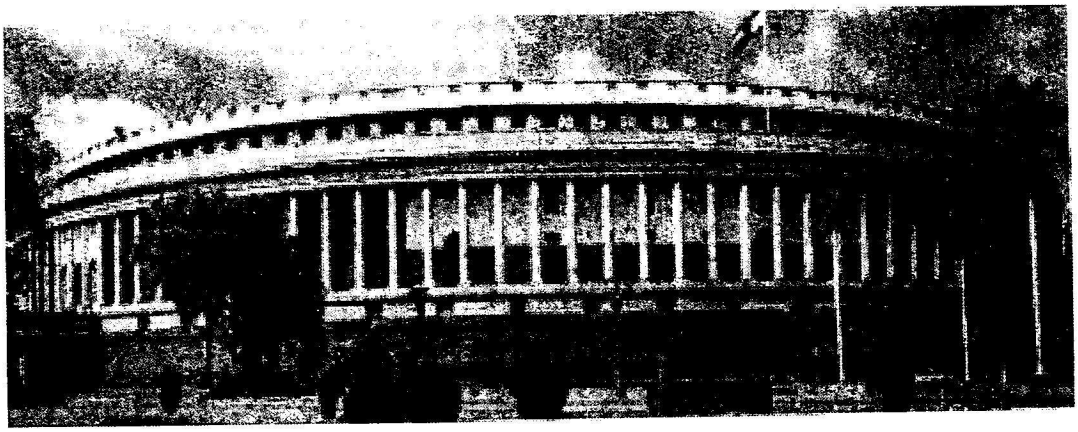
सत्यमेव जयते

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

"SPACE IN PARLIAMENT"



BUDGET SESSION OF PARLIAMENT 2023
(FEBRUARY – APRIL, 2023)

COMPILATION OF REPLIES GIVEN IN PARLIAMENT DURING 2023

Government of India
Department of Space
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PARLIAMENT QUESTIONS – BUDGET SESSION OF PARLIAMENT 2023
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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

STARRED QUESTION NO. 96

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 08, 2023

STARTUPS IN SPACE TECHNOLOGY BASED BUSINESSES

***96. SHRIMATI KANIMOZHI KARUNANIDHI**

Will the PRIME MINISTER be pleased to state:

(a) Whether the Government has accepted the involvement of private sector companies and startups in space technology based businesses;

(b) if so, the details of current policies and schemes to support these businesses;

(c) the details of existing public and private market share in space tech based markets in the country; and

(d) the details of total imports and exports carried out in space tech based industry in the country?

ANSWER

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

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

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(2)

STATEMENT LAID ON THE TABLE OF THE LOK SABHA IN REPLY TO STARRED QUESTION NO. 96 REGARDING "STARTUPS IN SPACE TECHNOLOGY BASED BUSINESSES" ASKED BY SHRIMATI KANIMOZHI KARUNANIDHI FOR ANSWERING ON WEDNESDAY, FEBRUARY 08, 2023.

(a) Yes, Sir

(b) As per the Gazette notification dated 02.10.2021, IN-SPACe has been mandated to promote, enable, authorize and supervise the Non-Governmental entities in Space sector in India. IN-SPACe has started authorizing Indian Space companies for utilization of ISRO facilities for the private companies / start-ups, installation of facilities within ISRO campuses, Launch of Satellites and launch vehicles, and Mentorship support. Till date, IN-SPACe has received applications from 135 NGEs in the Space Sector.

A new Seed fund scheme is approved by IN-SPACe board to provide initial financial assistance to Indian space start-ups. Further a differential pricing policy has been evolved by IN-SPACe.

Revised FDI policy in space sector to facilitate overseas investment in NGEs and a National Space Policy are in the process of final approval of the Government.

(c) With the announcement of Space Sector reforms, private players have started contributing to the Space economy and their share is increasing.

(d) **During financial year 2021-22, items worth Rs. 2,114.00 Cr (approx.) were imported for executing various projects/ programmes. The major imported items include EEE components, high strength carbon-carbon fibres, space qualified Solar Cells, Detectors, Optics, Power Amplifiers etc. During the financial year 2021-22, an amount of Rs. 174.90 Cr was generated towards export of launch services, data sales and in-orbit support services and post-launch operations.**

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 934

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 08, 2023

PRIVATE STARTUPS OFFERING SATELLITE SERVICES IN KARNATAKA

934. SHRI ANNASAHEB SHANKAR JOLLE:
SHRI SANGANNA AMARAPPA:

Will the PRIME MINISTER be pleased to state:

(a) whether The number of private startups in the State of Karnataka offering satellite services to global customers;

(b) whether the government is likely to accept Public Private Partnership (PPP) for the advancement of space technology and whether there is any proposal under consideration; and

(c) If so, the details thereof?

ANSWER

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

(DR. JITENDRA SINGH):

****

(5)

(a) Three known space startups located in Karnataka are offering satellite services to global customers.

(b) & (c)

In light of the space reforms announced by the Government in 2020, greater participation of Non-Government Entities (NGEs) is envisaged in carrying out end-to-end activities in space sector, under these reforms, Government may consider Public Private Partnership (PPP) for advancement of space technology.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1103

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 08, 2023

ESTABLISHMENT OF TELEMEDICINE NODES

1103. SHRI P. RAVINDHRANATH:

Will the PRIME MINISTER be pleased to state:

(a) the status of establishment & functioning of "Telemedicine Nodes" by Indian Space Research Organization (ISRO), towards providing emergency medical treatment services in remote areas, across India;

(b) whether there is any proposal to extend the telemedicine network of ISRO for the upcoming AIIMS at Madurai thereby ensuring remote Government hospitals, and primary health centers, situated across Tamil Nadu, that are going to avail expert consultation services, on need basis, including emergency medical services; and

(c) If so, the details thereof;

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC

(a) **Presently 190 Tele-medicine nodes are functional using satellite communication across the country. These nodes are established in remote and hilly regions of the country benefitting the Defence & Security agencies and General Public for Tele-consultations.**

(b) & (c) **ISRO has not received any request/proposal to establish Telemedicine network from AIIMS Madurai.**

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 1138

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 08, 2023

INSTITUTIONS FOR SPACE SCIENCE

1138. SHRI RAMESH BIDHURI:

Will the PRIME MINISTER be pleased to state:

(a) **whether the Government has taken any steps for development of space science, space research and satellite technology in the country;**

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

(c) **Whether any new institution has been established for space science in the country;**

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

(e) **the details of achievements space science during the last five years?**

ANSWER

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

(DR. JITENDRA SINGH):

****

(9)

(a) & (b)

Yes, the Government has taken various steps for the development of space science, space research and satellite technology in the country through:

i. **Realization of planetary and astronomy missions namely Chandrayaan-1 & 2, AstroSat, Mars Orbiter Mission providing space platforms for carrying out scientific observations.**

ii. **Data from the aforementioned missions are available for scientific community through Indian Space Science Data Centre portal.**

iii. **Upcoming missions like Aditya-L1, XPoSat, Chandrayaan-3 for further scientific research.**

iv. **Ground facilities for carrying out optical observations of planets and stars.**

v. **Providing funding support in devising space science curriculum and sensor / payload development at universities as well as research institutes for promotion of space science research.**

vi. **Development of technologies for deep space missions, in-situ scientific experiments, sensors and soft landings.**

(c), (d) & (e)

The details of achievements of space science, during the last five years, are as follows:

i. **Planetary missions have provided scientific insights of the surface, sub-surface and exo-sphere of the Moon, including detection of**

water molecules on the lunar surface, elemental mapping of the lunar exosphere and physics of the solar flares.

ii. The AstroSat mission has solved the mystery of a cosmic source which is bright in both infrared and Ultraviolet, providing better understanding of various astrophysical processes through simultaneous multi-wavelength observations.

