ASTROBOTIC

XODIAC VTVL ROCKET TESTBED

Astrobotic is a leader in the terrestrial test market for space technologies after its recent acquisition of Masten Space Systems. The Xodiac vertical takeoff and vertical landing (VTVL) testbed provides customers with unique test opportunities. Xodiac is the result of nearly two decades of VTVL flight testing and experience and over 600 rocket-powered landings.

Operated out of the Mojave Air & Space Port, Xodiac provides government, university, and commercial customers with a rocket-powered test environment to retire risk and advance technology readiness for terrestrial and space applications.

WHY TEST ON XODIAC?

- **ADVANCE TECHNOLOGY READINESS LEVEL**
- **REDUCE OPERATIONAL RISK**
- **SIMULATE DIVERSE LANDING ENVIRONMENTS**
- **OPEN & CLOSED LOOP FREE FLIGHT OPTIONS**

TEST SERVICES

- **ENTRY, DESCENT & LANDING SIMULATION**
- **SENSOR, COMPONENT & INSTRUMENT TESTING**
- **PLUME-SURFACE INTERACTION TESTING**
- **NIGHTTIME FLIGHT OPERATIONS**

TEST PROCESS

Astrobotic works directly with each customer to design a test campaign tailored to its unique objectives, specifications, and success metrics. Astrobotic works with payload teams as few as six months out to more than a year before commencing test flights.

ConOps Development

Technology Integration

Tether Flights

Data Analysis & Iteration

Free Flights

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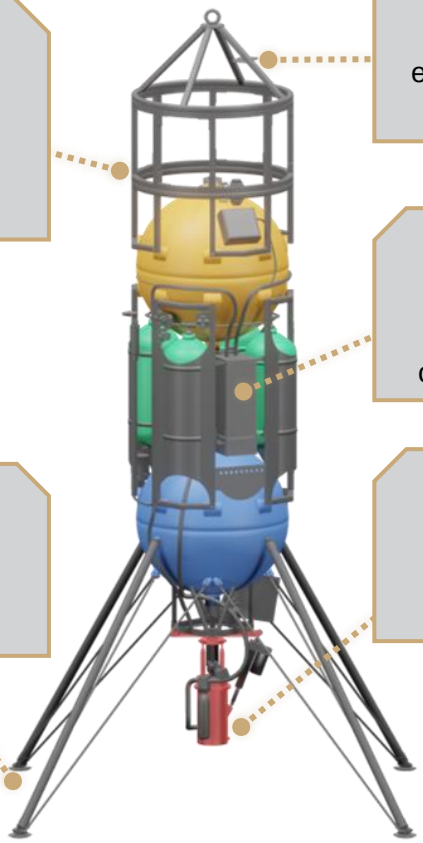
Payloads
Standard payloads integrated within payload bottle; external mounting options available

Precision Landing
Onboard navigation enables landings within 2 cm of target



Closed Loop Flights
Hypervisor GN&C software allows payload software to control Xodiac in-flight

PSI Testing
Instruments can be mounted to legs to study ejecta and surface interactions

Scimitar Engine
Throttleable 1,200 lbf LOX/IPA engine enables controlled descent and hovering

XODIAC BY THE NUMBERS	
Total Flights	120+
Payload Mass	50 kg
Payload Height	14 in
Payload Diameter	24 in
Target Altitude	500 m
Divert Range	800 m
Flight Duration	180 s
Max Speed	25 m/s
Comms Band	2.4 GHz
Bandwidth	10 MHz

COMMON FUNDING OPPORTUNITIES

Astrobotic works with payload providers as they seek funding for flight testing, often through two key programs:

NASA FLIGHT OPPORTUNITIES PROGRAM

Xodiac has served as a key testbed for NASA's Flight Opportunities Program since 2016. Funding for Xodiac flights may be available through REDDI/TechFlight awards or the NASA TechLeap Prize. This program is available to commercial and government customers.

SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM

Customers with existing SBIR contracts may be eligible for additional funding to test their research or technology aboard Xodiac as part of a post-Phase II effort. Astrobotic also provides Xodiac testing in support of SBIR Phase II or Phase III contracts at its Flight Opportunities pricing.

CUSTOMER EXPERIENCES

"[This testing] helped in a realistic environment on an actual lander doing vertical takeoff and vertical landing, which is what we'll see for our Martian Moons eXploration mission."

– Dr. Kris Zacny, VP of Exploration Technology at Honeybee Robotics

"The tests went smoothly with four successful flights. We could measure how much dust is in the clouds… proving the quality of data that can be collected during a lunar landing."

– Dr. Philip Metzger, Planetary Scientist at the University of Central Florida