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THE FALCON HEAVY LAUNCH: THE MOST POWERFUL OPERATIONAL ROCKET IN THE WORLD

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In this still image taken from a SpaceX broadcast, SpaceX's Falcon Heavy rocket lifts off from Launchpad 39A at Kennedy Space Center in Florida on November 1. | Photo Credit: AFP

The story so far: On November 1, Elon Musk-owned SpaceX launched the Falcon Heavy rocket into a geosynchronous Earth orbit from the Launch Complex 39A at the Kennedy Space Center in Florida, U.S. This is considered as a National Security Space Launch for the U.S. military. The company hails this as the most powerful operational rocket in the world. This is the fourth launch of the giant rocket system, and the first one in nearly three years since its last launch in 2019.

The rocket is carrying satellites to space for the U.S. military in a mission named as U.S. Space Force (USSF)-44. The mission deployed two spacecraft payloads, one of which is the TETRA 1 microsatellite created for various prototype missions in and around the geosynchronous earth orbit. The other payload is for national defence purposes. It will place the satellites for the Space Systems Command's Innovation and Prototyping.

Space Systems Command (SSC) is the oldest military space organisation in the United States Armed Forces. It is responsible for developing, acquiring, equipping, fielding and sustaining lethal and resilient space capabilities. SSC mission capability areas include launch acquisition and operations, communications and positioning, navigation and timing, space sensing, battle management command, control, and communications, and space domain awareness and combat power.

The Falcon Heavy uses three boosters for added thrust and lift capacity. The centre booster plunged into the ocean as planned and the two side boosters landed on ground pads at the Cape Canaveral Space Force Station. These two boosters will be refurbished for a subsequent U.S. Space Force mission later this year, according to a press release by the Space Systems Command. The boosters are reused on other missions to cut down on mission costs.

SpaceX claims Falcon Heavy to be the most powerful rocket in the world today by a factor of two. With a lifting capacity of around 64 metric tonnes into orbit, Falcon Heavy can lift more than twice the payload of the next closest operational vehicle, the Delta IV Heavy.

The rocket has a height of 70 m, a width of 12.2 m and a mass of 1,420,788 kg. Falcon Heavy has 27 Merlin engines which together generate more than five million pounds of thrust at lift-off, equalling around eighteen 747 aircraft at full power. This makes it the most capable rocket flying. The rocket can lift the equivalent of a fully loaded 737 jetliner, complete with passengers, luggage and fuel, to orbit, SpaceX said.

Merlin is a family of rocket engines developed by SpaceX for use on its Falcon 1, Falcon 9 and Falcon Heavy launch vehicles. Merlin engines use RP-1 and liquid oxygen as rocket propellants in a gas-generator power cycle. These engines were designed for recovery and reuse, according to SpaceX.

SpaceX last launched its Falcon Heavy rocket in June 2019 from NASA's Kennedy Space Center. It carried 24 satellites as part of the Department of Defense's Space Test Program-2.

The satellites included four NASA (National Aeronautics and Space Administration) technology and science payloads to study non-toxic spacecraft fuel, deep space navigation, “bubbles” in the electrically-charged layers of Earth’s upper atmosphere, and radiation protection for satellites, according to a NASA release. The space agency said that the mission was useful for smarter spacecraft design and benefitted the agency’s Moon to Mars exploration plans by providing greater insight into the effects of radiation in space. It also tested out an atomic clock that could change how spacecraft navigates and looked at how the space environment around the Earth affects us.

The mission was earlier scheduled for lift-off in 2020 but was delayed. The exact reasons for delaying the mission were not publicly disclosed but payload readiness issues were considered to be the cause. Also, most of SpaceX’s missions till date did not require the massive power of the Falcon Heavy.

The Falcon Heavy debuted in 2018 when SpaceX CEO Elon Musk sent his personal red Tesla Roadster, an electric sports car with a dummy driver, into space as a test payload. The car is still in space, orbiting around the sun, travelling as far away as Mars’ orbit and, at times, as close as Earth’s orbit. SpaceX launched the other two Falcon Heavy missions in 2019. One carried a TV and phone service satellite to orbit for Saudi Arabia-based Arabsat, and the other carried experimental satellites for the U.S. Department of Defense.

SpaceX is said to be working on even bigger rockets. The company is targeting early December to launch its giant Starship rocket system, according to a report by Reuters.

These test flights of Starship are all about improving our understanding and development of a fully reusable transportation system designed to carry both crew and cargo on long-duration interplanetary flights, and help humanity return to the Moon, and travel to Mars and beyond, SpaceX said in its website.

The Musk-owned company claimed Starship to be the world’s most powerful launch vehicle ever developed, with the ability to carry an excess of 100 metric tonnes to Earth orbit.

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