AstroSat data has resulted in the publication of more than 750 articles and 12 Ph.D theses.

iii. Discovery of an exo-planet located at a distance of 750 light years through optical observations.

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(11)

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 955

TO BE ANSWERED ON WEDNESDAY, FEBRUARY 08, 2023

CAPACITY FOR FUTURE REALISATION

955. SHRI SANJAY KAKA PATIL:

SHRI MADILLA GURUMOORTHY

Will the PRIME MINISTER be pleased to state:

(a) whether the Government is taking measures to augment domestic capacity for future realization of Space Tourism;

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

(c) the progress made in this regard; and

(d) the obstacles faced till now and the proposed measures to be taken to address these challenges?

ANSWER

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

(DR. JITENDRA SINGH):

****

(a), (b) & (c)

Through Gaganyaan, India's maiden human spaceflight programme, ISRO is engaged in development of various

technologies, which are essential building blocks for human space missions. The objective of the Gaganyaan programme is the demonstration of human spaceflight capability to Low earth orbit. Future missions will be taken up after the accomplishment of Gaganyaan mission. ISRO has also carried out a few feasibility studies for a sub-orbital space tourism mission onboard a liquid propellant stage booster.

(d) Does not arise.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2414

TO BE ANSWERED ON WEDNESDAY, MARCH 15, 2023

PROMOTING SPACE RELATED INDUSTRIES

2414. SHRI SHANMUGA SUNDARAM K.:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has any plans to promote the establishment of space related industries as part of the Coimbatore Defence Corridore so as to promote the mutual Research and Development in both sectors and if so, the details thereof; and

(b) if not, the reasons therefor?

ANSWER

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

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(14)

(a) & (b)

Various promotion related initiatives for space related industries are being undertaken under the ambit of IN-SPACe (Indian National Space Promotion & Authorisation Centre). Presently, no proposals have been received by IN-SPACe with regards to the establishment of space related industries in the Coimbatore Defence Corridor.

****

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2363

TO BE ANSWERED ON WEDNESDAY, MARCH 15, 2023

PRIVATE SECTOR IN SPACE INDUSTRY

2363. SHRI KAMLESH PASWAN:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government allows private sector in the space industry; and

(b) if so, the details of the benefits of private sector participation in the space industry?

ANSWER

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

(DR. JITENDRA SINGH):

****

(a)& (b)

Yes, Sir. Government envisages enhanced participation of private sector in conducting end-to-end space activities in the space sector. Participation of private sector including academic institutions, Start-ups and Industries in space industry is expected to expand the national space economy, generate more employment opportunities, create a thriving space ecosystem and result in increased Indian share in the global space economy in long term.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2452

TO BE ANSWERED ON WEDNESDAY, MARCH 15, 2023

STRENGTHENING OF IN-SPACe

2452. SHRI VINOD KUMAR SONKAR:

SHRI BHOLA SINGH:

SHRI RAJVEER SINGH (RAJU BHAIYA):

DR. SUKANTA MAJUMDAR:

Will the PRIME MINISTER be pleased to state:

(a) whether the country is planning to launch a human spaceflight – Gaganyaan to explore the moon and neigbouring planets;

(b) if so, whether the Government has enhanced the budget allocation in this regard and if so, the details thereof;

(c) whether the Government has planned to strengthen Indian National Space Promotion and Authorisation Centre (IN-SPACe);

(d) if so, the budget allocation and revenue earned by the IN-SPACe since its inception; and

(e) the other steps being taken by the Government to strengthen the space sector in the country?

(17)

ANSWER

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

****

(a) The scope of Gaganyaan programme is to demonstrate human spaceflight capability to Low Earth Orbit and safe return. ISRO is developing indigenous technologies for Human rated launch vehicle, Habitable Crew Module, Life Support System, Crew Escape System, Ground Station Network, Crew Training and Recovery. These technologies are crucial to meet the objectives of Gaganyaan mission and to take up any further interplanetary missions.

(b) The currently allocated budget of Rs. 9023 Cr. is towards achieving the objectives of Gaganyaan mission.

(c) & (d)

Government has created the Indian National Space Promotion and Authorization Centre (IN-SPACe), as the single window agency to promote, enable, authorize and supervise the Non-Government entities in Space Sector in India.

IN-SPACe has started to facilitate the private companies / start-ups, in installation of facilities within ISRO campuses, launch of satellites and Launch Vehicles, and Mentorship support. Till date, IN-SPACe has received applications from more than 160 NGEs in the Space Sector.

The Budget Allocation and details regarding Revenue are presented below:

(Amount in Rs.)

IN-SPACe Financial Year (FY)	BE	RE	Revenue earned by IN-SPACe
2022-23	33 Cr.	21 Cr.	With Joint Project Implementation Plan (JPIP) terms the facility usages charges of ISRO is paid by the Vendor directly to the concerned ISRO Centre.
2023-24	95 Cr.	-	

(e) Government has taken a number of steps to strengthen the space sector in the country.

The sector has already been opened up for enhanced participation of private enterprises in the space sector by allowing them to conduct end-to-end activities across all verticals of space domain. In this regard, IN-SPACe has been created for the promotion and handholding of Non-Government Entities.

The role of New Space India Limited [NSIL] has also been widened to bring forth a commerce-oriented approach towards the conduct of space activities.

Besides, several private industries are also contributing significantly to the Indian space programme led by ISRO, delivering subsystems and components.

The Department of Space is also in the process of formulating a comprehensive, overarching space policy that shall provide a further boost to the entire space ecosystem.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2438

TO BE ANSWERED ON WEDNESDAY, MARCH 15, 2023

FUNDS ALLOCATED TO OBSERVATORIES

2438. SHRI D.M. KATHIR ANAND:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has sanctioned adequate funds for the Vainu Bappu Observatory at Kavalur, Vellore and Kodaikanal Solar Observatory and if so, the funds allocated to the two observatories in the last nine years, year-wise;

(b) whether the Indian Institute of Astrophysics and the ISRO has taken any efforts to initiate and facilitate space research studies from both the observatories and if so, the details thereof; and

(c) the measures taken by the Government to make these two observatories as educational tour destination for school and college students across the country?

ANSWER

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

****

(a) Yes Sir. Department of Science and Technology provides core grant support to Indian Institute of Astrophysics (IIA) for maintaining solar observational facilities and carrying out related research activities. The funds are not sanctioned/ allocated separately for the field stations like Vainu Bappu Observatory (VBO) at Kavalur and Kodaikanal Solar Observatory (KSO), Kodaikanal.

The details of the total expenditure incurred during the last nine years for both the above field stations are shown below year-wise:

(Rs. In lakhs)

Year	Kodaikanal Solar Observatory	Vainu Bappu Observatory
2014-15	146.37	146.83
2015-16	169.64	154.82
2016-17	141.06	180.87
2017-18	163.64	186.26
2018-19	215.07	289.77
2019-20	318.83	217.70
2020-21	253.08	184.79
2021-22	295.46	246.97
2022-23	382.85	385.38

(b) Yes, Sir. IIA carries out a large number of research studies from both the observatories in collaboration with ISRO. Similarly, the ISRO scientists have also availed the facilities at the VBO, Kavalur for their scientific pursuits.

(c) The Vainu Bappu Observatory (VBO) and Kodaikanal Solar Observatory are opened for public visits. School and college students regularly visit these Observatories to get some knowledge about the astronomical research being undertaken at these observatories.

At Kodaikanal, students visit the Museum and the IIA Archives at the library and are taken on a tour of the research telescopes, followed by night sky watching. IIA also organizes Winter and Summer Schools on basic astronomy every year at Kodaikanal for University students.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 2417

TO BE ANSWERED ON WEDNESDAY, MARCH 15, 2023

GAGANYAAN MISSION

2417. SHRI KESINENI SRINIVAS:

Will the PRIME MINISTER be pleased to state:

(a) the current project status of the Gaganyaan Mission;

(b) whether it is a fact that the Government had set 2022 as the deadline for conceptualizing the Gaganyaan mission, if so, the details thereof;

(c) whether the execution of the Gaganyaan mission has since been delayed;

(d) if so, the reasons therefor;

(e) the remedial steps the Government is planning to take in order to expedite the execution of the project; and

(f) the total expenditure incurred by the Government in the Gaganyaan Mission till October 2022 and the details of any overhead expenditures incurred due to the delay?

