



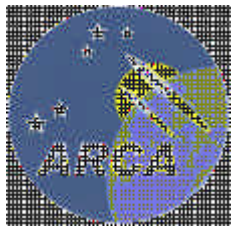
## X PRIZE Team Summary Sheet AERONAUTICS AND



# COSMONAUTICS ROMANIAN ASSOC.

All the information given in this document has been cleared for official release by the X PRIZE Foundation and the ARCA team. Quotes provided by the ARCA team are shown in italics. For more information or if you have questions about ARCA, please visit their web site at [www.arcaspace.ro](http://www.arcaspace.ro).

## TEAM OVERVIEW



Aeronautics and Cosmonautics Romanian Association (ARCA) is a non-governmental organization that promotes innovative aerospace projects. ARCA was founded in 1999 but their members

worked together for an ambitious project of developing a high performance rocket engine since 1998. That year, in Sibiu, Romania, in front of Hermann Oberth memorial house, a group of students decided to change the low level space activities in Romania. They had no money, no support. But they had a strong will to change the situation. Since then, ARCA became a united team and, despite a very small budget in the first years, it succeeded to lead the field in rocket technology in Romania. The most important achievement in ARCA's activities was to represent Romania in the most ambitious world competition ever addressed to the private sector in astronautics: the X Prize Competition.

## TEAM LEADER BACKGROUND

Dumitru Popescu is the ARCA Chairman and Technical Director.

## DATA AT-A-GLANCE

### TEAM SPECIFICATIONS

- Name: Asociatia Româna pentru Cosmonautica si Aeronautica - ARCA
- Leader: Dumitru Popescu, Chairman
- Place: Ramnicu Valcea, Romania
- Registered with X PRIZE: 16 October 2002
- Web: [www.arcaspace.ro](http://www.arcaspace.ro)

## VEHICLE SPECIFICATIONS

- Name: Orizont
- Length: 14 meters (46 feet)
- Diameter: 1.3 meters (4.3 feet)
- GTOW: 7,000 kg (15,430 lb<sub>m</sub>)
- Dry Weight: 2,500 kg
- Crew Environment: Pressurized cabin to 1 atmosphere
- Payload Capacity: Crew of three people
- No. of Engines: 1
- Propulsion System: Uncooled, gas pressure fed
- Fuel: Kerosene
- Oxidizer: Hydrogen Peroxide (85%)
- Total Thrust: 12,000 daN (27,000 lb<sub>f</sub>)
- Reaction Control System: low thrust engines

## MISSION SPECIFICATIONS

- Launch Method: Vertical
- Max. Accel. Force on Ascent: 3.5 G
- Time and Alt. at Engine Cut-off: 40,000 m (130,000 feet)
- Max. Speed: 1,300 meters per second (2,900 mph)
- Max. Altitude: > 100 km (62 miles)
- Time in Weightless Conditions: 2 minutes
- Reentry Method: Parachutes deployed at 4 km
- Accel. Forces on Descent: 1.5 G
- Landing Method: Parachute recovery
- Total Duration: not disclosed
- Landing Distance from Take-off Location: 50 km
- Time Between Missions: 2 weeks





## VEHICLE/LAUNCH SYSTEM DESCRIPTION



The Orizont vehicle is extremely simple to ensure a high reliability and low production cost. The entire vehicle has a length of 14 meters, a diameter of 1.3 meters, and weighs 7,000 kg (15,430 lb<sub>m</sub>).

The payload capsule is made of two compartments. The lower section is the

habitable section for a crew of three and the upper section is the service compartment. The crew sits single-file, one behind the other, to minimize the diameter of the vehicle. The service compartment contains equipment and parachutes.

## PROPULSION SYSTEM

The vehicle has one liquid fuel rocket engine which is capable of 12,000 daN (27,000 lb<sub>f</sub>) of thrust at sea level. The engine is uncooled and has a gas-pressure feed system. The fuel tank is made of composite materials. At the top of the fuel tanks are the high-pressure tanks and the parachutes for recovery.



## MISSION DESCRIPTION

### VEHICLE ASCENT

The vehicle will take-off vertically, from a launch pad. It will accelerate to a speed of about 1,300 m/s. g and this value will be present at the end of the propelled flight.

