

**GOVERNMENT OF INDIA  
SPACE  
LOK SABHA**

STARRED QUESTION NO:312

ANSWERED ON:12.02.2014

CRYOGENIC TECHNOLOGY

Chacko Shri P.C.;Majhi Shri Pradeep Kumar

**Will the Minister of SPACE be pleased to state:**

- (a) whether the Indian Space Research Organisation (ISRO) has successfully launched a Geosynchronous Satellite Launch Vehicle with an indigenous cryogenic engine;
- (b) if so, the details thereof;
- (c) the significance of the success of this launch in India's space programme;
- (d) whether the indigenously developed cryogenic engine conform to international standards of space technology and if so, the details thereof and the efforts made to upgrade this cryogenic engine for use in the Geosynchronous Satellite Launch Vehicle Mk-III; and
- (e) the plans for future space exploration?

**Answer**

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PG & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (SHRI V. NARAYANASAMY):

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

STATEMENT LAID ON THE TABLE OF THE LOK SABHA IN REPLY TO STARRED QUESTION NO 312 REGARDING 'CRYOGENIC TECHNOLOGY' ASKED BY SHRI P.C. CHACKO AND SHRI PRADEEP MAJHI FOR ANSWER ON WEDNESDAY, FEBRUARY 12, 2014.

(a) Yes, Madam.

(b) Indian Space Research Organisation (ISRO) has successfully launched the Geosynchronous Satellite Launch Vehicle (GSLV- D5) with an indigenous cryogenic engine & stage, on 5th January 2014 from Satish Dhawan Space Centre, Sriharikota. This was the first successful flight of the indigenous cryogenic engine & stage. The GSLV-DS injected the GSAT-14 Communications Satellite, weighing 1982 kg, into a precise Geosynchronous Transfer Orbit.

(c) The success of this launch signifies India's technological capability to master the highly complex cryogenic rocket technology. With this, India has become the sixth nation to prove this technology. Further, this launch is a major advancement towards self-reliance in launching 2000 kg- class communication satellites into Geosynchronous Transfer Orbit.

(d) Yes, Madam. The indigenously developed cryogenic engine conforms to international standards of space technology.

The thrust generated by this indigenous cryogenic engine in relation to the mass of propellants consumed per second, is on par with the cryogenic engines developed by other countries.

The cryogenic engine for use in the Geosynchronous Satellite Launch Vehicle Mk III, which requires three-fold increase in thrust level, is in advanced phase of development. Testing of subsystem elements of this new high-thrust cryogenic engine for GSLV-Mk III has been carried out successfully and the Engine is being integrated for evaluation of its performance.

(e) Future space exploration plans include Chandrayaan-2, with a lander and rover on the surface of the Moon for in-situ investigations of lunar surface and Aditya, a scientific mission for study of the solar corona.