(24)

ANSWER

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

****

(a) The current project status of the Gaganyaan is as follows:

I. All the design activities are completed, proto models testing commenced for all systems. Manufacturing of all the systems have been initiated and in progress.

II. The Human rated Launch vehicle systems (HLVM3) are tested and qualified. All propulsion systems tests for higher margins completed.

III. Test Vehicle TV-D1 mission for demonstration of crew escape system designed, and stage for first flight realised. The Crew Module structure for TV-D1 mission is delivered.

IV. Static tests of all Crew Escape System motors have been completed. Batch testing is in progress.

V. First semester of Astronauts training has been completed. Crew evaluation and assessment activities have also been completed.

VI. Orbital module for uncrewed G1 mission realization in progress. For qualification of Parachutes and pyros through Ground and Air drop tests underway.

VII. Recovery trials of crew module from sea commenced at Water Survival Test Facility (WSTF), Indian Navy, Kochi.

(b), (c) & (d)

Yes Sir, the target for launching first crewed mission of Gaganyaan has been in 2022. However, due to lockdowns, disruptions in raw material supply chain from foreign sources and delays in hardware realization from industries, the schedule is modified. Moreover, Gaganyaan Advisory Council has recommended testing of Crew Escape System and deceleration systems through four abort missions using Test Vehicle (TV) and Integrated Air Drop Tests before proceeding with crewed missions. This is in addition to the two uncrewed missions planned earlier.

(e) In the post-lockdown phase, the activities with respect to Gaganyaan progressed well at various work centers. Department of Space has taken various steps to accomplish Gaganyaan through establishment of dedicated teams at all ISRO centres for design, quality and Human rating certification, and establishment of fast-track procurement committees.

Now resuming in the post lockdown phase, the design of various systems related to Gaganyaan is completed and the program has

entered the realization and testing phase. Presently, Gaganyaan is the high priority activity for Department of Space.

The first test vehicle mission, TV-D1, is planned in May 2023, followed by the second test vehicle TV-D2 mission and first uncrewed mission of Gaganyaan (LVM3-G1) in the first quarter of 2024.

The second series of test vehicle missions (TV-D3& D4) and LVM3-G2 mission with robotic payload is planned next. The Crewed mission is planned by end of 2024 based on the outcome of the successful test vehicle and uncrewed missions.

(f) The total expenditure incurred for Gaganyaan program as on 30th October 2022 is Rs 3040 Cr. All the budgeted items for Gaganyaan have been already committed for identified activities.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 3566

TO BE ANSWERED ON WEDNESDAY, MARCH 22, 2023

REVENUE OF GLOBAL SPACE INDUSTRY

3566. SHRI MANISH TEWARI:

Will the PRIME MINISTER be pleased to state:

(a) whether it is estimated that the global space industry could generate revenue of more than $1 trillion or more by 2040; and

(b) if so, the proposed future contribution of the Indian Space Industry to the global space industry by 2040?

ANSWER

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

****

(a) As per a research study undertaken by one of the global consulting firms in 2020, revenue generated by global space industry may increase to over $1 trillion by 2040. However, it must be noted that the exact sizing of the global space industry, including future projections, is a complex exercise and a matter of much debate, with several global consulting firms predicting varied current and future numbers.

(b) Government envisages a substantial contribution of the Indian Space Industry to the global space industry by 2040, in pursuance of which it has taken several steps, through the reforms undertaken in 2020, which seek to augment the space sector in the country with greater participation of Non-Governmental Entities [NGEs].

As a part of these reforms, NSIL role has been enhanced to bring a commerce-oriented approach to space activities, with the agency acting as an aggregator of user requirements and to obtain commitments. Also, the Indian National Space Promotion & Authorization Centre [IN-SPACe] has been created as a single window agency to promote, handhold and authorize the activities of NGEs in the sector, thus providing them with a level playing field.

****

O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 3669

TO BE ANSWERED ON WEDNESDAY, MARCH 22, 2023

NEW SPACE RESEARCH CENTRE

3669. SHRI NIHAL CHAND:

Will the PRIME MINISTER be pleased to state:

(a) The extant number of research centres of Indian Space Research Organisation (ISRO) in the country, State/UT-wise;

(b) The status of the country in the space research sector in comparison to other countries;

(c) Whether the Union Government is contemplating to set up new Space Research Centres in other parts of the country as well, if so, the details thereof; and

(d) The progress made in the Indian Space Research sector during the last five years?

ANSWER

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

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(a) Indian Space Research Organization under Department of Space has its Research Centers/Units spread throughout the country with following distribution:

Centres/Units/Liaison Office	State	Number
Regional Remote Sensing Centre [RRSC] (West)	Rajasthan	3
Solar Observatory		
Infrared Observatory		
Space Applications Centre	Gujarat	2
Physical Research Laboratory		
Delhi Earth station	Delhi	2
Regional Remote Sensing Centre [RRSC] (North)		
Indian Institute of Remote Sensing	Uttarakhand	1
ISTRAC Ground Station	Uttar Pradesh	1
Regional Remote Sensing Centre [RRSC] (East)	West Bengal	1
North Eastern Space Applications Centre (NESAC)	Meghalaya	1
Regional Remote Sensing Centre [RRSC] (Central)	Maharashtra	1
Master Control Facility (Bhopal)	Madhya Pradesh	1
National Remote Sensing Centre [NRSC]	Telangana	1

Centres/Units/Liaison Office	State	Number
Satish Dhawan Space Centre [SDSC]	Andhra Pradesh	2
National Atmospheric Research laboratory [NARL]		
U R Rao satellite Centre [URSC]	Karnataka	6
Human Spaceflight Centre [HSFC]		
Laboratory for Electro optics Systems [LEOS]		
ISRO Telemetry , Tracking and Command Network [ISTRAC]		
Regional Remote Sensing Centre [RRSC] (South)		
Master Control Facility [MCF]		
Vikram Sarabhai Space Centre [VSSC]	Kerala	4
Liquid Propulsion Systems Centre [LPSC]		
ISRO Inertial Systems Unit [IISU]		
Indian Institute of Space Science and Technology [IIST]		
ISRO Propulsion Complex [IPRC]	Tamil Nadu	1
Down range Station	Andaman &	1

(32)

Centres/Units/Liaison Office	State	Number
	Nicobar Islands	

(b) India is the fifth amongst spacefaring nations having end-to-end capabilities in space research and development, including the capability to launch from our own land and operate programs of earth observation, satellite communication, meteorology, space science & navigation and ground infrastructure. Now, NewSpace industries are also emerging at fast pace after space sector reforms.

(c) As of now, there are no specific plans to set up new space research centres in other parts of country.

(d) During the last five years, significant progress has been made in the Indian Space Research sector. Some of the major achievements are listed below:

- **24 satellite missions and 20 Launch Vehicle missions have been successfully accomplished during the period, besides a technology demonstrator mission - the successful Pad Abort Test (PAT) to qualify the Crew Escape System (CES) in July 2018.**
- **In June 2018, India announced a capacity building training programme UNNATI (UNispace Nanosatellite Assembly & Training by ISRO) on Nanosatellites development through a combination of theoretical coursework and hands-on training on Assembly, Integration and Testing (AIT). First batch of UNNATI Programme was conducted from 15th**

January to 15th March 2019 wherein 30 participants from 17 countries had benefitted. Second batch was held in Oct-Dec 2019. The third batch was conducted between October 15, 2022, and December 15, 2022. Thirty-one participants from 19 countries attended the training.

