

A Boeing X-37 hypersonic vehicle is shown in space, orbiting Earth. The vehicle is white with a black nose cone and a black thermal protection system on the underside. It has a small vertical fin on the back. The Earth's blue and white clouds are visible in the background.

Boeing X-37: Beyond The Blue

Justin T. Millsap

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Need for the Boeing X-37

What is the need for the Boeing X-37?

- Space Experimentation
 - Conduct Experiments in space over long periods of time.
- Satellite Deployment and repair.
- Military and National Security Applications.
- Expand the United States Space Force's knowledge of the space environment

Current Models:

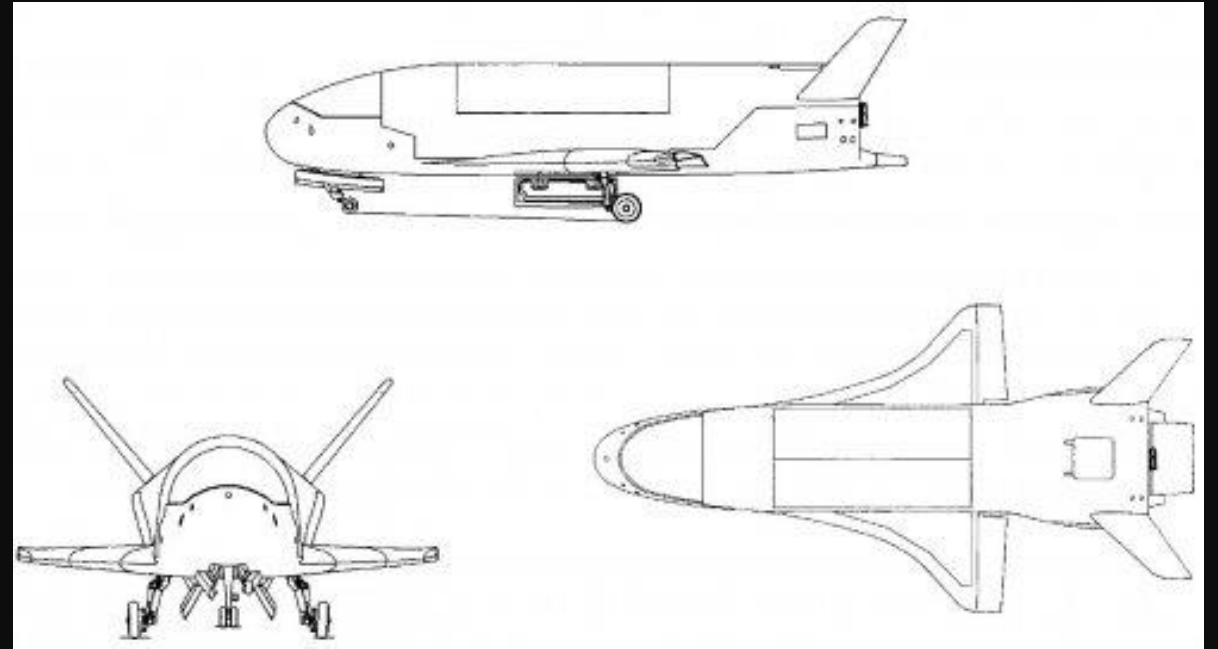
- X-37A: Used by NASA and DARPA
- X-37B: Used by United States Space Force

Derived from the Boeing X-40



Boeing X-37 Configuration

- 8.9 meters long, 2.9 meters tall, and has a wingspan of 4.5 meters
- 4,990 Kilograms
- Two swept wings
- Tail Fins
- Landing Gear



“Highspeed” Aerodynamic/Propulsion design attributes

Aerodynamic Attributes:

Lifting Body Design:

- Allows for longer glide times for re-entry
- Improved stability and Control

Swept wings:

- Ideal for high-speed stability and control

Tail Fins:

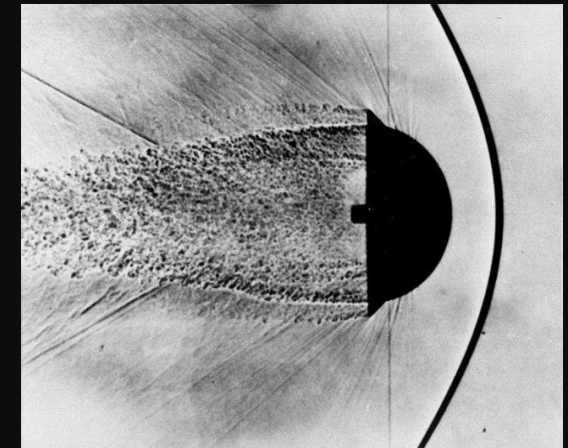
- Provide stability and control in the atmosphere during ascent and re-entry phase

Generates bowshock waves during re-entry

Propulsion System:

Aerojet AR2-3 engine:

- 700N of thrust
- Delta-V of 3.1 km/s
- $I_{sp} \sim 280s$



Desing and Manufacturing

- Company:
NASA 1999 – 2004
Department of Defense (DoD) 2004 - Present
 - Initial Development: 1999
 - Number Produced: 2
 - Unit Cost: \$173 Million
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Impact of the Boeing X-37

Flight	Launch Site	Launch Date	Landing Date	Launcher	Duration	Status
OTV-1	Cape Canaveral	April 22, 2010	December 3, 2010	Atlas V 501	224 Days	SUCCESS
OTV-2		March 5, 2011	June 6, 2012		468 Days	
OTV-3		December 11, 2012	October 17, 2014		674 Days	
OTV-4		May 20, 2015	May 7, 2017		717 Days	
OTV-5	KSC	September 7, 2017	October 27, 2019	Falcon 9	779 Days	
OTV-6	Cape Canaveral	May 17, 2020	November 12, 2022	Atlas V 501	908 Days	ONGOING
OTV-7	KSC	December 29, 2023	N/A	Falcon Heavy	74 days	



Impact on Future designs:

- Space vehicle reusability
- Rapid Responsive Space Observations
- Various materials which can withstand high temperatures
- Propulsion technology