLIAMENT DURING 2018

Government of India
Department of Space
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PARLIAMENT QUESTIONS – WINTER SESSION OF PARLIAMENT 2018

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.272

TO BE ANSWERED ON WEDNESDAY, DECEMBER 12, 2018

SATELLITE OF FOREIGN COUNTRIES

272. PROF. SAUGATA ROY:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has given its facilities to launch satellites of foreign countries regularly;

(b) if so, the details of the countries having used ISRO's facilities so far;

(c) the total revenue earned through such launchings;

(d) whether the Government is keen to provide ISRO's facilities on commercial basis to foreign 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) Yes Madam. Antrix corporation Limited (Antrix), the commercial arm of Indian Space Research Organisation (ISRO), has been regularly launching satellites of foreign countries from ISRO's launch facility named Satish Dhawan Space Centre (SDSC) located at Sriharikota.

(b) As on date, 269 foreign satellites from 33 countries have been successfully launched using Polar Satellite Launch Vehicle (PSLV) from ISRO's launch facility. The countries that utilized ISRO's launch facility for launching their satellites include Algeria, Argentina, Austria, Australia, Belgium, Canada, Chile, Columbia, Czech Republic, Denmark, Finland, France, Germany, Italy, Indonesia, Israel, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Malaysia, Netherlands, Norway, Republic of Korea, Slovakia, Spain, Switzerland, Singapore, Turkey, UAE, UK and USA.

(c) The total revenue earned through launching of these satellites from foreign countries amounts to approx. 22 Million USD and 179 Million Euros.

(d) & (e)

Yes Madam. In the coming years, ISRO through Antrix would continue to provide the launch facility for launching foreign satellites using its launch vehicles on commercial basis.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.281

TO BE ANSWERED ON WEDNESDAY, DECEMBER 12, 2018

SPACE ACTIVITIES BILL

281. SHRIMATI POONAM MAHAJAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has invited suggestions from the public or stakeholders regarding the draft Space Activities Bill, 2017;

(b) if so, the details thereof including the objectives and salient features of the draft Space Activities Bill, 2017;

(c) the details and number of suggestions on the draft bill received by the Government from various stakeholders including organisations and individuals; and

(d) the timeframe by which the Government is expected to approve the draft Space Activities Bill, 2017 and introduce the same in Parliament?

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) The objective of the Space Bill is to facilitate the overall growth of the space activities in India with higher order of

participation of public/ non-governmental/ private sector stakeholders.

The Bill provides for establishment of a regulatory mechanism through an appropriate body, by the Central Government for the purpose of authorization and licensing of space activities. The provision on liability for damages caused by space activities of licensee, provides for a risk sharing mechanism, by which the central Government may determine the quantum of liability to be borne by the licensee.

(c) Totally 52 responses were received from various group of stake holders, which includes General public (15), Indian Aerospace industry and start-ups (04), law firms and lawyers (04), Space law experts and scholars (09), satcom companies (04), industry fora (07) and scientists (09).

Responses fall broadly under the category of seeking clarifications and suggestions on certain provisions, such as scope of space activities, regulatory mechanism, licencing and authorization procedures, sharing of liability burden with a limit on damage costs, penal provisions, powers of Central Government, etc.

(d) Steps are being taken up on best effort basis so that the Bill could be possibly introduced during Budget session in 2019.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.318

TO BE ANSWERED ON WEDNESDAY, DECEMBER 12, 2018

LAUNCH OF SATELLITES

318. SHRI NALIN KUMAR KATEEL:

SHRI D.K. SURESH:

Will the PRIME MINISTER be pleased to state:

(a) whether it is true that the Indian Space Research Organisation (ISRO) has planned to launch more state-of-the-art satellites to cater to the needs of emerging applications and if so, the details thereof;

(b) whether the Government has set any timeframe for the launch of the satellites and if so, the details thereof;

(c) the details of financial allocation made by the Government for the said programme; and

(d) the details of areas identified/to be benefited with the launching of the said satellites?

ANSWER

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

(a) Yes, ISRO is planning to launch more state-of-the-art satellites in the near future encompassing, optical remote sensing, microwave remote sensing, Infra Red remote sensing (IR). Also making scientific missions to moon and the communication

satellites to provide high throughput communication links as well as Direct To Home (DTH) applications. These satellites will address various user requirements.

(b) These satellites will be realized and launched by the coming three years.

(c) The details of the financial allocations are as following:

(₹ in Crore)

Sl. No.	Programme	BE 2018-19
1.	Communication Satellites	403.10
2.	Earth Observation Systems	510.35
3.	Satellite Navigation	50.00
4.	Space Science & Planetary Exploration	214.10
	Total	1177.55

(d) The proposed satellites will provide better Earth imaging with day and night capabilities, improved weather predictions, better handling of disaster situations, facilitate navigational applications and will also improve communication connectivity.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.337

TO BE ANSWERED ON WEDNESDAY, DECEMBER 12, 2018

MANNED MISSION TO SPACE

337. SHRIMATI RAKSHATAI KHADSE:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government proposes to achieve the ambitious manned mission to space by 2021 and attempt to send an astronaut to space on board during the successful launching of GSLV-MkIII-D, a communication Satellite by ISRO; 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) No Madam. However, it is proposed to undertake manned mission to space before 75th Anniversary of Indian Independence. The manned mission will be accomplished using ISRO's launch vehicle GSLV MkIII.

(b) The manned mission will launch Indian astronauts from Satish Dhawan Space Centre (SDSC), Sriharikota into an approximately 400 Km Low Earth Orbit. The maximum mission planned is of 7 days duration.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.413

TO BE ANSWERED ON WEDNESDAY, DECEMBER 12, 2018

LAUNCH OF SATELLITES BY ISRO

413. SHRI VENKATESH BABU T.G.:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has launched several satellites in the last few months;

(b) if so, the details along with the features of each of them;

(c) whether the launch of Chandrayaan 2 has been postponed by ISRO again and whether it proposes to work on smaller launch vehicles;

(d) if so, the details thereof along with the reasons therefor and the salient features of the mission; and

(e) the time by which the said mission is likely to be launched?

