



X PRIZE Team Summary Sheet

PIONEER ROCKETPLANE



All the information given in this document has been cleared for official release by the X PRIZE Foundation and the Pioneer Rocketplane team. Quotes provided by Pioneer Rocketplane are shown in italics. For more information about Pioneer Rocketplane, please visit their web site at www.rocketplane.com.

TEAM OVERVIEW



Pioneer Rocketplane is a company dedicated to revolutionizing

space travel by building a rocket powered aircraft and applying standard aviation practices to create a vehicle that will fly to space as readily as conventional aircraft fly to places on the Earth's surface. Rocketplanes permit travel to space, travel in space, and travel through space

TEAM LEADER BACKGROUND

Mitchell Burnside Clapp holds a Master's degree in Aeronautics and Astronautics from the Massachusetts Institute of Technology and is a graduate of the US Air Force Test Pilot School. The author of numerous technical papers on various subjects in the area of space transportation, Burnside Clapp was the inventor of the concept of aerial propellant transfer to enable horizontal takeoff-horizontal landing, single stage to orbit spaceplanes. He led the design effort at the US Air Force's Phillips Lab which developed the first such design for this type of vehicle, the "Black Horse" rocketplane. He then was responsible for presenting this concept to numerous high level decision making bodies and study groups throughout the Air Force, resulting the strong recommendation by the Air Force's "spacecast 2020" study that a trans-atmospheric rocketplane be developed for military purposes.



DATA AT-A-GLANCE

TEAM SPECIFICATIONS

- Name: Pioneer Rocketplane
- Leader: Mitchell Burnside Clapp
- Place: Solvang, California, USA

- Registered with X PRIZE: October 16, 1996
- Web: www.rocketplane.com

VEHICLE SPECIFICATIONS

- Name: Pioneer XP
- Length: 43 feet
- Diameter: 5 feet
- GTOW: Under 18,000 lb_m
- Dry Weight: Over 7,000 lb_m
- Crew Environment: Pressurized cabin to 8 psi plus pressure suits for redundancy.
- Payload Capacity: 900 lb_m
- No. of Engines: 1
- Propulsion System: Pressure Fed
- Fuel: Kerosene
- Oxidizer: Liquid Oxygen
- Total Thrust: 18,000 lb_f
- Reaction Control System: Compressed air

MISSION SPECIFICATIONS

- Alt. at Ignition: Between 18,000 and 30,000 feet
- Orientation at Ignition: Horizontal
- Max. Accel. Force on Ascent: 2 G
- Alt. at Engine Cut-off: 175,000 feet
- Time at Engine Cut-off: 3 minutes
- Max. Speed: 6,000 feet/sec
- Max. Altitude: 350,000 feet
- Time in Weightless Conditions: 4 minutes
- Reentry Method: Ballistic descent
- Accel. Forces on Descent: 3 to 4 G
- Landing Method: Powered, horizontal landing at landing strip
- Total Duration: 1 hour
- Landing Distance from Take-off Location: 0 kilometers
- Time Between Missions: 3 to 5 days



VEHICLE/LAUNCH SYSTEM DESCRIPTION



The Pioneer XP is a four-seat fighter-sized vehicle powered by two jet engines and two rocket engines, enabling it to reach altitudes of 350,000 feet

(106.7 kilometers). It has applications for passenger travel, as a research and observation platform, and as a promotional and sponsorship opportunity. A crew escape system will give the crew an option for survival if the XP is no longer capable of controlled flight.

The XP does not use any launch assist and it can achieve about 6,000 feet per second (4,100 miles per hour) at 350,000 feet altitude.

The thermal protection system, the wing propellant tanks, and other systems are designed with the possibility of eventual upgrade so that the option for a longer-range aircraft can be realized in the future without the need for expensive reinvestment.

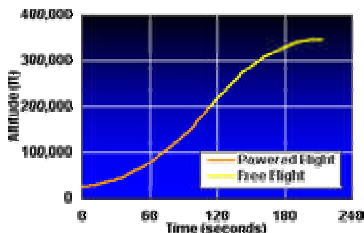
The XP will operate from ordinary airfields within the well-established rules and practices for experimental aircraft.

PROPULSION SYSTEM

Safety, existing aircraft rules, and the constraints of cost and schedule force the Pioneer Rocketplane team to select oxygen and kerosene as the main propellants, to use a simple and reliable propellant feed system, to employ safe, already certified aircraft components, and to plan on an incremental flight test approach.

MISSION DESCRIPTION

The Pioneer XP trajectory is simple. The altitude for rocket engine ignition is arbitrary. A unique feature of this relatively low performance design is that it can readily take off and land at the same spot. It manages this by



flying subsonically on its air breathing engines to offset the rocket engine ignition point from the takeoff airfield. After reentry, the aircraft is already aligned for approach to the airfield.

VEHICLE ASCENT

The trajectory is carefully designed to make maximum use of the aerodynamic forces available during the early part of flight and to reduce dependence on thrust vectoring.

- Takes off under conventional turbojet thrust from spaceport runway
- Flies to 20,000 feet under turbojet power
- Fly 50 miles downrange subsonically and turn around facing the landing strip.
- Ignites rocket engine for two minutes to climb from 20,000 to 350,000 feet.
- Main engine cut-off

WEIGHTLESSNESS

About four minutes of 0.0001 G or less are available at the peak of the trajectory, provided the occupants remain still.

VEHICLE DESCENT AND LANDING

- Reentry deceleration
- Reset and restart turbojet engine
- Powered landing back at the spaceport landing strip.

HARDWARE & TESTS

Pioneer Rocketplane has no scale models or full-scale engineering mock-ups of the XP vehicle yet.

No hardware or hot-fire tests have been conducted for the XP vehicle yet.

PUBLICITY

PERSONAL APPEARANCES

None

TELEVISION AND RADIO

None

PRINT MEDIA

None



TEAM BACKGROUND

TEAM MEMBERS

- Merrill A. "Tony" McPeak, Chairman of the Board
- Edward G. Gibson
- Dr. James R. Stuart
- Brad Bracewell
- Michael P. Scardera, Senior Systems Engineer
- Matt Knapp, Aerodynamics and Performance Analysis

X PRIZE QUOTE

“The X PRIZE has served the entire rocket and space community as a way to raise public awareness about the private design and development of spaceships. Pioneer Rocketplane is focused on creating a spaceship which is able to change the economics of space transportation, in the same fashion that the personal computer brought low-cost computing to the masses. We are proud to be participating in the X PRIZE and thank the people of St. Louis for their vision in creating this important challenge.” – Mitchell Burnside Clapp

PHILOSOPHY

“Our vehicle uses jet engines to fly as an aircraft and a rocket engine to boost the vehicle to space. After reentry, the rocketplane returns to land as a normal aircraft re-starting the jet engines.” – Mitchell Burnside Clapp

MISSION AND GOALS

“Pioneer Rocketplane is building a rocket powered aircraft and applying standard aviation practices to create a vehicle that will fly to space as readily as conventional aircraft fly to places on the Earth's surface.” – Mitchell Burnside Clapp

X PRIZE FOUNDATION

Below is contact information for the X PRIZE Foundation.

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