- **India's second mission to Moon, Chandrayaan-2 was successfully launched on July 22, 2019 on-board GSLV Mk III-M1, first operational flight of this new launch vehicle. Chandrayaan-2 Orbiter is providing valuable science data for the research community.**
- **The launch of PSLV-C48/ RISAT-2BR1 in December, 2019 marked the 50th launch of PSLV, the workhorse launch vehicle.**
- **In 2019, ISRO launched an annual special programme called "Young Scientist Programme" or the *"YUva VIgyani KAryakram"* (YUVIKA), in line with the Government's vision "Jai Vigyan, Jai Anusandhan". The Program is primarily aimed at imparting basic knowledge on Space Technology, Space Science and Space Applications to the young talents with the intent of encouraging them in the fascinating domain of outer space. Second batch of YUVIKA programme was held in May 2022, with the third edition planned in May 2023.**
- **NewSpace India Limited (NSIL) was incorporated in 2019, as a wholly owned Government of India Undertaking/ Central Public Sector Enterprise (CPSE), under the**

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administrative control of Department of Space (DOS), to enable Indian Industries to scale up high-technology manufacturing base for space programme and to commercially exploit the products and services emanating from the Indian Space Programme for meeting the domestic and global customer needs

- **On June 26, 2020, the Government of India announced Space Sector Reforms – a major transformation of Indian Space Sector with enhanced participation of private players in Indian space programme and playing key roles to boost India's market share in Global Space Economy.**
- **Setting up of Indian National Space Promotion and Authorisation Centre (IN-SPACe) and enhancing the role of New Space India Limited (NSIL) are the two major thrust areas in the Reform.**
- **The establishment of IN-SPACe was announced in June 2020 by Government of India, as a single window agency under the Department of Space, to create eco-system of industry, academia and start-ups and to attract major share in the global space economy, by authorizing and regulating activities of NGEs in space sector through detailed guidelines and procedures.**
- **A dedicated ISRO System of Safe and Sustainable Space Operations Management (IS^4OM) has been established in July, 2022 to collate all Space Situational Awareness**

efforts in India and to act as a hub for the relevant data exchanges and collaborations.

- LVM3 (GSLV MkIII) M2/OneWeb India-1 Mission was successfully accomplished on 23rd October 2022. With this launch, LVM3 exemplifies Atmanirbharata and enhances India's competitive edge in the global commercial launch service market.
- Launch of Vikram-S (Prarambh mission), a suborbital launch vehicle from M/s. Skyroot Aerospace Pvt. Ltd., Hyderabad, was accomplished successfully on 18th November 2022.
- First private launchpad & mission control center established by M/s. Agnikul Cosmos Pvt. Ltd., Chennai in ISRO campus at Sathish Dhawan Space Centre, Sriharikota on 25th November 2022. Agnilet Semi-cryogenic rocket engine developed by Agnikul was successfully hot tested at ISRO facility on 04th November 2022.
- HAL and L&T consortia have been identified as Indian Industry partner for end-to-end production of 5 Nos. of PSLV.
- On February 10th, 2023, the successful flight of Small Satellite Launch Vehicle (SSLV – D2) took place, launching three satellites – EOS-07, Janus-1 and AzaadiSAT-2 – into their intended orbits.

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- **AzaadiSAT-2 – an 8.7 kg satellite built as a combined effort of about 750 girl students across India guided by Space Kidz India, Chennai, was launched aboard SSLV-D2**
- **On March 7th, 2023, controlled re-entry experiment for the decommissioned Megha-Tropiques-1 (MT-1) satellite was carried out successfully, with final impact in the Pacific Ocean, demonstrating the nation's continued efforts towards ensuring the long-term sustainability of outer space activities.**
- **Large research projects are being undertaken by ISRO in all advanced technology domains such as Space transportation systems, propulsion systems, Artificial Intelligence, Quantum Communication, etc. across all ISRO centres and also in collaboration with research institutes and industries.**

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O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 4663

TO BE ANSWERED ON WEDNESDAY, MARCH 29, 2023

SETTING UP ISRO SPACE CENTRE IN BIHAR

4663. SHRI DILESHWAR KAMAIT:

Will the PRIME MINISTER be pleased to state:

(a) the total number of space centres set up across the country;

(b) whether the Government proposes to set up ISRO space centre in Bihar under the private sector keeping in mind the interests of young entrepreneurs and students in the field of space science; and

(c) if so, the details of the facilities likely to be provided to the youths under the said scheme?

ANSWER

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

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(a) Department of Space has 31 space centres across the country, comprising of Centres/Units of Indian Space Research Organisation, Autonomous Bodies and Public Sector Enterprises.

(b) & (c)

Keeping in mind, the interests of young entrepreneurs and students in the field of space science, ISRO has set up the Regional Academic Centre for Space (RAC-S) at NIT, Patna.

Regional Academic Centre for Space (RAC-S) is a regional level initiative to pursue advanced research in the areas of relevance to the future technological and programmatic needs of the Indian Space Programme and act as a facilitator for the promotion of space technology activities in the region.

The selected institute for the establishment of RAC-S will coordinate the research activities and will act as the lead centre. RAC-S will also engage other institutes of excellence in the area of Science and Technology in the region to take part in the research and development activities of the centre.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 4664

TO BE ANSWERED ON WEDNESDAY, MARCH 29, 2023

SHARE IN GLOBAL SPACE MARKET

4664. COL. RAJYAVARDHAN RATHORE:

Will the PRIME MINISTER be pleased to state:

(a) whether India's share in Global Space Market has increased since 2014, if so, the details thereof;

(b) the data on exports and imports carried out in the space technology industry, since 2014, year-wise;

(c) the achievements made to boost 'ISRO' through 'Atmanirbhar Bharat';

(d) the achievements in indigenization of space technology business and startups in India since 2014;

(e) the details of the achievements made by the Government in the field of space since 2014, along with upcoming missions; and

(f) the details of foreign satellites launched by India since 2014 and the year-wise data on revenue generated through it?

ANSWER

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

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(40) **(a) Several steps have been taken to increase India's share in global space market, through the reforms undertaken in 2020, which seek to augment the space sector in the country with greater participation of Non-Governmental Entities [NGEs].**

As a part of these reforms, NSIL role has been enhanced to bring a commerce-oriented approach to space activities, with the agency to act as an aggregator of user requirements and undertake space activities in a demand-driven mode. Also, the Indian National Space Promotion & Authorization Centre [IN-SPACe] has been created as a single window agency to promote, handhold and authorize the activities of NGEs in the sector, thus providing them with a level playing field.

These steps are expected to increase India's share in the global space market, which as per an estimate undertaken in 2019, stood at 2-3%.

(b) The data on exports and imports carried out in the space technology industry, since 2014, year-wise is given below:

(Rs. in crores)

Financial Year	Imports	Exports
2014-15	2211.37	308.45
2015-16	2255.03	258.73
2016-17	2708.70	230.81
2017-18	2201.60	236.54
2018-19	3376.38	330.08
2019-20	3213.37	287.53
2020-21	2261.02	271.46
2021-22	2310.42	188.40

(c) The Indian Space Research Organization (ISRO) has over the years made significant contributions to 'Atmanirbhar Bharat' by placing India as one of the leading spacefaring nations having end-to-end capabilities in space research and development, including the capability to launch from our own land and operate programs of earth observation, satellite communication, meteorology, space science & navigation and ground infrastructure. Further, now NewSpace industries are also emerging at fast pace after space sector reforms.

(d) Through continuous efforts, including involvement of Indian industries, the national space programme has resulted in the indigenous development of various materials & alloys and chemicals/propellants. The number of indigenous space technology business and start-ups has seen a tremendous growth, since 2014, with the latest figures indicating 167 Start-ups registered under "Space technology" category.

