Blue Origin

NG-1 Mission Overview

MISSION NAME
New Glenn – 1 or NG-1

LAUNCH DATE
NET January 12, 2025

PAYLOAD
Blue Origin's Blue Ring Pathfinder

LAUNCH WINDOW
1:00 - 4:00 AM EST / 6:00 – 9:00 UTC

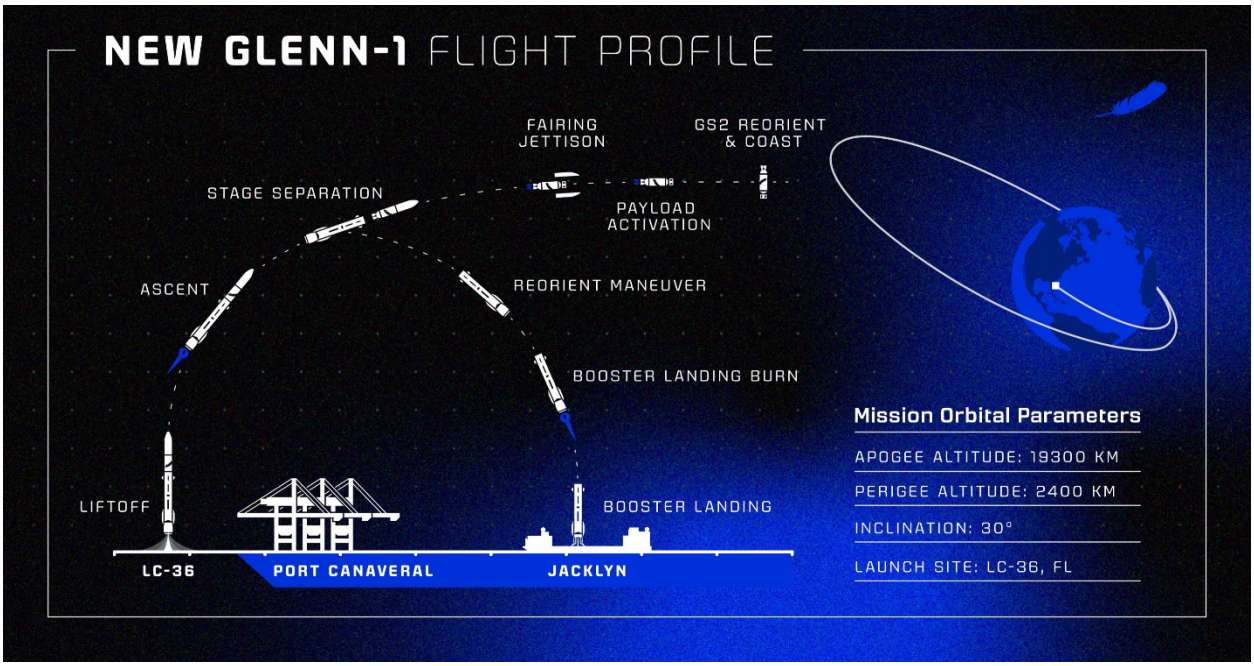
MISSION PATCH
The NG-1 mission patch features New Glenn on the pad at Launch Complex 36 surrounded by Team Blue as we build a road to space.

MISSION SUMMARY
New Glenn will launch for the first time from LC-36 at Cape Canaveral Space Force Station in Florida. The NG-1 mission will carry our Blue Ring Pathfinder and mark the vehicle's first National Security Space Launch certification flight. Blue Ring Pathfinder includes a communications array, power systems, and a flight computer affixed to a secondary payload adapter. The payload will also test its in-space telemetry, tracking and command hardware, and ground-based radiometric tracking that will be used on the future Blue Ring production space vehicle. The Pathfinder will remain affixed to the New Glenn Standard Payload Adapter.

