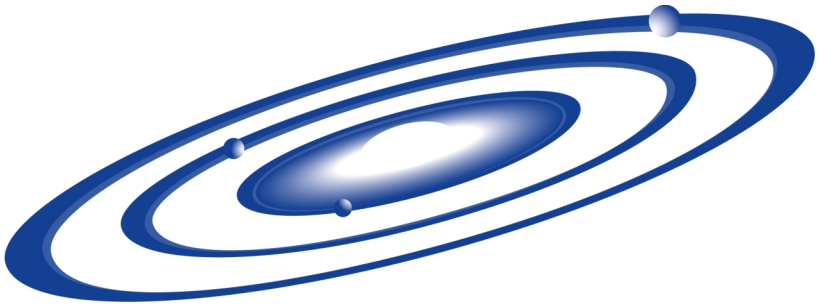


Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

Student Text Supplement

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

NASA

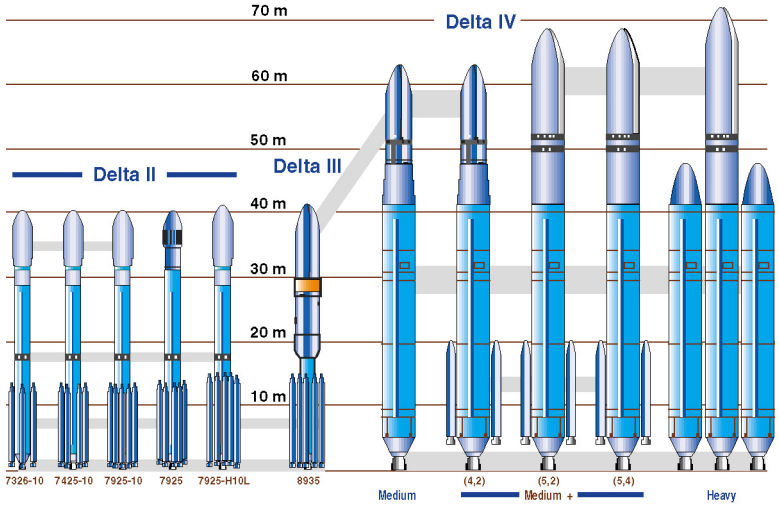
Many rockets have been used to launch vehicles into space. The United States used the Jupiter C to launch its first satellite, called Explorer I, in 1958.

Optional activity: Listen to the sound of the beeping radio signal that Sputnik made.
http://www.hq.nasa.gov/office/pao/History/sputnik/sputnik.wav

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

The Delta is one of the most successful rockets in history. It can be configured in several ways to meet the specifications of a mission.



McREL/Boeing

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

NASA

The Genesis spacecraft was launched on a Delta 7326 on August 8, 2001.

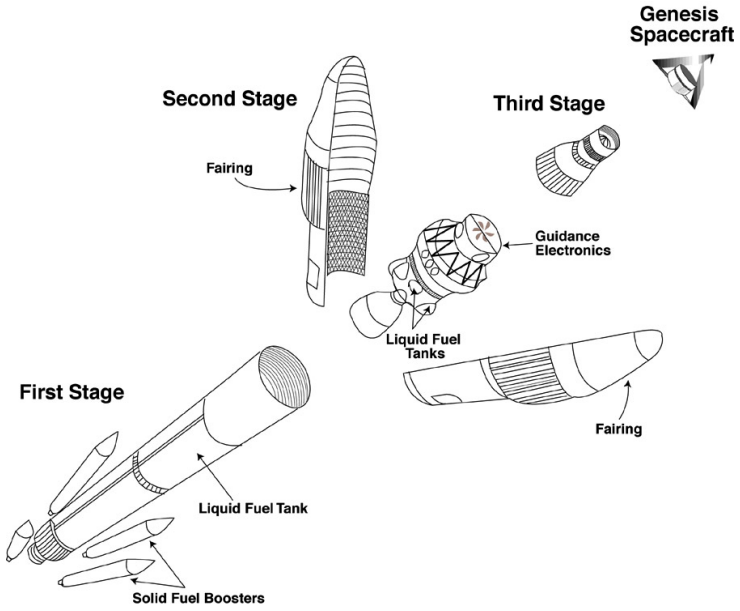
What does the number 7326 mean?