(e) Following are the major achievements made by the Government in space domain since 2014:

- **Altogether 45 spacecraft missions, 44 launch vehicle missions and 5 technology demonstrators, have been successfully realized, since 2014 till date.**
- **In January 2014, the first successful flight with indigenous Cryogenic Upper Stage, in the GSLV-D5 launch vehicle was achieved and GSAT-14 was placed into GTO.**
- **In September 2014, India's Mars Orbiter Spacecraft successfully entered into an orbit around planet Mars, putting India into a league of select nations which had sent a spacecraft to the Red Planet.**
- **In December 2014, the country witnessed the experimental flight of the next generation launch vehicle – the GSLV MKIII. The LVM3-**

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X/CARE Mission, the first experimental suborbital flight of the vehicle, launched the Crew Module Atmospheric Re-entry experiment (CARE).

- AstroSat launched by PSLV in September 2015, is the first dedicated Indian astronomy mission aimed at studying celestial sources in X-ray, optical and UV spectral bands simultaneously. AstroSat has made major breakthroughs by discovering five new galaxies.
- ISRO has established and operationalised Navigation with Indian Constellation (NavIC) which provides highly accurate Position, Navigation and Time information to users in India and its surroundings. A total of 7 satellites form the Indian Regional Navigation Satellite System [IRNSS] – all launched by PSLV, with IRNSS-1G completing the constellation in 2016.
- Various NavIC based services have been rolled out in many key sectors like - integration of NavIC-enabled devices with the enrolment architecture of UIDAI Aadhar enrolment, incorporation of NavIC in the Continuously Operating Reference Stations (CORS) network, in agricultural drones and Radio Technical Commission for Maritime Services (RTCM) etc.
- Successful flight testing of Reusable Launch Vehicle-Technology Demonstrator (RLV-TD) was done on May 23, 2016 from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota.
- The first experimental mission of ISRO's Scramjet Engine towards the realisation of Air Breathing Propulsion System was also successfully conducted in 2016 from SDSC SHAR, Sriharikota.
- In 2017, PSLV C-37 created a world record by successfully placing 104 satellites in orbit during a single launch.

- **In response to an idea mooted by the Hon'ble Prime Minister in 18th SAARC summit, ISRO launched the 2.2 Ton communication satellite in 2017 to support neighbouring countries.**
- **The first developmental mission of GSLV Mk-III D1 was successfully accomplished in June-2017 and boosted GSAT-19 satellite into geosynchronous transfer orbit.**
- **ISRO demonstrated a crucial technology element of Human spaceflight in July 2018- The Pad Abort Test (PAT) to qualify the Crew Escape System (CES). The Pad Abort Test flight was a demonstration of the capability of CES to evacuate the Crew in case of a contingency at launch Pad.**
- **In the Independence Day address – 2018, the Hon'ble Prime Minister announced the "Gaganyaan Programme", marking India's foray into the new age of human space exploration.**
- **GSAT-29 high throughput communication satellite was successfully launched on November 14, 2018, on-board GSLV Mk III-D2. It is providing satellite based connectivity to Jammu & Kashmir and North Eastern regions of India.**
- **In 2018, ISRO's next generation high throughput communication satellite, GSAT-11 was successfully launched on December 05, 2018 from Kourou, French Guiana by Ariane-5 VA-246. Weighing about 5854 kg, GSAT-11 is the heaviest satellite built by ISRO.**
- **India's second mission to Moon, Chandrayaan-2 was successfully launched on July 22, 2019 on-board GSLV Mk III-M1, first operational flight of this new launch vehicle. Chandrayaan-2 Orbiter is providing valuable science data for the research community.**
- **The launch of PSLV-C48/ RISAT-2BR1 in December 2019 marked the 50th launch of PSLV, the workhorse launch vehicle.**

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- **Quantum entanglement based real time Quantum Key Distribution (QKD) over 300m atmospheric channel along with quantum-secure text, image transmission and quantum-assisted two-way video calling was demonstrated on 27 January 2022.**
- **A dedicated ISRO System of Safe and Sustainable Space Operations Management (IS^4OM) has been established in July, 2022 to collate all Space Situational Awareness efforts in India and to act as a hub for the relevant data exchanges and collaborations.**
- **LVM3 (GSLV MkIII) M2/OneWeb India-1 Mission was successfully accomplished on 23rd October 2022. With this launch, LVM3 exemplifies Atmanirbharata and enhances India's competitive edge in the global commercial launch service market.**
- **As part of Gaganyaan programme, new Test Vehicle for testing critical systems is developed. 'Integrated Main Parachute Airdrop Test (IMAT)' of crew module deceleration system was successfully carried out at Babina Field Fire Range (BFFR), Jhansi, Uttar Pradesh on 18th November 2022.**
- **Launch of Vikram-S (Prarambh mission), a suborbital launch vehicle from M/s Skyroot Aerospace Pvt. Ltd., Hyderabad, was accomplished successfully on 18th November 2022.**
- **First private launchpad & mission control center established by M/s Agnikul Cosmos Pvt. Ltd., Chennai in ISRO campus at SDSC, SHAR on 25th November 2022. Agnilet Semi-cryogenic rocket engine developed by Agnikul was successfully hot tested at ISRO facility on 04th November 2022.**
- **Recently, PSLV-C54 successfully launched EOS-06 satellite on 26th November 2022 along with Eight Nano-satellites including INDIA-BHUTAN SAT (INS-2B).**

- **On Feb 10th, 2023, the successful flight of Small Satellite Launch Vehicle (SSLV – D2) took place, launching three satellites – EOS-07, Janus-1 and AzaadiSAT-2 – into their intended orbits.**
- **Two nano-satellites from Indian space start-up M/s DhruvaSpace were launched as a rideshare passenger in PSLV-C54 mission. Gen-1 satellites from M/s OneWeb was launched using LVM3 (GSLV Mk-III). AzaadiSAT-2 – an 8.7 kg satellite built as a combined effort of about 750 girl students across India guided by Space Kidz India, Chennai, was launched aboard SSLV-D2.**
- **On March 7th, 2023, controlled re-entry experiment for the decommissioned Megha-Tropiques-1 (MT-1) satellite was carried out successfully, with final impact in the Pacific Ocean, demonstrating the nation's continued efforts towards ensuring the long-term sustainability of outer space activities.**
- **Further in 2023, a range of missions including commercial launches from NSIL and scientific missions such as Aaditya – L1 and Chandrayaan -3 are planned to be realized, besides the recent launch of 36 OneWeb satellites aboard LVM3-M3.**

(f) During last 8 years from 2014-2022, a total of 388 foreign satellites have been launched on commercial basis on-board ISRO's launch vehicle. Year wise details of satellites launched are as indicated below:

Year	No. of Foreign Satellites Launched
2014	5
2015	17
2016	22
2017	130

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Year	No. of Foreign Satellites Launched
2018	60
2019	50
2020	9
2021	14
2022	44
2023 (as on March)	37
Grand Total	388

Net Revenue earned in Foreign Exchange by launching these 388 foreign satellites amounts to approx. 157 Million USD and 188 Million Euros

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 4702

TO BE ANSWERED ON WEDNESDAY, MARCH 29, 2023

SPACE PROGRAMMES AND MISSIONS

4702. SHRI LALLU SINGH:

Will the PRIME MINISTER be pleased to state:

(a) the details of India's space programmes and missions to be launched in the year 2023;

(b) whether the Indian Space Agency will also send a mission to study the Sun;

(c) if so, the details regarding the mission;

(d) whether the Indian Space sector is opening its door to private companies and space startups in the country; and

(e) if so, the details thereof?

