

What is the Space Shuttle Program

Celebrating 50 years of flight

Source: https://www.nasa.gov/pdf/55412main_29%20SSP.pdf

The Space Shuttle program was the fourth human spaceflight program carried out by the U.S. National Aeronautics and Space Administration (NASA), which accomplished routine transportation for Earth-to-orbit crew and cargo from 1981 to 2011. Its official name, Space Transportation System (STS), was taken from a 1969 plan for a system of reusable spacecraft of which it was the only item funded for development. It flew 135 missions and carried 355 astronauts from 16 countries, many on multiple trips.

The Space Shuttle—composed of an orbiter launched with two reusable solid rocket boosters and a disposable external fuel tank—carried up to eight astronauts and up to 50,000 lb of payload into low Earth orbit (LEO). When its mission was complete, the orbiter would reenter the Earth's atmosphere and land like a glider at either the Kennedy Space Center or Edwards Air Force Base.

The Shuttle is the only winged crewed spacecraft to have achieved orbit and landing, and the first reusable crewed space vehicle that made multiple flights into orbit. Its missions involved carrying large payloads to various orbits including the International Space Station (ISS), providing crew rotation for the space station, and performing service missions on the Hubble Space Telescope. The orbiter also recovered satellites and other payloads (e.g., from the ISS) from orbit and returned them to Earth, though its use in this capacity was rare. Each vehicle was designed with a projected lifespan of 100 launches, or 10 years operational life. Original selling points on the shuttles were over 150 launches over a 15-year operational span with a 'launch per month' expected at the peak of the program, but extensive delays in the development of the International Space Station never created such a peak demand for frequent flights.



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Space Shuttle missions Included

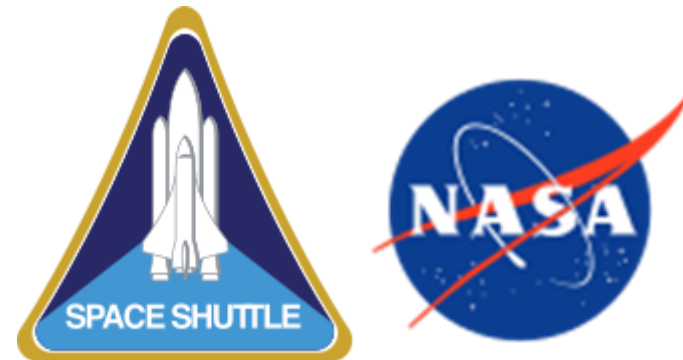
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- Spacelab missions Including: Science, Astronomy, Crystal growth, Space physics.
- Construction of the International Space Station (ISS)
- Crew rotation and servicing of Mir and the International Space Station (ISS)
- Servicing missions, such as to repair the Hubble Space Telescope (HST) and orbiting satellites
- Human experiments in low Earth orbit (LEO)
- Carried to low Earth orbit (LEO):
 - The Hubble Space Telescope (HST)
 - Components of the International Space Station (ISS)
 - The Long Duration Exposure Facility
 - The Upper Atmosphere Research Satellite
 - The Compton Gamma Ray Observatory
 - The Earth Radiation Budget Satellite
 - The Mir Shuttle Docking Node
- Carried satellites with a booster, such as the Payload Assist Module (PAM-D) or the Inertial Upper Stage (IUS), to the point where the booster sends the satellite to:
 - A higher Earth orbit; these have included:
 - Chandra X-ray Observatory
 - The first six TDRS satellites
 - Two DSCS-III (Defense Satellite Communications System) communications satellites in one mission
 - A Defense Support Program satellite
 - An interplanetary mission; these have included:
Magellan, Galileo, Ulysses

On April 24, 1990, *Discovery* carried the Hubble Space Telescope into space during STS-31.

The longest Shuttle mission lasted 17 days, 15 hours. The final flight of the Space Shuttle program was on July 8, 2011.



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Space Shuttle Golden Anniversary Celebration

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Challenger (OV-099) was delivered to Kennedy Space Center in July, 1982; followed by *Discovery* (OV-103) in November 1983, *Atlantis* (OV-104) in April 1985 and *Endeavour* in May 1991. *Challenger* was originally built and used as a Structural Test Article (STA-099), but was converted to a complete orbiter when this was found to be less expensive than converting *Enterprise* from its Approach and Landing Test configuration into a space worthy vehicle.

In the course of 135 missions flown, two orbiters (*Columbia* and *Challenger*) suffered catastrophic accidents, with the loss of all crew members, totaling 14 astronauts.

The accidents led to national level inquiries and detailed analysis of why the accidents occurred. There was a significant pause where changes were made before the Shuttles returned to flight. The *Challenger* disaster occurred in January 1986 and 32 months later and on September 29, 1988 returned to service. The *Columbia* disaster occurred in 2003, and took more than a year off before returning to flight in June 2005.

In 2022, the **American Space Museum** partnered with the **Astronaut Memorial Foundation** to celebrate the “**Golden Anniversary of the Dawn of the Space Shuttle Era**”. All of the program is available on:

<https://www.youtube.com/americanspacemuseum>

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