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) The details are:

CARTO-2F, IRNSS-1I, Nova-SAR, S1-4, GSAT-29, HysIS, GSAT-11 and 59 international co –passenger satellites

- **CARTO-2F is a high resolution satellite with 0.65 M resolution - PSLV-C38.**

- 29 Co-passenger Nano-satellites (14 countries - Austria, Belgium, Chile, Czech Republic, Finland, France, Germany, Italy, Japan, Latvia, Lithuania, Slovakia, UK, USA) – PSLV-C38
- IRNSS-1I is a navigation satellite which is part of the NaVIC constellation - PSLV-C41
- Nova SAR and S1-4 (from UK for earth observation) are two foreign satellites - PSLV-C42
- GSAT-29 is a high throughput communication satellite - GSLV-Mk III-D2
- HysIS is a hyper spectral imaging satellite which provides multiple features of the image - PSLV-C43
- 30 Co-passenger satellites (Australia-1, Canada-1, Columbia-1, Finland-1, Malasia-1, Netherlands-1, Spain-1, USA-23) - PSLV-C43
- GSAT-11 is India's biggest communication satellite to be part of the digital India Program providing communication in Ku / Ka band (Arian 5 VA-246)

(c), (d) & (e)

Chandrayan-2 is planned to be launched by first quarter of 2019 by GSLV MK-III. Chandrayaan-2 is the second lunar mission of India and will carry Orbiter, Lander and Rover. ISRO is working on small satellite launchers also.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.438

TO BE ANSWERED ON WEDNESDAY, DECEMBER 12, 2018

AGREEMENT WITH ROSCOSMOS

438. SHRI C. MAHENDRAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) and Russia's federal space agency Roscosmos have agreed to work together for first manned space mission 'Gaganyaan';

(b) if so, the details thereof;

(c) whether under the agreement Roscosmos has offered ride to Indian astronauts short visit to International Space Station (ISS) onboard Soyuz spacecraft for short training mission in 2022; 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) Yes Madam.

(b) ISRO and ROSCOSMOS have signed a Memorandum of Understanding (MoU) on 5th October 2018 on 'Joint Activities in the field of Human Spaceflight Programme'.

(c) No, specific missions to International Space Station on Soyuz have not been included in the MoU.

(d) Not applicable.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1398

TO BE ANSWERED ON WEDNESDAY, DECEMBER 19, 2018

REUSABLE ROCKET TECHNOLOGY

1398. SHRI B. SENGUTTUVAN:

Will the PRIME MINISTER be pleased to state:

(a) **whether the Indian Space Agency, ISRO is working on reusable technology that would drastically cut the cost of the space missions carried out by ISRO and if so, the details thereof;**

(b) **whether ISRO has created any technology demonstrator using reusable technology and if so, the details thereof;**

(c) **whether ISRO is working on the technology to enable orbital re-entry of the space vehicle, to land the reusable vehicle on airstrip and on reusable rocket stages, etc. and if so, the details thereof; and**

(d) **whether ISRO has any proposal to increase the payload capacity of GSLV Mk III from the present capacity of 4 tonnes to 6.5 tonnes so that its dependence on European Spaceports is done away with 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. ISRO is working on reusable technology for reducing the cost of access to space including the**

development of a winged body unmanned reusable launch vehicle for launching payloads into low earth orbits.

(b) Yes, Madam. ISRO has successfully developed a scaled down (1:5) technology demonstration version of Reusable Launch Vehicle – Technology Demonstrator (RLV-TD) vehicle and successfully carried out the first experimental mission on May 23, 2016 from Satish Dhawan Space Centre, Sriharikota. In this mission, critical technologies such as autonomous navigation, guidance & control and reusable thermal protection system have been successfully demonstrated.

(c) Yes, Madam. Development of Reusable Launch Vehicles is a technical challenge and it involves the development of many cutting edge technologies. A series of technology demonstration missions would be required to validate these technologies. In the next phase, an autonomous runway landing experiment is planned releasing the RLV-TD vehicle from a helicopter to demonstrate the runway approach and landing capability. This will be followed by an end-to-end orbital re-entry mission demonstration using a Technology Demonstration Vehicle boosted by propulsion systems.

(d) Yes, Madam. ISRO has undertaken the development & qualification of Semi-Cryogenic engine. Further development activities are planned to realise a Semi-cryogenic stage and uprated version of the high thrust GSLV Mk III cryogenic stage, in order to increase the payload capacity of GSLV Mk III from 4 tonnes to 6.5 tonnes.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.1405

TO BE ANSWERED ON WEDNESDAY, DECEMBER 19, 2018

SPACE TECHNOLOGY BASED TOOLS

1405. SHRIMATI POONAM MAHAJAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has assessed the current utilisation of space technology-based tools in each Ministry or Department to explore new potential application areas following the National Meet on Promoting space technology based Tools and Applications in Governance and Development organised on 7th September 2015;

(b) if so, the details thereof including the details and number of projects identified under various themes for effective utilization of space technology to enhance functional effectiveness, facilitate planning and decision making;

(c) the current status of implementation of the projects, theme-wise; and

(d) the timeframe by which all the projects are expected to be completed and the total amount of funds spent on the projects, project-wise?

ANSWER

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

(a) & (b)

Yes, Madam. Department of Space (DOS) has interacted with 60 Central Ministries/Departments on various themes and joint action plans on space applications were prepared. 158 Space Application projects were identified across nine basic themes.

