X PRIZE Team Summary Sheet
ACCELERATION ENGINEERING

All the information given in this document has been cleared for official release by the X PRIZE Foundation and Acceleration Engineering. Quotes provided by Acceration Engineering are shown in italics.

TEAM LEADER OVERVIEW

Micky Badgero, the leader of Acceleration Engineering, has been studying rockets for over 25 years and has degrees in Electronics and Computer Science. Mr. Badgero is currently a graduate student in computer science at Michigan State University, studying artificial intelligence and robotics.

DATA AT-A-GLANCE

TEAM SPECIFICATIONS

- Name: Acceleration Engineering
- Leader: Micky Badgero
- Place: Bath, Michigan, USA
- Registered with X PRIZE: 16 October 1996

VEHICLE SPECIFICATIONS

- Name: Lucky Seven
- Length: 29.53 ft (9 m)
- Diameter: 6.56 ft (2 m)
- GTOW: 5,600 lb_m (2540 kg)
- Dry Weight: 1,400 lb_m (635 kg)
- Passenger Environment: Pressurized cabin
- Payload Capacity: 3 passengers, 600 lb_m (270 kg)
- Number of Engines: Not yet disclosed
- Propulsion System: Pressure fed
- Fuel: Liquid methane, 900 lb_m (408 kg)
- Oxidizer: Liquid oxygen, 2700 lb_m (1224 kg)
- Total Thrust: 16,200 lb_f (72,000 N)
- Reaction Control System: Cold gas

MISSION SPECIFICATIONS

- Ascent Method: Vertical launch ground
- Max. Accel. Force on Ascent: 3 G
- Alt. at Engine Cut-off: 32 miles (52 km)
- Time at Engine Cut-off: 90 seconds
- Max. Speed: 3,300 fps (1,000 m/s, local Mach 3)
- Max. Altitude: 62 miles (100 km)
- Time in Weightless Conditions: 200 seconds
- Reentry Method: Ballistic reentry
- Accel. Forces on Descent: 4.5 G peak
- Landing Method: Guided, parafoil descent to a vertical landing
- Total Duration: Approximately 12 minutes
- Landing Distance from Take-off Location: <1 km
- Time Between Missions: Not yet disclosed

VEHICLE/LAUNCH SYSTEM DESCRIPTION

Lucky Seven will be a conical rocket 9 meters long and 3 meters between fin tips. For launch and landing, the rocket will be supported on four fixed leg-fins, each five feet tall. These legs are part of a metal frame that supports the propulsion system, a pressurized cabin, and a nose cone/recovery system.

PROPULSION SYSTEM

The propulsion section contains the engines, liquid methane tanks, liquid oxygen tanks, and a helium pressurization system, along with main ascent control and guidance systems. A firewall separates the propulsion section from the passenger compartment.

PRESSURIZED CABIN

The frame tapers to support the flask shaped passenger compartment. The pressurized cabin will be mounted inside the frame, and an aeroshell will be fitted outside. There will be two seats at the bottom of the cabin and one above. The cabin will contain a communications system, and the backup guidance and control systems. The hatch will be in the top, beneath the nose cone.

NOSE CONE/RECOVERY SYSTEM

The ten foot long nose cone will contain the drogue parachute, the main parasail, an emergency backup parachute, and the main descent guidance and control systems.

MISSION DESCRIPTION

Launching vertically, the main engines will burn for 90 seconds, after which the rocket will coast for another 100 seconds past the 100-kilometer altitude mark. Passengers will experience weightlessness for about three and a half minutes - from the time the engines shut off until the rocket falls back into the atmosphere. Upon reentering the atmosphere, a drogue parachute will be deployed to slow the ascent. When the air thickens, a parafoil will be deployed. The spacecraft will then return to the launch site, using a Global Positioning System satellite guidance system, gliding to a vertical landing.

TEAM BACKGROUND

TEAM MEMBERS

There are no other members of this team. Mr. Badgero is designing the rocket in his spare time, building it in his garage, paying for it with his savings, and will also be the test pilot.

"Rocket science is, for the most part, a solved problem. Many of the engineering challenges have also been overcome. What remains is a problem of technology application. One of my goals is to demonstrate that manned rockets can be made on the scale and complexity of homebuilt aircraft." - Micky Badgero

X PRIZE QUOTE

“I would be glad to pay for a trip into space, but I never gave much thought to space tourism until I read about the X PRIZE. I see the X PRIZE as a golden opportunity to encourage space tourism. Suborbital flight is just the first step in making space travel affordable, and it is a necessary step.” – Micky Badgero

PHILOSOPHY

“Not just the winning design, but any successful design, can be made economical by selling seats to people who want to see the Earth from space. Tourists will decide, based on safety, comfort, and cost, which company they want to fly with. As with the airlines, competition will provide a selection that covers most passenger requirements, and cooperation will combine good designs into better ones.” – Micky Badgero

MISSION AND GOALS

“With the X-PRIZE prize money and a good business plan as leverage, a profitable space tourism business could be built around small, single stage rockets, with propellant tanks specially designed to be assembled on orbit into a space hotel. Money from this venture could be used to launch a mission to the Moon or to Mars. I hope to look up some day to see the cliffs of the Mariner Valley. Even the stars are not too far with the help of fusion energy. Of course, to accomplish all this requires a basic education in the Three Rs of space travel: Rockets, Robots, and fusion Reactors.” – Micky Badgero

X PRIZE FOUNDATION

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