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

The seven refers to the fact that the first stage has been changed seven times. The three comes from the fact that the first stage has three solid rocket motors.

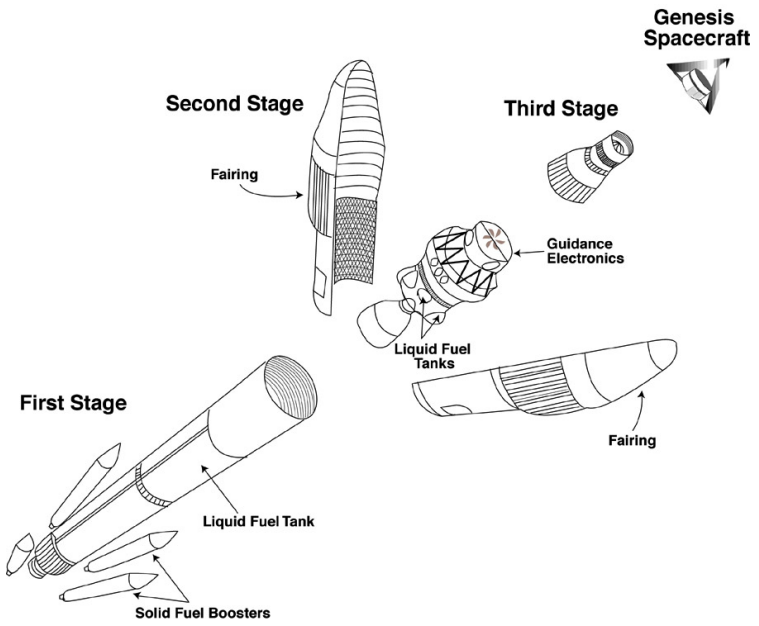
Optional activity: View the video clip, "The Boeing Delta 7326."
http://www.genesismission.org/educate/scimodule/kriswalsh/Boeing_delta_video.html



McREL/Boeing

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket



McREL/Boeing

For Genesis, the first stage burned for four minutes. A liquid-propellant engine that powered the second stage was then fired. The two in 7326 means the second stage was changed twice.

The third stage contained a Star 37 motor. The six refers to the type of third stage on the rocket. After the spacecraft had been oriented into the proper trajectory, it was separated from the third stage.

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

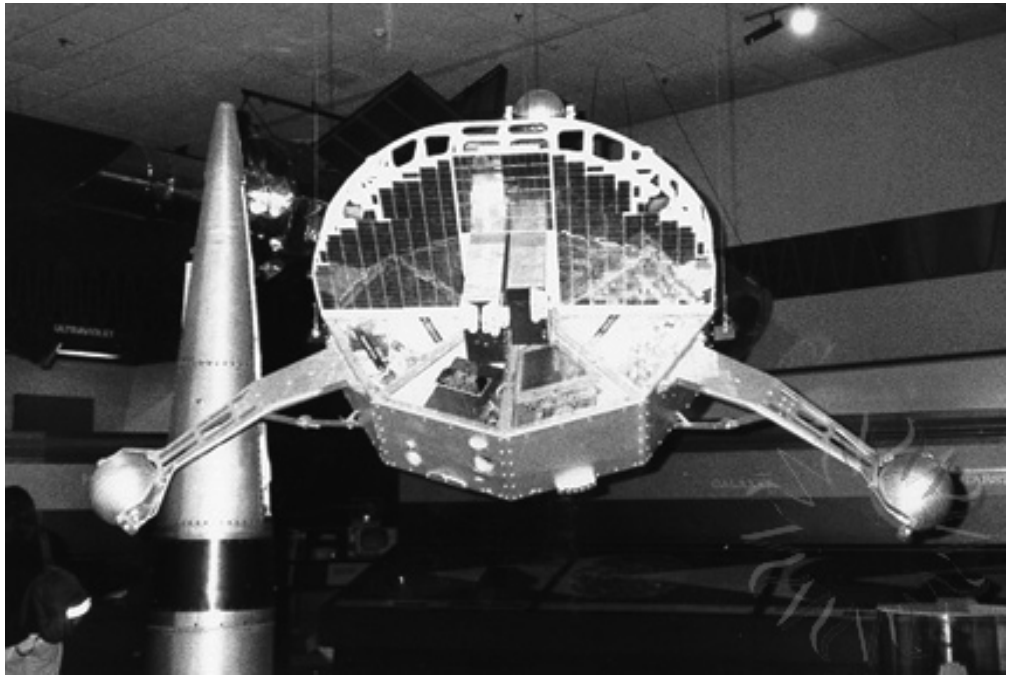
The Delta rocket was derived from the Thor rockets used by NASA in the 1950s.