(c) Out of 158 identified projects, 94 projects have been completed, 35 projects are in progress and 29 projects were withdrawn by the respective Ministries/Departments. The current status of implementation, theme-wise, is as under:

Themes	Total No. of Projects	Completed	Ongoing
Agriculture	15	9	6
Energy and Environment	32	20	7
Infrastructure Planning	17	13	1
Water Resources	12	8	3
Technology Diffusion	14	6	3
Developmental Planning	17	8	4
Communication and Navigation	23	12	2
Weather & Disaster Management	7	5	2
Health & Education	21	13	7

(d) Out of the 35 ongoing projects, 29 projects, are expected to be completed by December, 2019 and the remaining to be completed by December, 2021. The details of funds spent are given below:

Themes	Fund Spent (₹ in Crores)
Agriculture	2.1 (for 8 projects)
Energy and Environment	8.02 (for 9 projects)
Infrastructure Planning	1.53 (for 1 project)
Water Resources	12.8 (for 4 projects)
Technology Diffusion	1.37 (for 3 projects)
Developmental Planning	15.29 (for 6 projects)
Communication and Navigation	2.5 (for 1 project)
Health & Education	14.78 (for 3 projects)

Remaining projects are carried out as part of internal activities of DOS/ISRO.

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O.I.H.

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2320

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

LAUNCH OF GSAT-29

2320. SHRI AJAY MISRA TENI:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) has successfully launched GSAT-29 satellite with the help of GSLVMK-III D2 rocket; and

(b) if so, the details of benefits likely to accrue to the strategically important remote areas?

ANSWER

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

(a) Yes, Madam. Indian space Research Organisation has successfully launched GSAT-29 on November 14, 2018 using GSLV MkIII D2 Rocket.

(b) The Ku and Ka band payloads of GSAT-29 are configured to cater to the communication requirements of users including those from remote areas especially from Jammu & Kashmir and North-Eastern region of India.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2335

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

HEAVIEST SATELLITE LAUNCH

2335. **KUNWAR HARIBANSH SINGH:**
SHRI JITENDRA CHAUDHURY:
SHRI S.R. VIJAYAKUMAR:
SHRI SUDHEER GUPTA:
SHRI R. PARTHIPAN:
SHRI S. RAJENDRAN:
SHRI T. RADHAKRISHNAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) has launched heaviest and most advanced high throughput communication satellite GSAT-11 recently;

(b) if so, the details thereof along with the aims and objectives thereto;

(c) whether the targeted objectives have been achieved successfully till date and if so, the details thereof;

(d) the expenditure incurred on the development of the satellite and its launch separately;

(e) the further steps taken/ being taken to boost the broadband connectivity to rural and inaccessible Gram Panchayats in the country; and

(f) the number of targets fixed by the Government to launch satellites during the next year?

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) GSAT-11 satellite, with a lift-off mass of 5854 kg, was successfully launched from French Guiana onboard Ariane-5 launch vehicle at 0207 hrs (IST) on December 5, 2018. GSAT-11 is a communication satellite in Ka x Ku band providing a high throughput capacity of 16 Gbps. The satellite is launched with an objective to provide high data rate and broadband connectivity to Gram Panchayats, Islands and rural areas of the country. In addition, this satellite has capability to support other telecommunication services also.

(c) Yes Madam. The satellite has been launched successfully. All orbit raising operations and deployments on GSAT-11 have been completed successfully.

(d) The expenditure incurred (as on November 2018) on the development of the satellite and its launch is Rs. 573.68 Crores and Rs. 810.94 Crores respectively.

(e) In order to address the required satellite connectivity to boost the broadband connectivity to rural and inaccessible Gram Panchayats in the country, three satellites namely GSAT-19, GSAT-29 and GSAT-11 satellites have been launched and another satellite GSAT-20 is under realisation for augmenting the capacity further.

(f) ISRO has target of realizing around 30 missions during the year 2019.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2338

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

LAUNCH OF HEAVY SATELLITES

2338. SHRI SUDHEER GUPTA:
KUNWAR HARIBANSH SINGH:
SHRI S.R. VIJAYAKUMAR:
SHRI S. RAJENDRAN:
SHRI T. RADHAKRISHNAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) has not been able to launch heavy satellites so far;

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

(c) the number of heavy satellites that have been launched from foreign destinations so far;

(d) whether ISRO is working on any programme for launching heavy satellites in the country; and

(e) if so, the details thereof and the time by which it is likely to be materialised?

ANSWER

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

(a) & (b)

The Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk-III) of ISRO is capable of launching 4 tonne class of

satellites to Geosynchronous Transfer Orbit (GTO). The GSAT-29 communication satellite, weighing 3423 kg, is the heaviest satellite launched from Indian soil by GSLV Mk-III recently on 14.11.2018. The heaviest satellite built by ISRO so far i.e. GSAT-11, weighing 5854 kg, was launched on 05.12.2018 by Ariane 5 rocket from French Guiana.

(c) Till now, fourteen heavy satellites (weighing more than 2200 kg) were launched from foreign destinations.

(d) Yes, Madam.

(e) ISRO has taken up the development of a Semi-Cryogenic stage and uprated Cryogenic engine & stage, which is expected to be completed by 2020-21. Induction of these stages in GSLV Mk-III will enhance the GTO payload capability to 5 tonne class.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2340

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

COMMUNICATION SIGNALS OF GLONASS

2340. DR. KIRIT SOMAIYA:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has given clearance to Russia for setting up ground base stations in India receiving communication signals of GLONASS;

(b) if so, the details thereof;

(c) whether any agreement has been signed between Russia and India in this regard; and

(d) if so, the details thereof and the details of benefits that will accrue out of this agreement?

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), India and State Space Corporation ROSCOSMOS, Russia mutually agreed to set up ground-measurement gathering stations in Russia for Navigation with Indian Constellation (NavIC) and reciprocally in India for Russian Global Navigation Satellite System (GLONASS). Based on that, a location at ISTRAC, Bengaluru is identified for setting up the GLONASS ground station.

(c) Yes, Madam.

(d) An MoU on Mutual Allocation of Ground Measurement Gathering Stations has been signed between ISRO and ROSCOSMOS on October 15th, 2016. The NavIC station in Russia to be installed on a reciprocal basis will help enhance the baseline for orbit determination and of Ionosphere delays to improve the accuracy of the navigation solution.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2358

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

ROVER TO MOON

2358. DR. C. GOPALAKRISHNAN:

SHRI P. NAGARAJAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Indian Space Research Organisation (ISRO) is in the process of launching a Rover to explore moon and to study the potential for mining a source of waste-free nuclear energy;

(b) if so, the details thereof including the cost of the project and the time by which the project would be launched; and

(c) the total number of rockets/ satellites launched by ISRO during the last three years ?

