Mission Demo-2

Part of: GS-III- S&T Space (PT-MAINS-PERSONALITY TEST)

National Aeronautics and Space Administration (NASA) and SpaceX are all set for the Demo-2 mission who is scheduled for 27th May, 2020 from the Kennedy Space Center in Cape Canaveral, Florida, USA. Demo-2 Mission will send astronauts to the International Space Station (ISS).

Imp Points

- Under the Mission, astronauts Robert Behnken and Douglas Hurley will dock with ISS and then remain there for between one to four months, depending on the time of next mission.
- It is a part of NASA’s Commercial Crew Program, which is a partnership to develop and fly human space transportation systems.
- SpaceX spacecraft named Crew Dragon will be used to take them into space. It will be only the fifth class of US spacecraft to take human beings into orbit, after the Mercury, Gemini, Apollo and Space Shuttle programs.
- It is a high priority mission for the US which is clear by the fact that the mission is being carried out amidst Covid-19 pandemic.
- The mission is a major milestone for SpaceX, which is a private company founded by Elon Musk, who is the founder of Tesla.
  - It has established itself as the leader in the private space sector mainly due to its reusable rocket, the Falcon 9.
- NASA classifies the impact of space flight on humans in 5 broad criteria known as 5 Hazards. These are: (PT)
  - Radiation
  - Isolation and confinement
  - Distance from Earth
  - Gravity
  - Hostile/closed environments
- Health Specific Impacts:
  - Weightlessness and osteoporosis
  - Telomeres get longer during spaceflight
  - Decreased body mass and increased folate in orbit
  - Spaceflight can Trigger Gene Mutations

Project Mercury (1958-63)

- It was the first US man-in-space program.
- The objectives of the program, which made six manned flights from 1961 to 1963, were specific:
  - To orbit a manned spacecraft around Earth.
  - To investigate man’s ability to function in space.
  - To recover both man and spacecraft safely.

Gemini Program (1962-66)

- Designed as a bridge between the Mercury and Apollo programs, it primarily tested equipment and mission procedures and trained astronauts and ground crews for future
Apollo missions.

- **Four main goals:**
  - To test an astronaut's ability to fly long-duration missions (up to two weeks in space).
  - To understand how spacecraft could meet and dock in orbit around the Earth and the moon.
  - To perfect re-entry and landing methods.
  - To further understand the effects of longer space flights on astronauts.

Apollo Program (1963-72)

- It was designed to land humans on the Moon and bring them safely back to Earth. These missions returned with scientific data and almost 400 kilograms of lunar samples.
- Apollo 8 was the first manned mission to go to the moon. This mission did not land on the moon. It orbited the moon, and then came back to Earth.
- Apollo 11 was the first moon landing mission. It landed on 20th July, 1969. The crew of Apollo 11 was Neil Armstrong, Michael Collins and Buzz Aldrin.

Space Shuttle Program (1981-2011)

- NASA's space shuttle fleet, Columbia, Challenger, Discovery, Atlantis and Endeavour, flew 135 missions and helped construct the ISS.
- The spacecraft carried people into orbit repeatedly, launched, recovered and repaired satellites, conducted cutting-edge research and built the largest structure in space.
- As humanity's first reusable spacecraft, the space shuttle pushed the boundaries of discovery ever farther, requiring not only advanced technologies but the tremendous effort of a vast workforce.

Indian Human Space Flight Programme:

ISRO aims to launch its maiden *Human Space Mission, Gaganyaan* before the 75th anniversary of India’s independence in 2022.

**Objectives of the Mission:**

- Enhancement of science and technology levels in the country
- A national project involving several institutes, academia and industry
- Improvement of industrial growth
- Inspiring youth
- Development of technology for social benefits
- Improving international collaboration

**Relevance of a Manned Space Mission for India:**

**Boost to industries:** The Indian industry will find large opportunities through participation in the highly demanding Space missions. Gaganyaan Mission is expected will source nearly 60% of its equipment from the Indian private sector.

**Employment:** According to the ISRO chief, the Gaganyaan mission would create 15,000 new
employment opportunities, 13,000 of them in private industry and the space organisation would need an additional manpower of 900.

**Technological development:** Human Space flights are frontier field in the science and technology. The challenges the Human Space Flights provide to India, and the benefits accruing from taking up those missions will be very high and will lead to further thrust for technological developments in India

**Spurs research and development:** It will boost good research and technology development. With a large number of researchers with proper equipment involved, HSF will thrust significant research in areas such as materials processing, astro-biology, resources mining, planetary chemistry, planetary orbital calculus and many other areas.

**Motivation:** Human space flight will provide that inspiration to the youth and also the national public mainstream. It would inspire young generation into notable achievements and enable them to play their legitimate role in challenging future activities.

**Prestige:** *India will be the fourth country to launch human space mission.* The Gaganyaan will not only bring about prestige to the nation but also establish India’s role as a key player in the space industry.