ANSWER

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

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(a) Major space programmes and missions launched / to be launched in 2023 include:

(48)

- **The 2nd development flight of Small Satellite Launch Vehicle (SSLV) – the SSLV D2- successfully launched on February 10, 2023 carrying three satellites: EOS-07, Janus-1 and AzaadiSAT-2 into their intended orbits.**
- **The commercial launch of the next batch of 36 satellites for OneWeb- India aboard the LVM3 through NSIL – the LVM3-M3/OneWeb India -2 mission is scheduled for March 26,2023**
- **NSIL sponsored commercial launches of TeLEOS-2 aboard the PSLV C55, DS-SAR aboard the PSLV C-57 and ANWESHA aboard the PSLV C58 are also scheduled in 2023.**
- **The configuration and design of various systems related to Gaganyaan is completed and the programme has entered the realization and testing phase. The first test vehicle mission, TV-D1, is planned in mid-2023.**
- **The launch of GSLV F12 carrying the Navigation satellite – NVS-01 is scheduled in 2023. This is the first of the series of NaVIC satellites with L1 band and greater security.**
- **The Reusable Launch Vehicle Landing Experiment [RLV-LEX] is also scheduled during early 2023.**
- **Further, there are major space science expeditions planned to be held in 2023:**
- **Aaditya-L1 - the first Indian Space mission to study the Sun, aboard the PSLV C56;**
- **XPoSAT- The X-Ray Polarimeter Satellite, India's first dedicated polarimetry mission to study the dynamics of bright astronomical X-ray sources in extreme conditions, aboard the SSLV-D3; and**

- **Chandrayaan-3 - the follow-up mission to Chandrayaan-2, intended to demonstrate soft landing on the lunar surface, aboard the LVM3-M4. The spacecraft is being readied incorporating the learnings from Chandrayaan-2 mission, with additional tests being conducted towards ensuring a higher degree of ruggedness in the lander.**
- **The launch of Radar Imaging Satellite- RISAT 1 B aboard the PSLV C60 is planned in 2nd half of 2023.**
- **Besides, a host of private sector activities, including launch vehicles and satellite launches, are also expected to happen in 2023.**

(b) & (c)

Yes, Sir. The Indian Space Research Organization will send a mission called Aditya-L1 to study the Sun. The Aditya-L1 spacecraft will conduct solar observation from a halo orbit around the first Sun-Earth Lagrangian point. The scientific instruments for this mission are developed by the Indian Institute of Astrophysics (IIA), Bangalore, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune, Physical Research Laboratory (PRL), Ahmedabad, U R Rao Satellite Centre (URSC/ISRO), Bangalore, Laboratory for Electro Optics Systems (LEOS/ISRO), Bangalore and Space Physics Laboratory (SPL/ISRO), Trivandrum.

The scientific objectives of Aditya-L1 mission include understanding the coronal heating and solar wind acceleration, understanding the initiation of Coronal Mars Ejection (CME), to understand coupling and dynamics of the solar atmosphere, as well as the solar wind distribution at the first Sun- Earth Lagrangian point. This mission is unique with its capability of imagining the solar disk in the near - UV band; study of the CME

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dynamics close to the solar disk (~ from 1 ·05 solar radius) and thereby providing information in the acceleration regime of the CME which is not observed consistently; as well as its capability to study the directional and energy anisotropy of solar wind using multi-direction observations.

(d) & (e)

Yes, Sir. Government envisages enhanced participation of private sector in conducting of end-to-end activities in the space sector. Participation of private sector including academic institutions, start-ups and industries in end-to-end space activities is expected to expand the national space economy; generate more employment opportunities; create a thriving space ecosystem and result in increased Indian share in the global space economy in long term.

In order to increase India's share in global space economy, Government of India under visionary leadership has carried out space sector reforms to allow participation on Indian private sector in space activities. An autonomous nodal agency the Indian National Space Promotion and Authorization Centre (IN-SPACe) has been formed on June 24, 2020. The IN-SPACe will promote, enable, authorize and supervise private enterprises and start-ups to undertake space activities. This will enhance the diffusion of space technology and boost space economy within the country, for a resurgent, Atmanirbhar Bharat. These far-reaching space reforms initiatives by the Government of India in June 2020 will give a major fillip to private sector space industry, including the start-ups.

The major initiatives that IN-SPACe has taken up include enabling start-ups to use ISRO facilities and providing Mentorship support.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 4756

TO BE ANSWERED ON WEDNESDAY, MARCH 29, 2023

GEOSPATIAL PORTAL BHUVAN

4756. SHRI KURUVA GORANTLA MADHAV:

Will the PRIME MINISTER be pleased to state:

(a) the details of the features of the indigenous Geospatial Portal Bhuvan;

(b) the details of the progress made thereunder including the significance of the same; and

(c) the other measures being taken by the Government in this regard?

ANSWER

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

(DR. JITENDRA SINGH):

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(a) Bhuvan portal has features for visualization of satellite data and value-added thematic services pertaining to Disaster Management support, Weather, Ocean Sciences, Asset Mapping, Planning and Development, Monitoring and Evaluation, Location

based services, framework for collaborations and mashups. As of now, Bhuvan possess 100+ layers of satellite data, 15 different thematic datasets, disaster specific data, weather and climate data, 100+ million rich point of interest, 190+ Web GIS applications, APIs and Analytics, AI ML solutions, open-source solutions, multi-lingual platform with 18 lakh unique users and 550 million total hits every month.

(b) Since the inception of Bhuvan in 2009 and being one stop Indian EO portal, Bhuvan has been upgraded with state-of-the-art infrastructure, its content, dissemination mechanism, governance application, citizen centric application and currently focusing its activities on data analytics platform. Bhuvan supports around 40 flagship programmes of Government of India and several State level applications.

(c) Other measures being taken includes sharing of Bhuvan services and high resolution satellite data as a Web Map Services (WMS) to industry and start-ups through IN-SPACe, improved citizen centric applications by densifying civic amenities information and urban infrastructure, strengthening of mobile friendly services and end-to-end applications development.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

LOK SABHA

UNSTARRED QUESTION NO. 5386

TO BE ANSWERED ON WEDNESDAY, APRIL 05, 2023

STATUS OF GAGANYAAN PROGRAMME

5386. SHRI JAGANNATH SARKAR:

Will the PRIME MINISTER be pleased to state:

(a) the current status of the Indian Gaganyaan Human Space Flight Programme;

(b) whether the Government has the details of the major space programmes and flights to be launched with indigenously developed technologies in the near future; and

(c) if so, the details thereof, if not, the reasons therefor?

ANSWER

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

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(a) The current status of the Indian Gaganyaan Human Space Flight Programme is as follows:

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i. All the subsystems pertaining to Test Vehicle TV-D1 mission viz., stage hardware, pyros, auxiliary systems, launch complex systems etc. have been realized. The Crew Module for TV-D1 mission is delivered.

ii. Static tests of all Crew Escape System motors have been completed. Batch testing is in progress.

iii. First semester of Astronaut training has been completed. Corresponding crew evaluation and assessment activities have also been completed. Second semester is underway.

iv. Orbital module configuration for uncrewed G1 mission is finalised and realization of hardware commenced. The qualification of Deceleration System Parachutes and pyros via Ground and Air drop tests are underway.

v. Recovery trials commenced at Water Survival Test Facility (WSTF), Indian Navy.

vi. The MoU and contracts related activities with national and international agencies are progressing well.

(b) & (c)

Yes, Sir. Several missions on the indigenously developed launch vehicles viz. PSLV, GSLV, LVM3 and SSLV are planned in near future. A total of 12 launch vehicles missions i.e. 7 flights of PSLV, 3 flights of GSLV and 1 flight each of SSLV & LVM3 are planned in the upcoming months of 2023 and/or early 2024, in addition to the test flights for Gaganyaan program.