ANSWER

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

(a) & (b)

The Chandrayaan-2 mission, stated for launch in early 2019, involves a lunar rover to explore the southern polar region of the moon. It carries two experiments to study the composition of lunar soil in this unique location near the pole. It does not carry instruments to detect Helium-3, largely believed to have been deposited by the wind from the sun over millions of year.

Since these are present only at very low concentration levels, an experiment to detect and quantify the amount of Helium-3, for a future extraction programme can be designed later.

(c) During the last three years i.e. 2016, 2017 & 2018, ISRO launched 19 rockets (13 PSLV, 4 GSLV and 2 GSLV Mk-III) which carried a total of 239 satellites (22 National satellites, 212 customer satellites and 5 student satellites).

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2397

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

MEDICAL SERVICES IN REMOTE AREAS

2397. SHRI SISIR KUMAR ADHIKARI:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government plans to provide emergency medical treatment services in remote areas through space satellite systems;

(b) if so, the details of pilot projects under observation, if any, and the outcome thereof; and

(c) the reaction and bilateral fruitfullness of AIIMS and ISRO in providing emergency medical services?

ANSWER

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

(a) Yes, Madam. ISRO has established about 130 telemedicine nodes to provide emergency medical treatment services in remote areas through space satellite systems.

(b) The telemedicine nodes are established in association with the user agencies. ISRO is providing end-to-end satellite connectivity between specialist end hospitals and the patient end hospitals. This facility helps the patient living in remote areas to avail the tele-consultation, advices and second opinion from the specialist in speciality hospitals.

(c) Telemedicine network of ISRO is connected with hospitals like All India Institute of Medical Sciences (AIIMS), New Delhi; Postgraduate Institute of Medical Education & Research (PGIMER), Chandigarh; Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow and other renowned speciality hospitals through which the remote hospitals are availing the expert tele-consultation services on need basis, including emergency medical services.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2433

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

ASTEROID MINING

2433. SHRIMATI POONAM MAHAJAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has undertook a comprehensive assessment of asteroid mining in outer space;

(b) if so, the details thereof including the research and development undertaken as well as legal challenges arising out of the same; and

(c) whether the Government has identified and listed near earth asteroids of various sizes 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)

ISRO has not made a comprehensive assessment on asteroid mining.

(c) Does not arise.

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.2449

TO BE ANSWERED ON WEDNESDAY, DECEMBER 26, 2018

SPACE MISSIONS

2449. SHRI PINAKI MISRA:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has unveiled its roadmap to target 50 missions in the next three years and if so, the details thereof;

(b) whether it has set a target of 22 missions for the year 2019 and if so, the details thereof;

(c) whether the Government has enhanced its budget to meet its aggressive space activities; and

(d) if so, the details thereof and the steps taken to generate funds for these future missions?

ANSWER

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

(a) Yes, Madam. ISRO has unveiled its road map to target more than fifty missions in the next three years. The details of the missions planned from January 2019 to December 2021 are as follows:

Sl. No.	Name	No. of Missions
Launch Vehicle Missions		
1.	PSLV	25
2.	GSLV	06

Sl. No.	Name	No. of Missions
3.	GSLV Mk III	04 + 02*
Satellite Missions		
4.	Earth Observation	24
5.	Communication	22
6.	Space Science	03

** Human rated GSLV Mk III*

(b) Yes, Madam. ISRO has a target of more than 22 missions for the year 2019. The details are as follows:

Sl. No.	Name	No. of Missions
Launch Vehicle Missions		
1.	PSLV	07
2.	GSLV	02
3.	GSLV Mk III	02
Satellite Missions		
4.	Earth Observation	06
5.	Communication	06
6.	Space Science	02

(c) Yes, Madam.

(d) The budget for Space activities has been enhanced by Rs 1,689.71 Crores in BE 2018-19 (~19%), compared to BE 2017-2018. The enhanced fund allocation for future Space activities is proposed to be met through the process of Union Budget.

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.3490

TO BE ANSWERED ON WEDNESDAY, JANUARY 02, 2019

DOPPLER RADAR

3490. DR. SHASHI THAROOR:

Will the PRIME MINISTER be pleased to state:

(a) whether the Doppler Radar stationed at Vikram Sarabhai Space Centre, Thiruvananthapuram was switched on and made operational for every day between 15th Novermber, 2017 and 15th December, 2017;

(b) if so, the details thereof; and

(c) if not, the specific time period during which the Doppler Radar was switched off 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) Yes Madam. The Doppler Radar at Vikram Sarabhai Space Centre, Thiruvananthapuram was operational for every day between 15th November 2017 and 15th December 2017.

(b) On 15thNovember 2017, the Radar was operated in daytime i.e., 0900 hrs to 2100 hrs IST. From 16thNovember 2017 (0900 hrs IST) to 15thDec 2017, the Radar was operated round the clock.

(c) The Radar was switched off from 29th Nov 2017, 00:28 hrs IST to 29th November 2017, 10:08 hrs IST for maintenance.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.3514

TO BE ANSWERED ON WEDNESDAY, JANUARY 02, 2019

SATELLITE IMAGES

3514. SHRI MAGANTTI VENKATESWARA RAO (BABU):

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has taken any steps to bring satellite images accessible to common people;

(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) & (b)

A procedure is in place for accessing satellite images by the common people, as per the Remote Sensing Data Policy (RSDP-2011) enacted by Government of India. ISRO also makes some satellite images freely accessible to common people, which include images obtained from oceanographic & meteorological satellites, medium resolution satellite images with a latency and visualisation of satellite images, and products through its web portals.

(c) Does not arise.