NEW GLENN AT A GLANCE
- Integrated Vehicle Height: 321 feet (98 meters)
- Payload Fairing Diameter: 23 feet (7 meters)
- Payload Fairing Volume: 16,184 cubic feet (458 cubic meters)
- Payload Mass to Orbit: 13 metric tons to geostationary transfer orbit (GTO) and 45 metric tons to low Earth orbit (LEO)

NG-1 FLIGHT PROFILE

New Glenn lifts off from Launch Complex 36. Following separation, the first stage autonomously descends toward Jacklyn, a landing platform located several hundred miles downrange in the Atlantic. Meanwhile, the two BE-3U engines ignite, propelling New Glenn's second stage into space. The fairing separates and the Blue Ring Pathfinder will remain affixed to the New Glenn Standard Payload Adapter. After completion of the mission profile, the second stage will be safed and inerted, which is compliant with NASA's Orbital Debris Mitigation Standard Practices.



GLENN STAGE 1 (GS1)

New Glenn's reusable first stage is 188 feet (57 meters) tall and designed for a minimum of 25 flights.

BOOSTER NAME: So You're Telling Me There's a Chance

PROPELLANT: Liquid Oxygen (LOX) / Liquefied Natural Gas (LNG)

ENGINES: 7 Reusable BE-4 Engines
- Height: 12.5 feet (3.81 meters)
- Nozzle Diameter: 6.33 feet (1.93 meters)
- Oxygen-rich staged combustion
- Deep throttle capability
- Total Thrust: 17,126 kN total (3.85 million lbf)
- Thrust Per Engine: 2,450 kN per engine (550,000 lbf)

VEHICLE FEATURES:
- Forward Module Fins
    - Each of the four fins are about the size of a car—roughly 16 feet long at the base and sticking out 6.5 feet from the body of the rocket. They're responsible for steering the rocket on ascent and descent. Most of the structure is aluminum, which is protected from reentry heating by a durable fabric thermal protection system invented by Blue Origin and referred to as 'Comet.' The aerodynamic forces pushing on the fin during flight are roughly equal to the weight of a 737 aircraft.
- Reaction Control System
    - This system corrects New Glenn's orientation in zero-g and just before landing on Jacklyn, New Glenn's landing platform located downrange in the Atlantic. Together, the thrusters and the forward fins are essential to the booster's reusability.

- Strakes
    - There are two strakes on GS1, each about the size of an F-16 wing and carrying 175,000 pounds of lift when the stage re-enters for landing on Jacklyn. The strake is designed to accommodate two inches of thermal expansion during the different phases of flight.
- Aft Module
    - The aft module contains most of the stage's avionics, hydraulics, fluids, pneumatic systems, and landing gear. Its primary purpose is to distribute the thrust load from our seven BE-4 engines to the rest of the vehicle. The middle three BE-4 engines are gimbaling engines; they relight to support the exo-atmospheric deceleration and landing burns. The other four engines are fixed.
- Landing Gear
    - The aft module houses six hydraulically-actuated legs to support and secure the first stage during landing on a moving platform. The full landing gear bay is roughly 20 feet tall. Each leg can support about 150 tons of impact at touchdown, roughly the weight of two fully-loaded 737 aircraft. The legs are a folding link design, similar to traditional aircraft landing gear.

LANDING PLATFORM: Jacklyn

Jacklyn is a U.S.-flagged vessel purpose-built for landing New Glenn's first stage. It operates out of Port Canaveral, Florida. There's no bridge because there aren't any humans onboard the vessel during landing.

- Length: 380 feet (116 meters)
- Width: 150 feet (46 meters)
- Landing Area Diameter: 200 feet (61 meters), the same as New Shepard

GLENN STAGE 2 (GS2)

New Glenn's expendable second stage features a hydrogen-powered upper stage designed for demanding, highly energetic missions to low Earth orbit (LEO), medium Earth orbit (MEO), and geosynchronous orbit (GEO). GS2 is one of the largest and most capable upper stages ever developed with a propellant load comparable to a Delta IV booster.

