

# STEP BY STEP, FEROCIOUSLY

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**BLUE ORIGIN**

# SOAR WITH BLUE ORIGIN



**BLUE ORIGIN**

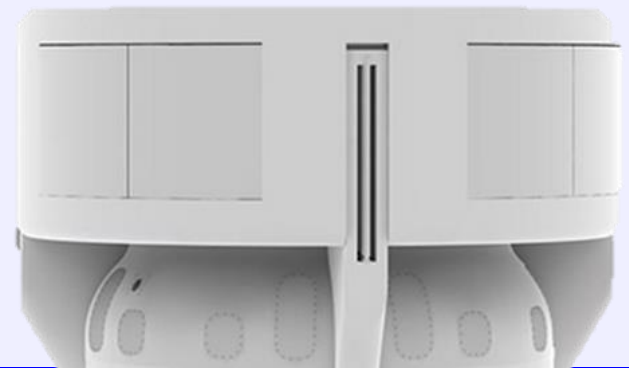
# ASTRONAUT EXPERIENCE

## Capsule

- Up to six astronauts
  - Multiple capsule configurations
- Largest windows in spaceflight history
- Full-envelope escape system
  - Escape available from launch pad to nominal separation

## Flight

- 11 min for complete flight
- Flight over 100 km
- Weightlessness for approximately 4 min



# SUBORBITAL RESEARCH CAPABILITIES

## Initial Capabilities

- 100 km apogee
- ~3 mins of milli-g accelerations
- Blue Origin Payload System or custom interface
- Sales partnership with NanoRacks