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

LOK SABHA
UNSTARRED QUESTION NO.3588

TO BE ANSWERED ON WEDNESDAY, JANUARY 02, 2019

SATELLITE CENTRE

3588. SHRI BALABHADRA MAJHI:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has approved a Satellite Centre of IGNAC at Nabarangpur District of Odisha; and

(b) if so, the details thereof and the time by which the Centre will be made operational?

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.3601

TO BE ANSWERED ON WEDNESDAY, JANUARY 02, 2019

SCRAMJET ENGINE

3601. SHRIMATI KAVITHA KALVAKUNTLA:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has successfully tested the scramjet engine technology recently;

(b) if so, the details thereof and it's benefits for future uses;

(c) whether this technology will help in the realisation of an air breathing propulsion system for space-crafts in future; 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) Yes, Madam.

(b) The first experimental mission of a sub-scale Scramjet engine, towards the realization of an Air Breathing Propulsion System, was successfully conducted on August 28, 2016 from Satish Dhawan Space Centre, Sriharikota. With this experimental flight, critical technologies such as ignition of air breathing engines at supersonic speed, holding the flame at supersonic speed, air intake mechanism and fuel injection

systems have been successfully demonstrated. The Air breathing propulsion technology will be useful during the atmospheric phase of the flight of launch vehicle as the oxidizer for the fuel is derived from the atmosphere itself. This reduces the need for carrying the oxidizer along with the fuel and will benefit in bringing down the cost of access to space.

(C) & (d)

The present developed technology is useful for launch vehicles and missiles and is not directly applicable for spacecraft propulsion.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
STARRED QUESTION NO. 36

TO BE ANSWERED ON THURSDAY, DECEMBER 13, 2018

PARTNERS FOR ASSEMBLING SATELLITES

*36. SHRI T. RATHINAVEL:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that ISRO has roped in three partners to help it assemble twenty seven satellites at a quicker pace over the next three years;

(b) if so, the details thereof;

(c) whether ISRO proposes to launch twenty seven spacecrafts by July, 2021; 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 RAJYA SABHA IN REPLY TO STARRED QUESTION NO.36 REGARDING "PARTNERS FOR ASSEMBLING SATELLITES" ASKED BY SHRI T. RATHINAVEL FOR ANSWER ON THURSDAY, DECEMBER 13, 2018.

(a) & (b)

Yes Sir. UR Rao Satellite Centre (URSC) has entered into work order contract with three different vendors to help in Assembly, Integration & Testing (AIT) activities of satellites. The companies are

a. M/s. Alpha Design Technologies, Bangalore
b. BEL, Bangalore
c. TATA advanced Systems Ltd.

(c) & (d)

Yes Sir. The details of the spacecrafts are as follows:

1.	Communication satellite	7
2.	Earth Observation	12
3.	Navigation Satellite	5
4.	Science	3

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 445

TO BE ANSWERED ON THURSDAY, DECEMBER 13, 2018

SATELLITES PUT INTO ORBIT THROUGH INDIAN PSLV

445. DR. T. SUBBARAMI REDDY:

Will the PRIME MINISTER be pleased to state:

(a) the number of satellites put into orbit through PSLV during the last three years;

(b) how many of them come under commercial category and how many of those belong to other countries;

(c) the revenue earned through the launch of other countries' satellites;

(d) the number of ISRO's satellities launched from other countries' launch pad;

(e) the reasons therefor;

(f) whether Government is planning the launch of many more satellites during the next three years in view of efficiency of launch pad system; and

(g) 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) Total 186 Nos. of satellites are put into orbit through Indian PSLV during the last three years (2015-2017).

(b) During the last three years (2015-2017), a total of 169 customer satellites from other countries were successfully launched on-board PSLV under commercial arrangements.

(c) The revenue earned through launching of these 169 satellites from other countries amounts to approx. 4 Million USD and 95 Million Euros.

(d) & (e) So far 31 Indian made satellites are launched by other countries. Foreign launches are preferred only when the spacecraft weight is more than our launcher capacity.

(f) & (g) Yes Sir, Government is exploring launch of many more satellites during the next three years. Details are as follows:

1.	Communication Satellite:	7
2.	Earth Observation satellite:	12
3.	Navigation satellite:	5
4.	Science satellite:	3

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 446

TO BE ANSWERED ON THURSDAY, DECEMBER 13, 2018

VENUS MISSION

446. SHRIMATI AMBIKA SONI:
DR. T. SUBBARAMI REDDY:
Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has planned Venus Mission in the next five years;

(b) if so, the details thereof;

(c) whether it has invited international proposals for scientific payloads for the Mission;

(d) if so, the details thereof;

(e) whether under the Make-in-India initiative, Indian private industries would be encouraged and given preference in the development of payloads; 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) Yes Sir. ISRO has planned a Venus mission in the next five years.

(b) The Venus mission planned during 2023 is under configuration study phase.

(c) Yes, ISRO has invited international proposals for scientific payloads for the Venus mission.

(d) As of now, details of payloads which would be sent aboard the satellite for the Venus mission are not available. The Announcement of opportunity to international science community to study Venus, using space based experiments, has been made only on November 6, 2018. The proposal submission deadline is January 3, 2019. The internal payload selection committee from ISRO will review and select the international payloads.

(e) In the proposed Venus mission, National Research Laboratories/Institutes are invited to submit proposals. They are encouraged to involve Indian private industries in the realization of the experiment.

(f) Not applicable given the response to (e)

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 447

TO BE ANSWERED ON THURSDAY, DECEMBER 13, 2018

TRAINING OF SPACE SCIENTISTS OF FOREIGN COUNTRIES

447. SHRI N. GOKULAKRISHNAN:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that India has decided to train space scientists of foreign countries that lack satellite building capacity;

(b) if so, the details thereof;

(c) whether it is also a fact that India would not charge for this capacity building programme but play a role in shortlisting scientists for the training programme; 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) Yes Sir.

(b) Indian Space Research Organisation (ISRO) of Department of Space (DOS), Government of India is offering capacity building programme on nanosatellite development for the participants from other countries, who are interested in developing their space programme. The 8-week programme, named as "**UNNATI** (UNispace Nanosatellite Assembly &Training by ISRO), will be held at Bengaluru every year for next 3 years.

