

Anvium- Avatair, robotic Gasship on Mars. Dr. Martin Frettlöh, Anvium GmbH, Siegener Straße 29, 57080 Siegen, Germany, martin.frettlöh@anvium.de and Tobias Lerch Anvium GmbH, Siegener Straße 29, 57080 Siegen, Germany, tobias.lerch@anvium.de. Homepage: www.anvium.de Telephone: +49 271 703 1980 0

Introduction: Our aim is to provide the NASA Mars research program with a multiuse and non expansive lighter than gas Ship for exploring both different heights of the atmosphere and future landing spots on Mars and also to carry loads like small robots to enhance their range and transport samples to a base station.

About Anvium: Anvium is a small company based in Siegen, central Germany. We specialize in Airships, Drones, video aided Sensorsystems, aerial pictures and 3D Modelling. We have close partnerships with the department for sensor systems, represented by Dr. Hartmann and the department of topographical survey, represented by Dr. Monika Jarosch, both of the University of Siegen. Both departments would love to join the project.

To check us out, you might go to our homepages. We apologize that they are not yet available in English. www.anvium.com; www.zess.uni-siegen.de; www.uni-siegen.de/fb10/subdomains/vermessung/

The concept:



The main idea is, to send a Gasship, packed in a very small and light compartment on board a landing device to the surface of planet Mars. Once it got to the surface and is being unloaded from the Marslander, it can slowly inflate by using its solar panel and its fuel cells to produce Hydrogen from atmospheric Water on Mars. Even though the content of Water in Mars atmosphere is very low, there have been clouds of water on Mars and thin layers of water-ice on the ground. If that process is too slow, the Marslander can carry water or hydrogen to inflate the ship for the first time. Once above ground, the big surface of the ship, covered with light weight solar panels, provides enough electricity to power the fuelcells to produce Hydrogen and Oxygen from atmospheric water. Both gases can be stored compressed in plastic tanks. They will be used to keep the gashull filled in order to control the height and to fuel the fuelcells if needed to provide electricity for internal systems and Motors in case the solar panels do not provide enough electricity.

Airborne, the Ship can stay put in a cubicle of 1km edge length for survey, or be drifted through the atmosphere by winds to survey different places in the atmosphere to measure wind, temperature or gases.

The Ship can lift small robots and set them down wherever needed, it can transport samples from remote spots to a central base and a return-to-earth vessel.

It also can take very detailed pictures with a 3D Camera from very different altitudes. Using Scale-Invariant Feature Transform (SIFT) it can gauge Ground in great detail, for example to spot out future landing spots for robotic and manned vehicles.

How it meets your goals:

[6] Challenge [6] is met, because the Ship can go to very different spots in the atmosphere to measure winds, densities and other parameters.

[8] Challenge [8] is met, because we can experiment how to inflate a structure on Mars.

[11] Challenge [11] is met, because the Ship will be a lightweight, lowcost Plattform in the atmosphere. It can in fact be a side and non-crucial experiment in a future Mars mission.

[16] Challenge [16] is met, because the Ship would dramatically increase the range of any Mars Mission on the Surface and above Ground.

[18] Challenge [18] is met, because the Ship can transfer loads over wide ranges. It can also enhance communication on Mars by acting as a relay station for radio between different vehicles.

The steps:

Even though the Mars atmosphere is way thinner than earth's, it consists mostly of CO₂ which is considerably more heavy than Earth Nitrogen and Oxygen mixture. So a gasship inflated with Hydrogen can be lifted above ground on Mars, it just needs a bigger gasbody. So almost all of the Gasships functions such as lift capacity, navigation and thrust, can easily be tested in high altitudes (about 35 Kilometers) in our atmosphere.

We think, the development of a working Gasship will not cost more than 20.000.000 Dollars US.

Additional Information: If you have any questions or need additional information regarding the project, please do not hesitate to contact us any time.

Please check our video for the earth based version of the planned Anvium Avatair ship: <http://www.youtube.com/watch?v=Tfp38zt01Rg>

Thank you for your patience, Martin and Tobias