

New Shepard Vehicle for Research and Education Missions

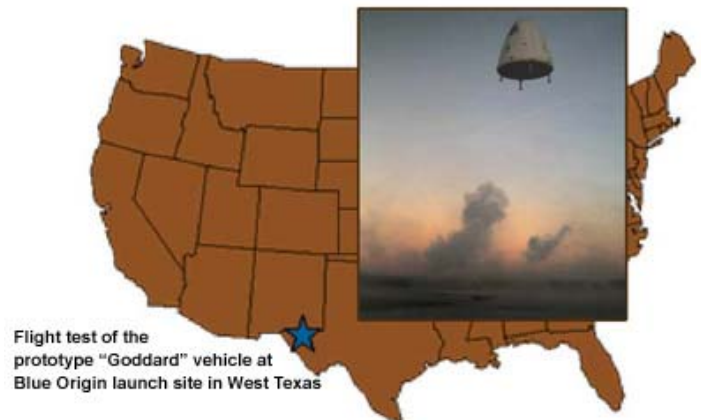
G. Lai, Blue Origins LLC

Program Overview

Blue Origin is developing New Shepard, a rocket-propelled vehicle designed to routinely fly multiple astronauts into suborbital space at competitive prices. In addition to providing the public with opportunities to experience spaceflight, New Shepard will also provide frequent opportunities for researchers to fly experiments into space and a microgravity environment.

Mission

The New Shepard vehicle will consist of a pressurized Crew Capsule (CC) carrying experiments and astronauts atop a reliable Propulsion Module (PM). Flights will take place from Blue Origin's own launch site, which is already operating in West Texas. New Shepard will take-off vertically and accelerate for approximately two and a half minutes before shutting off its rocket engines and coasting into space. The vehicle will carry rocket motors enabling the Crew Capsule to escape from the PM in the event of a serious anomaly during launch. In space, the Crew Capsule will separate from the PM and the two will reenter and land separately for re-use. The Crew Capsule will land softly under a parachute at the launch site. Astronauts and experiments will experience no more than 6 g acceleration into their seats and a 1.5 g lateral acceleration during a typical flight. High-quality microgravity environments (<10⁻³ g) will be achieved for durations of 3 or more minutes, depending on the mission trajectory.



Experiment Accommodations

Blue Origin is soliciting input from investigators to help design research astronaut and experiment accommodations. Researchers will have the opportunity to provide their own racks to mount into the vehicle (subject to a safety review), or use standard racks and services to mount their experiments. Flight experiments may be autonomous, remotely operated, or operated manually by an accompanying researcher provided by the customer or by Blue Origin. The tables below show some of the preliminary accommodations and standard services Blue Origin anticipates will be available, along with a partial list of the types of investigations that can be performed.

Accommodation	Description
Capacity	3 or more positions to be used by astronauts or experiment racks
Experiment Mass Allocation	120 kg available per position (including rack)
Windows	One per position
Power	28 VDC provided
In-Flight Communications	Recorded voice communications with crew and ground; recorded low-data rate link for experiment telemetry and control
Data Recording	Experiment data storage provided for post-flight download with synchronized trajectory parameter measurements
Pointing Accuracy	+/- 5° per each of 3-axes during coast
Turning Capability	Available

Types of Investigations	Example Applications
Remote Sensing	Atmospheric science Earth observations
In-Situ Science	Atmospheric sampling, Magnetospheric measurements
Deployables	Under study
In-Cabin Science	Physiology, Gravitational biology, Microgravity physics
Instrument Test/ Demonstrations	Gain flight experience Raise TRL levels
Active Experiments	LIDAR, Coordinated operations with White Sands Missile Range launches