(c)&(d) India would not charge for this capacity building programme for the selected candidates. The expenses towards air travel, accommodation and food for the selected candidates during the course duration will be borne by Indian Space Research Organisation (ISRO) of Department of Space (DOS). A selection committee with members from ISRO and MEA will be selecting the candidates for this training course from applications received.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 448

TO BE ANSWERED ON THURSDAY, DECEMBER 13, 2018

LAUNCHING OF COMMUNICATION SATELLITES

448. MS. SAROJ PANDEY:

Will the PRIME MINISTER be pleased to state:

(a) the number of communication satellites launched during the last four years;

(b) the number of such satellites launched during 2004 to 2014;

(c) whether it is a fact that ISRO has received requests from many countries for launching of their satellites; and

(d) if so, the number and names of such countries?

ANSWER

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

(a) Eight communication satellites are launched during the last four years (2015-2018).

(b) Thirty two satellites have been launched from 2004 to 2014.

(c) Yes Sir. Antrix Corportation Limited (Antrix), the commercial arm of Indian Space Research Organisation (ISRO), has received requests from many countries for launching their nano, micro and small satellites mainly meant for earth observation, scientific and technology demonstration purposes.

(d) So far, 269 foreign satellites belonging to 33 countries have been successfully launched. The countries include Algeria, Argentina, Austria, Australia, Belgium, Canada, Chile, Columbia, Czech Republic, Denmark, Finland, France, Germany, Italy, Indonesia, Israel, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Malaysia, Netherlands, Norway, Republic of Korea, Slovakia, Spain, Switzerland, Singapore, Turkey, UAE, UK and USA.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1244

TO BE ANSWERED ON THURSDAY, DECEMBER 20, 2018

LAUNCHING OF GSAT-29

1244. SHRI ANAND SHARMA:

Will the PRIME MINISTER be pleased to state:

(a) the salient features of the heaviest satellite GSAT-29, launched recently by ISRO from Sriharikota;

(b) whether the launch vehicle GSLV MK-III, utilised for the said satellite, would also be used in Chandrayaan-2 and Gaganyaan Mission;

(c) if so, the details thereof; and

(d) whether this satellite would be useful for enhancing communication service in Jammu and Kashmir and North-Eastern States due to its KU and KA Bands?

ANSWER

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

(a) GSAT-29 is a multi-beam communication satellite launched on November 14, 2018 onboard GSLV MK III from Sriharikota. The satellite is configured around ISRO's 3000 kg spacecraft bus (I-3K Bus) with a lift off mass of 3423 kg. The satellite carries KA and KU high throughput transponders for providing coverage over Jammu and Kashmir and North East Regions including a KA band steerable beam over Indian Mainland. It also carries experimental payloads like Q/V-Band communication payload, optical communication payload and Geo high-resolution camera payload.

(b) Yes, Sir.

(c) The development of GSLV Mk-III Launch vehicle has been successfully completed with two developmental flights (GSLV MkIII-D1 & D2). The first operational flight of GSLV Mk-III (GSLV MkIII-M1) has been identified for the Chandrayaan-2 Mission. The Gaganyaan programme will use the GSLV Mk-III in a human rated configuration along with a Crew Escape System.

(d) Yes, Sir.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1245

TO BE ANSWERED ON THURSDAY, DECEMBER 20, 2018

LAUNCHING OF HySIS

1245. SHRIMATI AMBIKA SONI:
DR. T. SUBBARAMI REDDY:
Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has successfully launched earth monitoring Hyperspectral Imaging Satellite (HysIS) recently;

(b) if so, the details thereof;

(c) the data is expected to collect and in what fields;

(d) whether co-passenger satellites were also dropped into the designated orbit; 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) Yes Sir. The Indian Space Research Organisation launched the earth monitoring Hyperspectral Imaging Satellite (HysIS) successfully on November 29, 2018 from Satish Dhawan Space Centre (SDSC), Shriharikota.

(b) The HysIS was launched from the First Launch Pad of SDSC at 09:57 hrs on November 29, 2018 using Core Alone version of Polar Satellite Launch Vehicle (PSLV) designated as PSLV-C43 mission. The satellite was injected into a Sun Synchronous Polar Orbit of 636 km altitude. HysIS weighed about 380 kg and carried an Electro-Optic payload called Hyper-Spectral Imager.

(c) The payload is capable of imaging earth in major spectral bands of Visible & Near Infra-Red (VNIR) and Short Wave Infra-Red (SWIR). The payload can capture characteristics of images in 60 spectral bands of VNIR (400-900 nanometer wavelength) and 256 spectral bands in SWIR (850-2400 nanometer wavelength).

The data is captured in fine spectral resolution of less than 10 nanometers in the above bands. These fine bands provide capability to study fine characteristics of the objects. The payload can image the earth with 30 meters resolution and 30 km swath. The data is used in a wide range of applications of agriculture, forestry, soil/geological environments, coastal zones and inland waters etc.

(d) Yes Sir. All the thirty co-passengers of HysIS were also injected into their designated orbits.

(e) The co-passengers of HysIS included 1 Micro satellite (USA) and 29 Nano satellites from 8 different countries (one nano satellite each from Australia, Canada, Colombia, Finland, Malaysia, Netherlands & Spain and 22 nano satellites from USA) . The total weight of 30 co-passenger satellites was 261.5 kg. These satellites were deployed in the polar orbits of altitude 504-506 km.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1246

TO BE ANSWERED ON THURSDAY, DECEMBER 20, 2018

PLACEMENT OF SATELLITES THROUGH A SINGLE LAUNCH

1246. SHRI VINAY DINU TENDULKAR:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has placed thirty nano satellites and an earth observation satellite Cartosat-2 in a single launch PSLVC-38 and if so, the details thereof;

(b) whether majority of satellites belonged to foreign countries and if so, the details thereof;

(c) the foreign exchange earned there-from;

(d) whether ISRO has taken steps to protect these satellites from space debris once they are made functional; 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)

Yes, Sir. In the PSLV-C38 mission that took place during June 2017, along with Cartosat-2, a total of 30 nano satellites were launched as co-passengers. Out of this, 29 satellites belonged to foreign countries viz. Austria, Belgium, Chile, Czech Republic, Finland, France, Germany, Italy, Japan, Latvia, Lithuania, Slovakia, UK and USA. These 29 foreign satellites were launched under commercial arrangements between Antrix Corporation Limited (Antrix), the commercial arm of ISRO and the foreign customer.