A brief description of major space programs and flights to be launched with indigenously developed technologies in the near future:

- **7 flights of PSLV are planned to be held with following spacecrafts:**
    - **Launch of Technology Demonstration Satellite – TDS 01, comprised of indigenous TWTA, Electric Propulsion system and a host of other technologies.**
    - **3 dedicated commercial missions of NSIL carrying TeLEOS-2, DS-SAR and ANWESHA, respectively.**
    - **Aaditya-L1 – the first Indian Space mission to study the Sun.**
    - **XPoSAT– The X-Ray Polarimeter Satellite, India's first dedicated polarimetry mission to study the dynamics of bright astronomical X-ray sources in extreme conditions.**
    - **Radar Imaging Satellite – RISAT 1B.**
- **The Reusable Launch Vehicle Landing Experiment [RLV-LEX] is also scheduled during early 2023.**
- **3 flights of GSLV are planned to be held, carrying NVS-01, INSAT-3DS and NISAR spacecrafts respectively.**
- **The configuration and design of various systems related to Gaganyaan is completed and the programme has entered the realization and testing phase. The first test vehicle mission, TV-D1, is planned in mid-2023.**
- **The launch of SSLV D3 is also planned in 2023.**

- **Chandrayaan-3 - the follow-up mission to Chandrayaan-2, intended to demonstrate soft landing on the lunar surface, to be launched aboard the LVM3.**
- **Besides, a host of private sector activities, including launch vehicles and satellite launches, are also expected to happen in 2023.**

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 136

TO BE ANSWERED ON THURSDAY, FEBRUARY 02, 2023

FUTURE REALISATION OF SPACE TOURISM

136. SHRI MASTHAN RAO BEEDA:

Will the PRIME MINISTER be pleased to state:

(a) whether Government is taking measures to augment domestic capacity for future realisation of space tourism;

(b) if so, the details of the progress made in this regard and if not, the reasons therefor; and

(c) the obstacles faced till now and the measures proposed to address them?

ANSWER

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

(DR. JITENDRA SINGH):

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(a) & (b)

Through Gaganyaan, India's maiden human spaceflight programme, ISRO is engaged in development of various technologies, which are essential building blocks for human space missions. The objective of the Gaganyaan programme is the demonstration of human spaceflight capability to Low earth orbit. Future missions will be taken up after the accomplishment of Gaganyaan mission. ISRO has also carried out a few feasibility studies for a sub-orbital space tourism mission onboard a liquid propellant stage booster.

(c) Does not arise.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 137

TO BE ANSWERED ON THURSDAY, FEBRUARY 02, 2023

PRIVATE SECTOR IN SPACE INDUSTRY

137. SHRI ELAMARAM KAREEM:

Will the PRIME MINISTER be pleased to state:

(a) whether Government has started allowing external agencies to use ISRO facilities across the globe;

(b) if so, the details thereof;

(c) whether Government allows private sector in the space industry; and

(d) if so, the details of the benefits of private sector participation in the space industry?

ANSWER

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

(DR. JITENDRA SINGH):

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(a) & (b)

No Sir, only Non-Government Indian entities (NGEs) are being allowed to use ISRO facilities and the technical support, as applicable, through IN-SPACe. Recent facilities used by NGEs include the Sounding Rocket Launch Complex at SHAR by M/s. Skyroot for its mission PRARAMBH and the Vertical Test Facility at Thumba Equatorial Rocket Launching Station (TERLS), Thiruvananthapuram by M/s. Agnikul Cosmos Pvt. Ltd. for hot testing of its engine – Agnilet.

(c) Yes, Sir.

(d) Yes, Sir, Government envisages enhanced participation of private sector in conducting of end-to-end activities in the space sector. Participation of private sector including academic institutions, start-ups and industries in end-to-end space activities is expected to expand the national space economy, generate more employment opportunities and create a thriving space ecosystem and result in increased Indian share in the global space economy in long term.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 138

TO BE ANSWERED ON THURSDAY, FEBRUARY 02, 2023

SPACE DEBRIS ORBITING THE EARTH

138. SMT. VANDANA CHAVAN:

Will the PRIME MINISTER be pleased to state:

(a) the number of Indian space debris orbiting the Earth;

(b) whether this will have an impact on the sustainability of future missions;

(c) whether Government has conducted a study on the environment dangers of such space debris; and

(d) if so, the details thereof?

ANSWER

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

(DR. JITENDRA SINGH):

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(a) There are a total of 111 payloads and 105 Space Debris identified as Indian Objects orbiting the Earth, as tracked and catalogued by USSPACECOM and published in spacetrack website, as on 20 Jan. 2023.

(b) Yes, Sir. All orbiting debris will have impact on the sustainability of outer space and future missions.

(c) Yes, Sir. ISRO has been carrying out many studies on impacts of growing space debris on space environment.

(d) Research and studies on the potential and emerging threats from space debris are carried out by ISRO and academia since the early 1990s. In 2022, ISRO System for Safe and Sustainable Operations Management (IS^4OM) has been established towards more focused efforts to continually monitor the objects posing collision threat, improve prediction of evolution of

space debris environment and concerted activities to mitigate the risk posed by space debris. ISRO has carried out 21 collision avoidance maneuvers of Indian Operational Space assets in 2022 to avoid collision threats from other space objects. To deal with the threat of very small debris objects which are too small to be tracked, spacecraft needs to shielded against the impact risk. Spacecraft shielding related studies and development are under progress in ISRO to improve the protection for the upcoming missions.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 930

TO BE ANSWERED ON THURSDAY, FEBRUARY 09, 2023

SPACE TOURISM

930. SHRI SANJEEV ARORA:

Will the PRIME MINISTER be pleased to state:

whether Indian Space Research Organisation (ISRO) is planning for space tourism, if so, the details of the Budget allocated for the purpose?

ANSWER

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

(DR. JITENDRA SINGH):

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The objective of India's maiden human spaceflight programme 'Gaganyaan' is demonstration of human spaceflight capability to Low Earth Orbit, which is a precursor to future Space Tourism Programme. ISRO has carried out a few feasibility studies for a sub-orbital space tourism mission. After the accomplishment of Gaganyaan mission, activities towards space tourism shall be firmed up.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 931

TO BE ANSWERED ON THURSDAY, FEBRUARY 09, 2023

PRODUCTION OF INDIGENOUSLY DESIGNED SATELLITE COMPONENTS

931. SHRI JAGGESH:

Will the PRIME MINISTER be pleased to state:

(a) Whether it is a fact that Government proposes to come up with dedicated industrial areas for the production/increasing the production of indigenously designed satellite components, launch vehicles, and geospatial navigation and monitoring systems;

(b) Whether Government has initiated consultations with State Governments to gauge their interest in setting up of dedicated manufacturing clusters in their respective States; and

(c) If so, the details thereof ?

ANSWER

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

(DR. JITENDRA SINGH):

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(a), (b) & (c)

A few state governments have already set up aerospace parks to facilitate development of manufacturing hub for aerospace and space technology. This indicates the interest of respective state governments in attracting private investment in aerospace and space technology domain. Recent reforms in space sector introduced by government has provided further impetus for start-ups and private industry to utilize these parks.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 932

TO BE ANSWERED ON THURSDAY, FEBRUARY 09, 2023

START-UPS IN THE DEVELOPMENT OF SPACE TECHNOLOGY

932. SHRI JUGALSINH LOKHANDWALA:

Will the PRIME MINISTER be pleased to state:

(a) Whether it is a fact that there is an increasing participation from the private sector and start-ups in the development of Space technology;

(b) The details of the Start-ups which have been supported by the Department during the last three years; and

(c) The steps that have been taken by the Department to decrease the import dependance on critical space technology components?

ANSWER

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

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(a) Yes, Sir.

(b) Applications from 135 Non-Government Entities (NGEs) are received so far and being supported by IN-SPACe in the areas of Satellites, Launch Vehicles, Ground Segment, Space Applications, Space Promotional Activities, etc. These NGEs include Start-ups (65), Micro, Small & Medium Enterprises (15), Academia (19) and Industries (36).

(c) The following steps have been taken by Department to decrease import dependence on critical space technology components:

(i) Department is pursuing development of critical technologies such as Travelling Wave Tube Amplifiers (TWTA), Atomic Clock, Electronics

packaging technology, Sensors and ASICs (Application Specific Integrated Circuits).

