15

IAS PRELIMS 2018

MISCELLANEOUS

INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

MODULE - 15

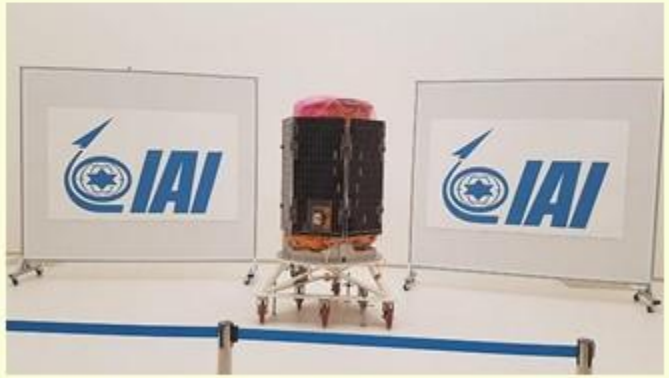
INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

QUESS SATELLITE

In case any intruder (hacker) tries to crack the message in Quantum communication, it will change its form in a way that would alert the sender and cause

- QUESS is China's Quantum Experiments at Space Scaler (QUESS) satellite.
- This is the World's first Quantum satellite.
- Quantum communication is meant for ultra-high security communication. It uses subatomic particles to securely communicate between two points
- QUESS was launched on Long March-2D rocket to the sun-synchronous orbit at an altitude of 500 km and will circle the Earth once every 90 minutes.
- The satellite will help China to establish hack-proof communications system ranging from highly secured military and government communications to online shopping.

ENVIRONMENTAL RESEARCH SATELLITE - VENUS

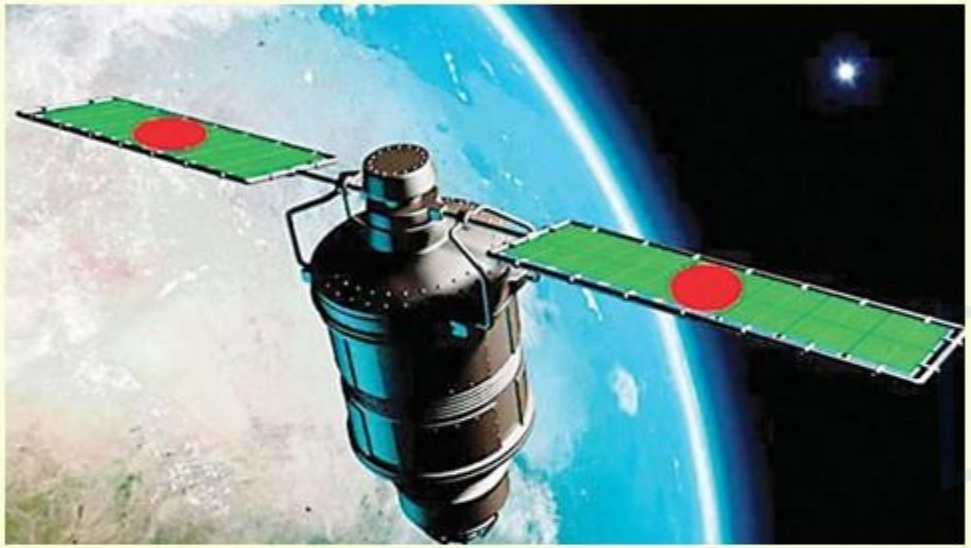


- Venus (Vegetation and Environment Monitoring New Micro-Satellite) is a joint venture between the Israel Space Agency (ISA) and its France's CNES.
- Venus satellite is an earth-observation micro-satellite.
- It is considered the smallest satellite of its kind in the world.
- The technological mission will test the operation of an innovative electric propulsion system based on the Israeli-designed Hall Effect Thrusters (HET)
- HET is a relatively low power device used to propel a spacecraft after entering orbit or farther out into space.

MICHIBIKI SATELLITES

- Japan's Quasi-Zenith Satellite System (QZSS) is the project of developing Japan's own version of GPS.
- These 4 satellites are called Michibiki satellites or QZS -1,2,3 and 4 which are all operational.
- They are focused on a new Time Keeping System which does not require on-board atomic clocks as used by existing navigation satellite systems such as GPS(US), GLONASS(Russia), NAVIC(India) or Galileo(EU) system.