(c) The revenue earned through launching of these 29 foreign satellites amounts to approx. 6 Million Euros.

(d) Yes, Sir.

(e) ISRO does conjunction assessment risk analysis studies before every rocket launch that identify time intervals for launch with the least debris collision probability. ISRO ensures the safety of the customer satellites from liftoff till satellite injection, after which the onus lies with the customer. For Indian satellites, ISRO does conjunction assessment and collision avoidance manoeuvres throughout satellite mission life.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1729

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

FUNDS FOR FUTURE MISSIONS OF ISRO

1729. SHRI ANUBHAV MOHANTY:

Will the PRIME MINISTER be pleased to state

(a) whether it is a fact that ISRO has unveiled its roadmap to target fifty missions during the next three years;

(b) whether it has set a target of twenty two missions for the year 2019;

(c) whether Government has enhanced its budget to meet its space activities; and

(d) if so, the details thereof and in what manner Government proposes to generate funds required for these missions?

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 unveiled its road map to target fifty plus missions in the next three years.

(b) Yes, Sir. ISRO has target of more than 22 missions for the year 2019.

(c) Yes, Sir.

(d) The budget for Space activities has been enhanced by ` 1,689.71 Crores in BE 2018-19 (~19%), compared to BE 2017-18. The enhanced fund allocation for future space activities is proposed to be met through the process of Union Budget.

*****

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1730

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

PROGRESS IN THE FIELDS OF ASTRO-BIOLOGY AND BIO-ASTRONAUTICS

1730. SHRI MAHESH PODDAR:

Will the PRIME MINISTER be pleased to state whether the Indian Space Research Organisation (ISRO) has made any progress in the fields of astro-biology and bio-astronautics 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):

ISRO had initiated astro-biology experiments on balloons and look for new life forms unknown on earth. Two Astrobiology Balloon Experiments were carried out in 2001 and 2005. Both these experiments yielded seven new species of bacteria, six Bacillus and one Janibacter. Of these, three new species of bacteria, which are not found on Earth and are highly resistant to ultra-violet radiation, have been discovered in the upper stratosphere. One of the new species has been named as Janibacter hoylei, after the Distinguished Astrophysicist Fred Hoyle, the second as Bacillus isronensis recognising the contribution of ISRO in the balloon experiments which led to its discovery and the third as Bacillus aryabhatta after India's celebrated ancient astronomer Aryabhatta and also the first satellite of ISRO.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1731

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

TAPPING OF SMALL CITIES FOR INNOVATION

1731. SHRI R. VAITHILINGAM:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that ISRO is considering to tap small cities for innovations;

(b) whether it is also a fact that more space research activities would be splashed in a big way across small cities to tap their talent and include them in the space footprint; and

(c) 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. ISRO is considering small cities across the country to tap for talents in innovation.

(b) Yes, ISRO is making efforts to involve more academic institutes, start-ups and small industries from various parts of the country for space research activities, with a focus on states, where ISRO does not have a presence.

(c) ISRO is in the process of establishing six nos. each of Technology Incubation Centres for Space and Regional Academic Centres for Space in a phased manner. The main objective is to create a nation-wide interest among students, researchers and inventors to engage and contribute for nation's space programme. The first Technology Incubation Centre for Space was inaugurated at NIT, **Agartala** (covering Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura). Further to this, similar centres are planned at **Jalandhar** (covering J&K, Uttarakhand, Himachal Pradesh, Punjab, Delhi & Haryana), **Indore** (covering Uttar Pradesh, Madhya Pradesh & Chattisgarh), **Rourkela** (covering Orissa, Jharkhand, Bihar, West Bengal, Sikkim

and Andaman Nicobar), **Nagpur** (covering Maharashtra, Goa, Gujarat, Rajasthan) and **Trichy** (covering Tamil Nadu, Karnataka, Pondicherry, Kerala and Lakshadweep). Regional Academic Centre for Space has one lead academic institute at each region supported by 8 to 10 nearby academic institutes. These are proposed at **Guwahati, Patna, Varanasi, Kurukshetra, Jaipur** and **Kanyakumari**. ISRO will provide research projects along with essential funding and review mechanisms in these initiatives, thus tapping talents across the nation to get involved and contribute for space research activities.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1732

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

OPPORTUNITY IN INDIAN SPACE MARKET

1732. SHRI T. RATHINAVEL:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that the Indian space market offers big opportunity to industry as it is estimated to grow to US $ 1.6 billion by 2023;

(b) whether it is also a fact that domestic industry needs to increase the production of critical electronic items needed in space and other programmes, as 75 percent of it is now imported; and

(c) 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, Indian Space research programme has unprecedented growth in the last few years with highly successful and commercial missions accomplished. There are a large number of approved missions in waiting for ISRO to accomplish, which indicates a big opportunity for the industry as well.

(b) Yes, it is a fact that domestic industry should come forward and increase the production of critical electronic components for space and other research programmes, a majority of which is currently imported.