- Diameter: 23 feet (7 meters)
- Height: ~88 feet (27 meters)
- The stage can be restarted up to three times during a mission and is capable of an on-orbit duration of up to 16 hours

PROPELLANT: Liquid Oxygen (LOX) / Liquid Hydrogen (LH_2)

ENGINES: Engines: 2 Restartable BE-3U Engines

- Height: 14.57 feet (4.4 meters)
- Nozzle Diameter: 8.25 feet (2.5 meters)
- Back-to-back turbine assembly
- Total Thrust in Vacuum: 1,423 kN (320,000 lbf)
- Thrust Per Engine in Vacuum: 712 kN (160,000 lbf)

PAYLOAD FAIRING

The fairing is seven meters in diameter with 16,184 cubic feet (458 cubic meters) of payload volume in our standard capacity configuration, which is twice the volume of smaller, five-meter class payload fairings. It's made out of carbon fiber composite structures and is the largest contiguous composite fairing ever built. It's large enough to fit an entire New Shepard rocket inside, with room to spare on the sides.

NEW GLENN OPERATIONS

ROCKET PARK
New Glenn is built, integrated, launched, refurbished, and re-flown within a nine-mile (14 km) radius of the manufacturing complex. Located in Exploration Park just outside the gates of Kennedy Space Center, the process starts at Rocket Park, Blue Origin's state-of-the-art manufacturing complex, which includes the vehicle's fabrication, integration, and operations facilities, as well as New Glenn Mission Control.

NEW GLENN MISSION CONTROL
New Glenn has a multi-use mission and launch control facility in Rocket Park that can support multiple payload customers concurrently. Launch Control features 26 consoles and is the only room that is command-enabled to launch the rocket. Mission Control has 22 consoles to support payload customers. Every system is fully redundant with fault tolerant power and networking on every console in the facility.

LAUNCH COMPLEX 36 (LC-36)
LC-36 is a 306-acre launch complex located at Cape Canaveral Space Force Station just nine miles (14 km) away from the manufacturing complex. Blue Origin invested more than $1 billion to construct the launch site from the ground up. Completed in 2021, LC-36 is the first newly-rebuilt launch complex since the 1960s. The complex is home to New Glenn's launch pad, final vehicle integration, propellant facilities, and environmental control center. LC-36 is the former home of more than 140 Atlas II/III launches, including the Mariner, Pioneer, and Surveyor missions.

The launch pad features a water-cooled flame deflector. The water is for thermal protection as well as to dampen as much harmful acoustic energy as possible. The water tower supporting this system is 353 feet (107 meters) tall, and one of the tallest in the world. The tower stores 750,000 gallons of water in the tank and 250,000 gallons in the piping.

BLUE RING

Blue Ring is a multi-orbit spacecraft platform designed to deploy and host payloads and provide numerous end-to-end services that span hosting, transportation, data relay, and logistics, including an in-space edge computing capability. The spacecraft can deliver and host up to 3,000 kilograms (6,600 pounds) of payloads across 13 ports, maneuvering with industry-leading delta-V to destinations in GEO, cislunar, and interplanetary space. Blue Ring is launch-vehicle agnostic. It can fly inside five-meter class fairings of National Security Space Launch-class vehicles, and in New Glenn's seven-meter fairing. Blue Ring production units are manufactured at Blue Origin's factory in Huntsville, Alabama.

BY THE NUMBERS
- Its 13 ports can accommodate hosted and separable payloads up to ESPA Grande class satellites, and up to a 2.5 metric ton payload on its top deck
- Solar arrays will roll out to 144 feet (44 meters) providing 20 kilowatts of power generation
- Electric & Chemical Propulsion providing nominal mission delta-V of 3,000 meters per second with payload configurations enabling up to 4,000 meters per second

BLUE RING PATHFINDER ON NG-1
- Blue Ring Pathfinder will validate space to ground communications capabilities by sending commands, receiving telemetry, receiving store and compute mission data, and performing radiometric tracking (for navigation)
- The telemetry and radiometric data from the ground system will interface over radio frequencies (RF) with ATLAS antennas in Hawaii, Georgia (USA), and Australia
- The orbit for Blue Ring Pathfinder is a highly elliptical orbit in the medium Earth orbit (MEO) range

- Data from the mission will support future production, launch vehicle integration, and on-orbit operations of the Blue Ring space vehicle
- The Blue Ring Pathfinder mission will demonstrate overall Mission Operations Capabilities and advance component flight heritage for the future Blue Ring missions

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