BANGABANDHU SATELLITE - 1



- The first Bangladeshi geostationary communications and Broadcasting Satellite BS-1 launched by a Falcon 9 Block 5 rocket in May 2018.
- Bangladesh Communication Satellite Company Limited, BCSCL will operate its first ever satellite in history, the Bangabandhu Satellite 1.
- The BS-1 satellite was launched for providing broadcast and communications services to rural areas, including direct-to-home TV broadcasting across the country.

INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

TYPES OF LAUNCH VEHICLES

Expendable Launch Vehicle

1. ELVs are launch vehicle systems that are used only once to carry a payload into space.
2. Most of the satellites and human spacecraft were launched mainly using expendable launchers.

Reusable Launch Vehicle

1. RLV are intended to allow for recovery of all or part of the system for later reuse.
2. The SpaceX Falcon 9 rocket has a reusable first stage and expendable second stage
3. Jeff Bezos Blue Origin - New Shepard rocket has recoverable first and second stages but is still in development

INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

TYPES OF LAUNCH VEHICLES(SIZE)

Small Lift Launch Vehicles

- Capable of lifting Upto 2000 kg to LEO.
- Sputnik(Soviet Union), SLV and ASLV(India)

Medium Lift Launch Vehicles

- Capable of lifting 2000 kg to 20,000 to LEO.
- Atlas(USA), PSLV and GSLV Mk I and II (India)

Heavy Lift Launch Vehicle

Capable of lifting 20,000 to 50,000 kg to LEO.

Super Heavy Lift Launch Vehicle

- Capable of lifting more than 50,000 to LEO
- US Space Launch System and Saturn 5

INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

HEAVY LIFT LAUNCH VEHICLES

A Launch vehicle with 20-tonne payload or more to LEO that would qualify them as an HLLV.

Ariane 5	European Space Agency
Delta IV Heavy	United Launch Alliance(US)
Proton M	Khrunichev (Russian)

Ariane 5


Delta IV Heavy

INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

HEAVY LIFT LAUNCH VEHICLES

Unproven but Upcoming new HLLV

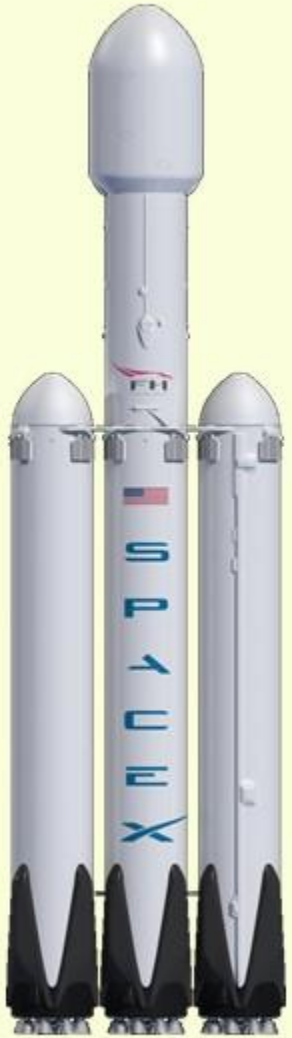
Falcon 9 (Expendable Version)	Space X (US)
Falcon Heavy (Partially resuable)	Space X (US)
Long March 5	China Academy of Launch Vehicle Technology CALT
Angara A5	Khrunichev (Russian)

INTERNATIONAL SATELLITES AND LAUNCH VEHICLES

HEAVY LIFT LAUNCH VEHICLES

Under Development

Ariane 6	ESA (20,000 kg to LEO)
New Glenn	Blue Origin (45,000 kg to LEO)
Vulcan	United Launch Alliance (40,000)



FALCON HEAVY

- Designed and manufactured by Space-X Falcon Heavy is a partially reusable super heavy-lift launch vehicle.
- Falcon Heavy has the highest payload capacity of any currently operational launch vehicle .
- Falcon Heavy consists of Falcon 9 as the "core" component, with two additional Falcon 9 first stages acting as liquid fuel strap-on boosters.
- The booster cores will land Earth via the VTVL Technology(Vertical Takeoff Vertical Landing)
- Elon Musk's Tesla Roadster was sent to the Mars heliocentric orbit by the Falcon Heavy on February 6, 2018.

EXPLORATION MISSION 1

- EM-1 is the first integrated test of NASA's deep space exploration systems: the Orion spacecraft, Space Launch System (SLS) rocket and the ground systems at Kennedy Space Center in Cape Canaveral, Florida.
- EM-1 will be an uncrewed flight test that will provide a foundation for human deep space exploration.
- With the first Exploration mission astronauts will build and begin testing the systems near the Moon needed for lunar surface missions and exploration to other destinations farther from Earth, including Mars.

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