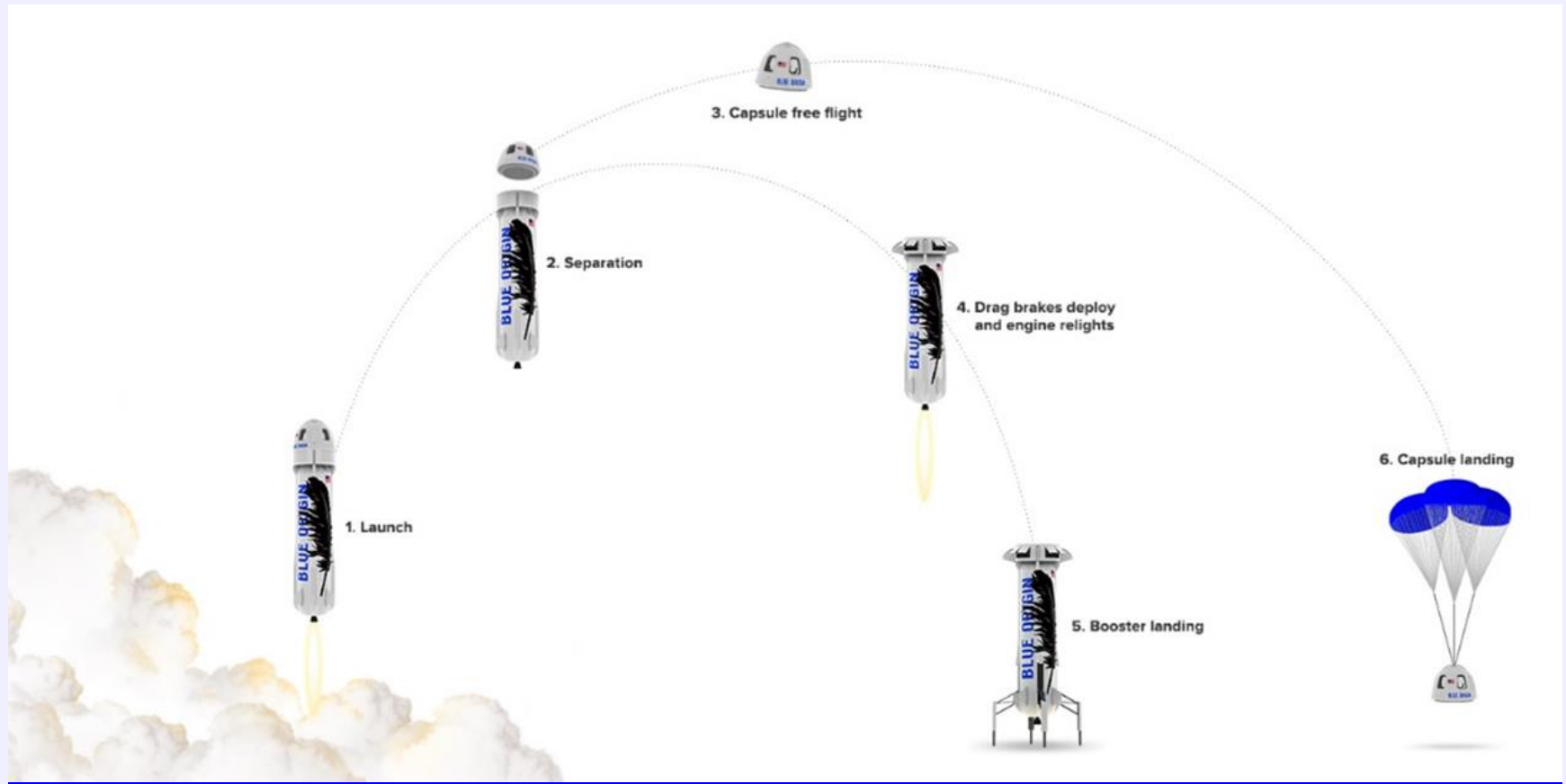
## Future Capabilities

- Up to six astronauts and/or payload stacks
- Access to large windows
- Turnaround as fast as 24 hours
- Additional possibilities as market demand grows



# NEW SHEPARD SUBORBITAL SYSTEM

Capsule separates from booster and lands classically under three parachutes with a cushioning retro-thrust system



# VERTICAL LANDING

## RING FIN

Upon reentry, airflow through the ring fin shifts the center of pressure

## WEDGE FINS & DRAG BRAKES

Wedge-shaped fins enhance aerodynamic stability and drag brakes reduce speed by half

## AFT FINS

Guide booster over the pad from altitude

## ENGINE RESTART

BE-3 engine throttles down to low power to reduce descent rate to 5 mph for landing

## LANDING GEAR

Landing gear deploy to cushion landing



# FIRST FLIGHT – APRIL 29<sup>TH</sup>, 2015

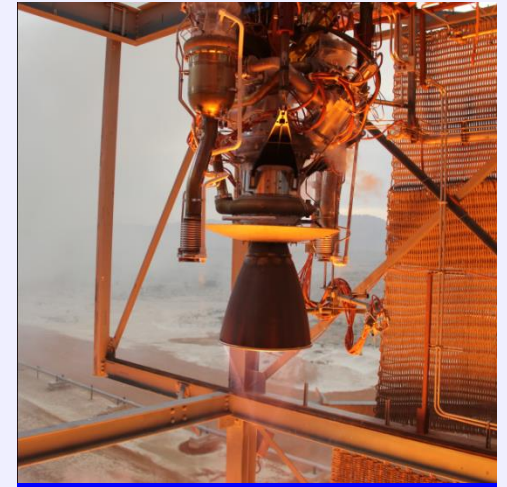
**307,000 ft  
(58 mi/94 km)**

**Flawless BE-3  
Performance**

**Clean  
Separation**

**Smooth  
Capsule  
Touchdown**

**Booster  
Recovery  
Attempt**



# NEXT STEP: ORBITAL

## Orbital Launch Vehicle

- First launch later this decade
- Reusable first stage with vertical landing
- Expendable upper stage
- Powered by BE-4 and BE-3U engines – fully funded and available to all launch providers
- Launch from LC-36 in Florida

## BE-3U Engine

- Liquid Oxygen, Liquid Hydrogen (LOx/LH2)
- 150,000-lbf thrust in vacuum
- Low recurring cost
- BE-3 variant demonstrated during flight to space

## BE-4 Engine

- Liquid Oxygen, Liquefied Natural Gas, (LOx/LNG)
- 550,000-lbf thrust at sea level
- Selected by ULA to replace RD-180 on Vulcan rocket



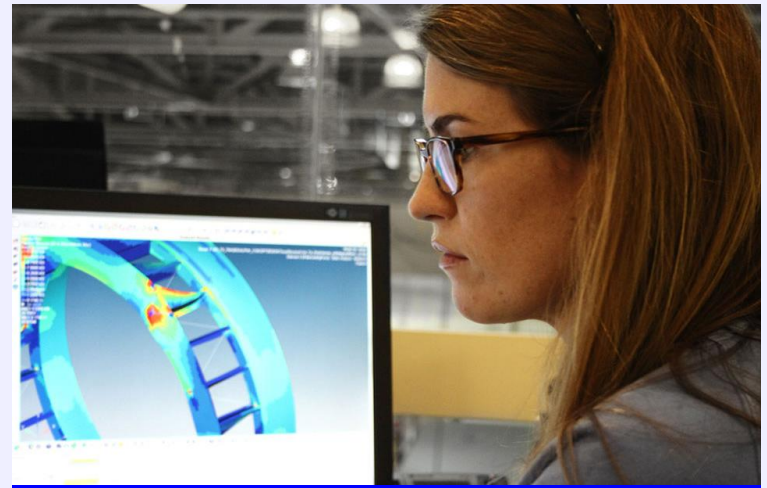


# GROWING TOWARDS SUCCESS

## Company Expansion

- Have ~500 employees currently
- Many openings in Washington and Texas
- Adding 300+ jobs in Florida
- Year-round internship program
- Hiring for long-term: balance of recent grads and experienced veterans

Check [www.blueorigin.com](http://www.blueorigin.com) for a list of open positions and other opportunities





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