The first successful launch using a Delta rocket was on August 12, 1960, when it carried the Echo I satellite.

NASA

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

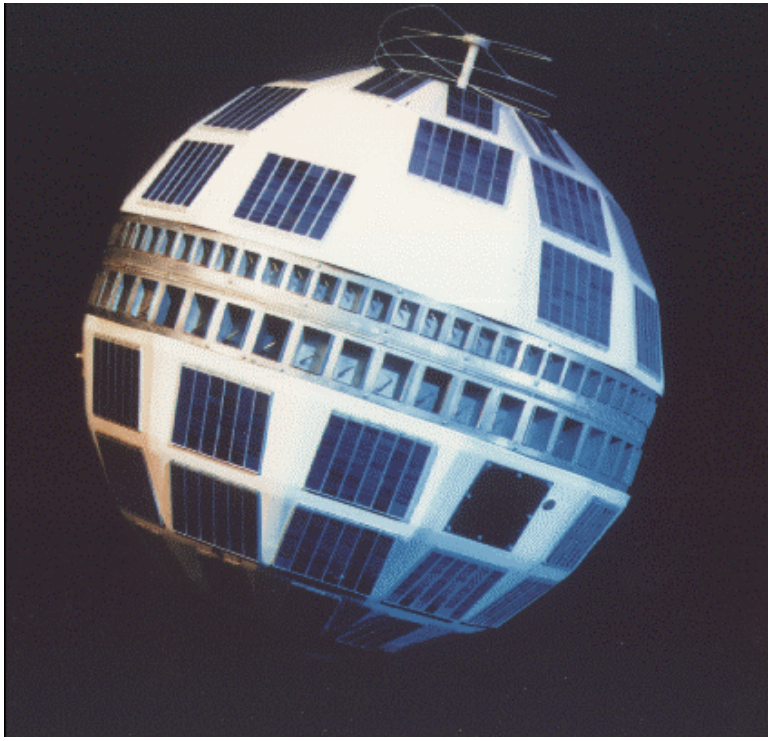


Smithsonian's National Air and Space Museum

Another notable early launch using the Delta launch vehicle was the Orbiting Solar Observatory, launched on March 7, 1962. This observatory studied the sun above Earth's atmosphere for the first time.

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket



Smithsonian's National Air and Space Museum

Delta 11 launched the Telstar I on July 10, 1962. Telstar I was the first television satellite.

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

Over the years, the Delta rockets have become larger and the payload capacity has increased. The last Delta flew In November 1984. The space shuttle was to take all medium and heavy satellites into orbit.

NASA

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

Boeing

After the Challenger explosion in 1986, the more powerful Delta II was produced in 1989 to launch spacecraft into geosynchronous orbit.

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

Successes and Failures of all Delta Series Rockets		
Year	**Success**	**Failure**
1960-1969	69	5
1970-1979	70	5
1980-1989	38	1
1990-1999	81	3
2000-2001	9	0

The Delta rocket has been a very reliable delivery system since 1960. The Delta II has launched 93 payloads into orbit with only one failure and one partial success.

COUNTDOWN TO LAUNCH

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

Two weeks before launch, the Genesis spacecraft was mated to the third stage of the Delta II rocket.

