

# Vikas engine

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**In news**– Recently, Indian Space Research Organisation (ISRO) has successfully conducted a 25-second qualification test for its liquid propellant-based High Thrust Vikas engine to be used under the Gaganyaan mission.

## **About Vikas engine-**

- VIKAS (an acronym for Vikram Ambalal Sarabhai) is a family of liquid-fuelled rocket engines conceptualized and **designed by the Liquid Propulsion Systems Centre since the 1970s.**
- The early production of VIKAS engines used imported French components which were later replaced by domestically produced equivalents.
- VIKAS engines are used to power the second stage PSLV, boosters and second stage of GSLV Mark I and II and now the first stage of GSLV Mark III (LVM3).
- Two new types of Vikas engines, HTVE (High Thrust VIKAS Engine) and HPVE (High Pressure or High Speed VIKAS Engine), are of particular interest.
- Its recent test was conducted at ISRO Propulsion Complex in Mahendragiri, Tamil Nadu.
- It was done to see how the engine performed in conditions that were not optimal, such as change in the fuel-oxidiser ratio or pressure in the fuel chamber.
- With regard to the Vikas engine qualification for the Gaganyaan mission, two engines have already undergone tests under nominal operating conditions for a total duration of 480 seconds.
- The **first stage of the launch vehicle, which used solid propellant,** is already qualified for the mission.
- Three more tests are set to be conducted for a cumulative duration of 75 seconds under varying operating conditions as the agency prepares for the

first Indian astronaut mission.

- Another high thrust Vikas engine will undergo a long-duration test for 240 seconds to complete the Vikas engine qualification for Gaganyaan mission.

### **Gaganyaan mission-**

- It envisages undertaking the demonstration of human spaceflight to Low Earth Orbit (LEO) in the short-term and will lay the foundation for a sustained Indian human space exploration programme in the long run.
- Formal announcement of the Gaganyaan programme was made by Prime Minister Narendra Modi during his Independence Day address on August 15, 2018.
- The initial target was to launch human space flight before the 75th anniversary of India's independence on August 15, 2022.
- This mission is delayed due to the Covid-19 pandemic and successive lockdowns, Gaganyaan, will be launched in 2023.
- As part of this programme, **two unmanned missions and one manned mission are approved by Government of India (GoI).**
- The test vehicle flight for the validation of Crew Escape System performance and the first uncrewed mission of Gaganyaan are scheduled at the beginning of the second half of 2022.
- **ISRO's heavy-lift launcher GSLV Mk III** has been identified for the mission.
- Once launched, **India will be the fourth nation in the world to launch a human spaceflight mission after the US, Russia and China.**