## WEIGHTLESSNESS

At 40,000 m the engine will shut down, and the vehicle will continue to coast to an altitude above 100 km. The acceleration will be no greater than 3.5 g. The crew capsule separates from the launch vehicle at an altitude of 80 km.

## VEHICLE DESCENT AND LANDING

The return to the surface of the Earth of the Orizont vehicle will be made in two separated pieces. One piece will be the rocket, and the other will be the capsule. Both will have a parachute recovery system, and they will land on sea. The main parachutes will be deployed at an altitude of 4 km. Helicopters will recover both the capsule and rocket. The occupants of the capsule will stay in the vehicle until the helicopter will transport the capsule to the land.

## HARDWARE & TESTS

A half-scale technological demonstrator of the X PRIZE competition vehicle has been constructed. The demonstrator is unguided but self stabilized by inertial and aerodynamic methods.

- March 2001 – Unsuccessful fuel tank pressurization tests achieve only 4.5 bars pressure.
- June 2001 – Successful fuel and oxidizer tank pressurization tests achieve maximum of 30 bars.
- May 2002 – Completion of rocket engine test stand construction and cold flow calibration tests. Successful series of hot fire tests achieved.

## PUBLICITY

### PERSONAL APPEARANCES

- 7-12 October 2002 - Bucharest International Fair

### TELEVISION

- National Romanian Television
- Pro TV
- Prima TV
- Antena 1
- TVRM
- Etalon TV
- VL 1 TV





## PRINT MEDIA

- Top Gun-Romania
- Stiinta si Tehnica,
- Adevarul
- Cotidianul
- Evenimentul Zilei
- National
- Libertatea
- VIP

## TEAM BACKGROUND

### TEAM MEMBERS

- Maria Nicolae, Economic Director
- Andrei Comanceanu-Vice Chairman
- Stud. Sorin Ivancu-Vice Chairman
- Constantin Truta-Technical Adviser
- Niculina Truta-Technical Adviser
- Gheorghe Ionita-Chemical Adviser
- Simona Popescu-Technical Adviser
- Mihail Staicu-Technical Adviser

### X PRIZE QUOTE

*"We consider the X PRIZE competition a new space race, even though this time the prize is not the Moon. It will open access to space for all of us, forever. Because of that, this competition is the most challenging competition ever addressed to private industry in astronautics. People all over the world are passionate about astronautics. Like all competitors, we are convinced that they want to feel what it's like to go into space and what it feels like to ride on a rocket. All those people deserve to have a chance to feel all of those things, and the X PRIZE will offer them this opportunity. Sub-orbital flights are nothing new; remember Mercury missions or the X-15 program. It is obviously possible to fulfill the X PRIZE competition tasks. We are proud to compete for the X PRIZE. We are honored to take part in this adventure." – Dumitru Popescu*

### PHILOSOPHY

*"Since the appearance of the rocket, and especially since the liquid fuel rocket was put into practice, specialists all over the world have wanted to make those transport systems commercially viable, such as point-to-point travel, cargo, and so on. Unfortunately, up to now, the only rockets that succeed to be commercially efficient are the satellite launch rockets. The X PRIZE competition could open the way to a new civil utility for sub-orbital*

*rockets, those rockets being used previous only for military or scientific application. Orbital space tourism has already been inaugurated, but it is available only to people capable of paying a substantial sum of money for a place aboard an orbital vehicle, such as Soyuz or the Space Shuttle. Never the less, the launch frequency of these vehicles is low. Sub-orbital space tourism will be accessible to almost anyone and the rate of sub-orbital launches will be far superior to the rate of current orbital launches." – Dumitru Popescu*

## X PRIZE FOUNDATION

Below is contact information for the X PRIZE Foundation.

### MAILING ADDRESS

722A Spirit of St. Louis Boulevard  
St. Louis, Missouri, USA 63005

### PHONE NUMBERS

Office: +1 314-533-2002  
Fax: +1 314-533-6502

### INTERNET

Email: [info@xprize.org](mailto:info@xprize.org)  
Web: [www.xprize.org](http://www.xprize.org)