Optional activity: Listen to the audio clip, "The Mating Procedure: Spacecraft to Rocket."
http://www.genesismission.org/educate/scimodule/kriswalshsoundfiles/mating_procedure.html

NASA

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

The spacecraft in the third stage was transported to the rocket at night moving no more than five miles per hour. Then the fairings were installed.

NASA

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

NASA

Genesis was launched from launch complex 17. The gantry is the highly visible service structure located next to the launch pad.

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket

During a successful launch, the temperature of the pad can be over 1900 degrees Celsius. Special heat-resistant surfaces are placed around the equipment for protection. Thousands of gallons of water are poured onto the pad to aid in sound abatement and cooling.

NASA

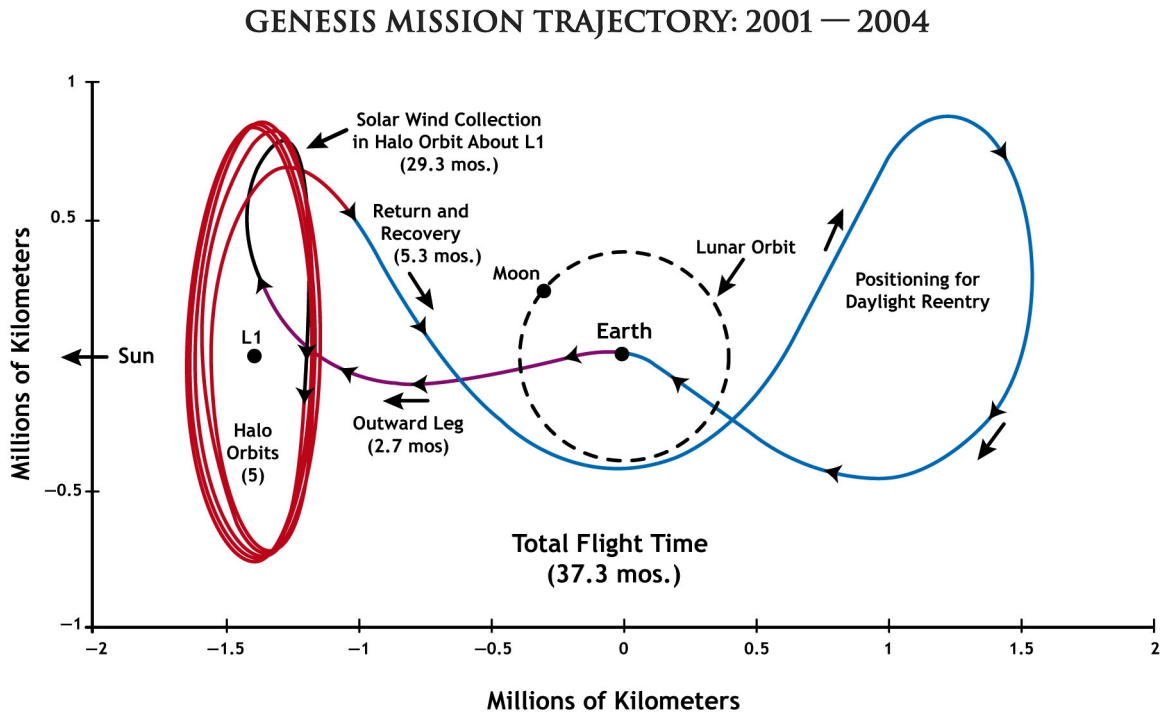
Optional activities:

- ***Listen to the audio clip, "Genesis Launch Campaign Overview."***
  http://www.genesismission.org/educate/scimodule/kriswalshsoundfiles/launch_campaign.html

- ***View the Genesis launch replay.***
  http://realserver1.jpl.nasa.gov:8080/ramgen/Video-GenesisLaunch-010808.rm?mode=compact

Dynamic Design: Launch and Propulsion

Genesis Launch Vehicle: The Delta Rocket



The spacecraft's destination was LaGrange point 1 (L1) to engage in solar wind collection.