(ii) Space grade Lithium-ion battery has been successfully developed and commercialized.

(iii) Action has been initiated along with HAL, NAL and Midhani for establishing Carbon Fiber production plant in India.

(iv) The imported items are published in the Procurement Live Register(PLR) portal of ISRO website to invite Expression of Interest (EoI) from Indian Industries for indigenous development.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1862

TO BE ANSWERED ON THURSDAY, MARCH 16, 2023

LAUNCHING PRIVATELY DEVELOPED ROCKETS FROM SRIHARIKOTA

1862. DR. K. LAXMAN:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that Government has allowed Indian Space Research Organisation (ISRO) to launch privately developed rockets from Sriharikota, if so, the details thereof;

(b) whether there is any proposal to expand ISRO activities on commercial lines to other countries also, if so, the details thereof?

ANSWER

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

(DR. JITENDRA SINGH):

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(a) Yes, Sir. India's first privately developed rocket 'Vikram-S', by M/s. Skyroot Aerospace Private Limited, was launched on 18th November, 2022. This was a sub-orbital mission and achieved a height of ~90 Km thus validating the design of indigenously developed rocket.

(b) Yes, Sir. Government has set up the NewSpace India Limited (NSIL) as a Central Public Sector Enterprise under Department of Space, and as the commercial arm of ISRO. NSIL offers services such as launch of customer satellites on-board ISRO's launch vehicles, satellite building, Mission Support Services, etc. on a commercial basis to other countries.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1895

TO BE ANSWERED ON THURSDAY, MARCH 16, 2023

JOINT CONSULTATIVE MACHINERY IN ISRO

1895. SHRI A.A. RAHIM:

Will the PRIME MINISTER be pleased to state:

(a) the reasons for putting on hold the approval for operating Joint Consultative Machinery (JCM) in Indian Space Research Organisation (ISRO) after re-verification of service association/Union in 2014 and by when Government is going to approve qualified service associations;

(b) whether Government has any plans to conduct re-verification afresh in ISRO; and

(c) the reasons for JCM Department Council not functioning in ISRO?

ANSWER

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

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(a), (b) & (c)

Reverification process is under examination in the Department of Space. However, Staff Grievance Redressal mechanism is functioning in ISRO to resolve the Employee-Employer relationship.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1896

TO BE ANSWERED ON THURSDAY, MARCH 16, 2023

SOCIALLY USEFUL TECHNOLOGY DEVELOPED BY DEPARTMENT

1896. SMT. SANGEETA YADAV:

Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that the Department has developed technologies which are of direct relevance for the mankind; and

(b) if so, the details thereof for the last three years, particularly for women folk?

ANSWER

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

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(a) & (b)

Yes, Sir. Department of Space has been pioneering development of space technologies for the benefit of the common people and society as a whole, which are of direct relevance to the mankind.

Space technologies have directly and indirectly benefited in areas like weather prediction, disaster management, DTH, digital connectivity, positioning services, crop forecasting and several others. Besides, space technology-based applications are put to use in several flagship schemes of Government such as PMFBY, AMRUT Smart Cities, PM-Gatishakti, etc.

These initiatives have improved lives of all members of the society, including women folk.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1897

TO BE ANSWERED ON THURSDAY, MARCH 16, 2023

INDIA'S SHARE IN GLOBAL SPACE ECONOMY

1897. SHRI JUGALSINH LOKHANDWALA:

Will the PRIME MINISTER be pleased to state:

(a) the estimated size of the global space economy and India's share in it;

(b) the steps taken by Government to increase India's share and the target for 2030; and

(c) the estimated timeline of the launch of Gaganyaan?

ANSWER

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

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(a) The exact sizing of Global Space Economy is a complex exercise and matter of much debate. A 2019 estimate pegs the global space economy at 360B USD, with India's share at approximately 2-3%.

(b) Government has taken several steps to increase India's share in global space market, through the reforms undertaken in 2020, which seek to augment the space sector in the country with greater participation of Non-Governmental Entities [NGEs].

As a part of these reforms, NSIL's role has been enhanced to bring a commerce-oriented approach to space activities, with the agency acting as an aggregator of user requirements

and to obtain commitments. Also, the Indian National Space Promotion & Authorization Centre [IN-SPACe] has been created as a single window agency to promote, handhold and authorize the activities of NGEs in the sector, thus providing them with a level playing field.

(c) The first uncrewed mission of Gaganyaan programme is targeted in the first quarter of 2024. This will be followed by the second uncrewed mission targeted in the second quarter of 2024. The first crewed mission of Gaganyaan programme is targeted in the last quarter of 2024. Prior to the crewed mission, series of test vehicle missions are planned to validate the performance of critical crew escape system and deceleration systems. The first test vehicle mission is planned in May 2023.

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O.I.H.

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 2694

TO BE ANSWERED ON THURSDAY, MARCH 23, 2023

MANUFACTURING OF NISAR SATELLITE

2694. SHRI BRIJLAL:

Will the PRIME MINISTER be pleased to state:

(a) whether the National Aeronautics and Space Administration (NASA) and the Indian Space Research Organisation (ISRO) have jointly manufactured an earth science satellite named, NISAR (NASA-ISRO Synthetic Aperture Radar);

(b) if so, the details thereof; and the main features of the said satellite; and

(c) the total expenditure incurred on the development/manufacturing of this satellite, along with the ratio-wise expenditure made by NASA and ISRO, respectively?

ANSWER

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

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(a) Yes, Sir. NASA-ISRO SAR (NISAR) is an earth-observation satellite being jointly developed by NASA and ISRO.

(b) The mission objectives of the satellite are:

i. Design, Develop and launch Dual Frequency (L and S band) Radar Imaging Satellite

ii. Explore newer applications areas using L & S Band microwave data especially in surface deformation studies, terrestrial biomass structure, natural resource

mapping and monitoring and studies related to dynamics of ice-sheets, glaciers, forests, oil slick etc.

The satellite is configured with I-3K bus and the instrument identified for SAR is based on the innovative Sweep SAR technique configured in both L and S band in polarimetric configuration for wide swath and high resolution.

The spacecraft will orbit the Earth in a sun synchronous orbit of 747 Km with an inclination of 98.4 degree for a 12-day repeat cycle.

(c) NASA is delivering the L-Band SAR payload, high precision GPS and 12m unfurlable antenna.

ISRO is delivering S-band SAR payload, spacecraft bus and facilitating launch. The total expenditure incurred on realization of NISAR satellite by ISRO as on February, 2023 is Rs. 469.40 Crore, excluding launch cost.

Cost incurred by NASA towards their participation in the mission is not known to ISRO/DOS.

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GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

STARRED QUESTION NO. 363

TO BE ANSWERED ON THURSDAY, APRIL 06, 2023

FOREIGN DIRECT INVESTMENT IN SPACE ACTIVITIES

*363. SHRI NIRANJAN BISHI:

Will the PRIME MINISTER be pleased to state:

(a) whether the Government has a policy framework in place to streamline foreign direct investment (FDI) for space intensive activities?

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

(c) the role of the Indian National Space Promotion and Authorization Centre (IN-SPACe) in channelising the FDI for space activities?

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. 363 REGARDING "FOREIGN DIRECT INVESTMENT IN SPACE ACTIVITIES" ASKED BY SHRI NIRANJAN BISHI FOR ANSWER ON THURSDAY, APRIL 06, 2023.

(a) Yes Sir.

(b) Presently FDI in space sector is allowed upto 100% in the area of Satellites-Establishment and Operations through Government route only.

(c) Indian National Space Promotion and Authorization Centre (IN-SPACe) being the regulatory and promotional body for space activities was involved in revision of FDI policy which is presently under consideration of the Government. The specific role of IN-SPACe for channelising FDI will evolve after approval of revised FDI policy by the Government.

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