(c) With respect to Space programmes, the import component for electronics in the launch vehicle area is mainly in stage avionics, which is around 10%. However, in the area of satellite building, the percentage of electronics import is as high as around 50%. Import substitution and indigenised manufacturing efforts are required in the areas of amplifiers (Travelling Tube Wave Amplifiers, Solid State Pre-Amplifier etc.), Image Sensors and Optical Equipments, FPGA, Crystal Oscillators, Memory devices, RF

Devices and equipments, Microwave devices and equipments, Semi-conductor components (Resistors, capacitors, Inductors, Diodes etc.), PCBs and ICs, Filters, Waveguides, Solar cells, Signal generators and conditioners, Power supplies, Convertors and isolators, Frequency synthesizers, etc.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1733

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

THIRD LAUNCH PAD FOR GAGANYAAN PROGRAMME

1733. SHRIMATI VIJILA SATHYANANTH :

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that ISRO is setting up a third launch pad to undertake Gaganyaan manned space flight programme;

(b) if so, the details thereof;

(c) whether it is also a fact that ISRO is searching for a location on the western sea coast near Gujarat to set up another launch pad for small satellite launch vehicles; 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)

No, Sir. It is proposed to utilise the existing launch pad with augmentation for carrying out the initial flights under the Gaganyaan manned space flight programme.

(c) & (d)

No, Sir. The criteria for selection of a new launch site are desired payload capability, azimuth corridor for launch vehicle flight path, impact points of spent stages beyond the exclusive economic zone of other countries and large safety zone to carry out various hazardous operations. A study has been carried out to identify suitable locations for establishment of a launch pad for the small satellite launch vehicle. It was found that the locations in the western sea coast near Gujarat did not meet some of the criteria for establishing the launch pad.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1734

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

LAUNCHING OF DOMESTIC GPS

1734. SHRI NARAYAN LAL PANCHARIYA:

Will the PRIME MINISTER be pleased to state:

(a) whether Government has conducted any study on excessive reliance on foreign controlled Global Positioning Systems (GPS);

(b) if so, the details thereof and if not, the reasons therefor;

(c) whether Government is considering to launch a domestic GPS; 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) No formal study has been conducted on the above.

(b) Such a study was not taken up as it is already well-known that the foreign-controlled, US-operated GPS has attained widespread use in India due to its free-of-cost availability and numerous GPS-based systems in the open market. The Government has already initiated concrete steps to proliferate the usage of the indigenous satellite system named Indian Regional Navigation System (IRNSS) or Navigation with Indian Constellation (NavIC).

(c) Yes Sir. Government has approved the project for a domestic navigation system. ISRO has successfully implemented the same - NavIC (Navigation with Indian Constellation) or IRNSS (Indian regional Navigation Satellite System). The system is operational.

(d) The NavIC (IRNSS) is an independent Indian satellite-based navigation system to provide PNT (Position, Navigation and Time) service to users over Indian region and

region extending to about 1500km around India. It consists of a Space segment (seven satellite constellation) and Ground Segment (spread across India). The system provides navigation signals in two frequency band, the L5 and S-bands. Two types of services are offered by the NavIC system, namely Standard Positioning Service (Open service for civilians) and Restricted Service (Strategic users).

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 1735

TO BE ANSWERED ON THURSDAY, DECEMBER 27, 2018

INSTALLATION OF DOPPLER WEATHER RADARS IN HIMALAYAS

1735. SHRI HARSHVARDHAN SINGH DUNGARPUR:

Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has installed Doppler Weather Radars in Himalayas and other areas in the country;

(b) if so, the details thereof; and

(c) whether the radars are capable of monitoring snow, rain, avalanches and other severe weather events?

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) Indian Space Research Organisation (ISRO) in association with India Meteorological Department (IMD) has installed indigenously built, dual polarimetric, S-band Doppler Weather Radars (DWRs) at Cherrapunji, Meghalaya; Gopalpur, Orissa; Kochi, Kerala and Shriharikota, Andhra Pradesh and one C-band DWR at Thiruvananthapuram, Kerala.

(c) These DWRs are capable of monitoring rain and snow (hydrometeors) including the severe weather events such as cyclones, tornadoes, thunderstorms and heavy snowfalls. The information on snowfall obtained from DWR is useful in avalanche studies.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2540

TO BE ANSWERED ON THURSDAY, JANUARY 03, 2019

SETTING UP OF SPACE TECHNOLOGY PARK AND MUSEUMS

2540. SHRIMATI AMBIKA SONI:
DR. T. SUBBARAMI REDDY:
Will the PRIME MINISTER be pleased to state:

(a) whether ISRO has decided to set up space technology park and museums across the country;

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

(c) the places where the museums are likely to be set up; and

(d) the measures taken to educate and inform the masses about development of space 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) Yes, Sir. ISRO has plans to set up Space Galleries in various locations in the country.

(b) The Space Galleries are expected to disseminate the knowledge about space science and technology amongst the citizens of our country. The Gallery will consist of interactive methods/ models describing the principles of Space science and technology.

(c) Initially, Space Galleries are planned to be established at Birla Science Centre at Hyderabad, Nehru Science Centre at Mumbai and National Science Centre at Pragati Maidan in New Delhi. In addition to this, ISRO has taken initiatives to establish space gallery in all the national museums/ science centres (under Ministry of Culture) across the country in a phased manner.

(d) In addition to the Space Galleries, ISRO is planning to establish Knowledge centres, mobile exhibitions, competitions amongst students and various talks/ lectures on Space Science/ technology related aspects.

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GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

RAJYA SABHA
UNSTARRED QUESTION NO. 2541

TO BE ANSWERED ON THURSDAY, JANUARY 03, 2019

UFOs IN MANIPUR

2541. SHRI K. BHABANANDA SINGH:

Will the PRIME MINISTER be pleased to state:

(a) whether the Ministry is aware of Unidentified Flying Objects (UFOs) seen in certain parts of Manipur;

(b) whether Government could establish any link of UFOs with strange nocturnal predator that have killed a large number of livestock in many parts of the State;

(c) if so, the details in this regard; and

(d) whether Government would make a thorough investigation in the matter to clear the fear in the minds of general population in the State?

ANSWER

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

(a) & (b)

Unidentified flying objects reported by the general public have often been linked to aircraft activities & dynamical process in the atmosphere that mimics a moving object. At present, ISRO is unaware of detection of any Unidentified Flying objects from Manipur.

(c) Does not arise.

(d) ISRO could carry out a study in this regard, if any evidence on reported sightings is received.

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