Horizon Acquisition Experiment

HORACE

The Experiment

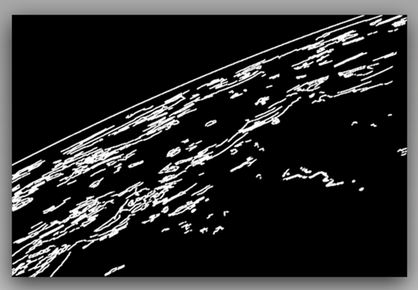
As part of the REXUS programme (Rocket Experiments for University Students) a new sensor system for attitude determiniation is developed at the University of Würzburg. By using powerful image processing algorithms which analyze video data of an ordinary camera, the system shall enable satellites to determine their attitude also during non-nominal phases (e.g. uncontrolled tumbling). This new concept shall be proven with the Horizon Acquisition Experiment (HORACE) on REXUS-16, which calculates the vector to the Earth‘s center continously during the flight of the rocket. The launch from Kiruna, Northern Sweden, is scheduled for spring 2014.

The Approach

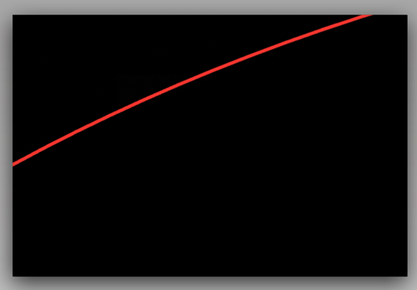
The universe is dark, the earth is bright and the border in between must be the horizon.This simple fact helps to perform a vector calculation using coloured pictures. Unfortunately the horizon is not the only border between dark and bright areas.

Image: NASA, ISS020-E-47807

fast pre-selection
simple pre-processing



edge detection
line detection



least square fit
vector calculation

The Rocket

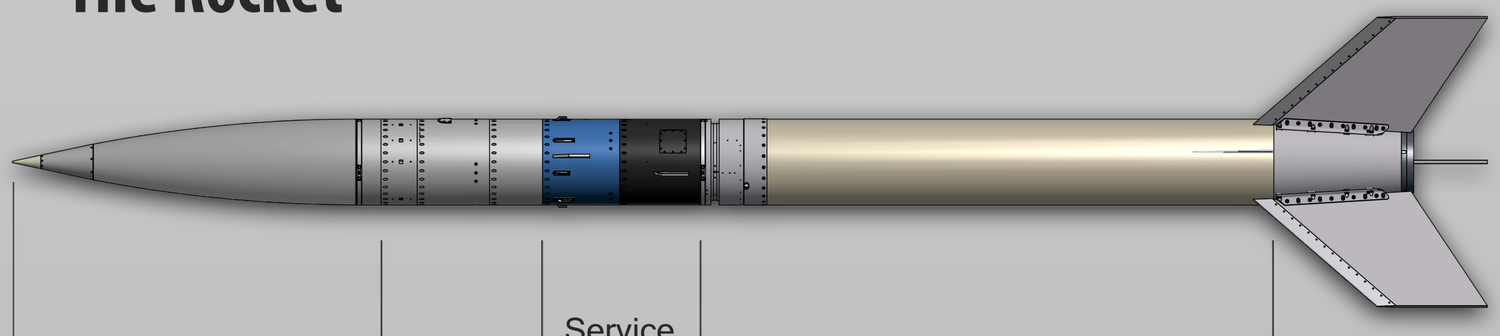
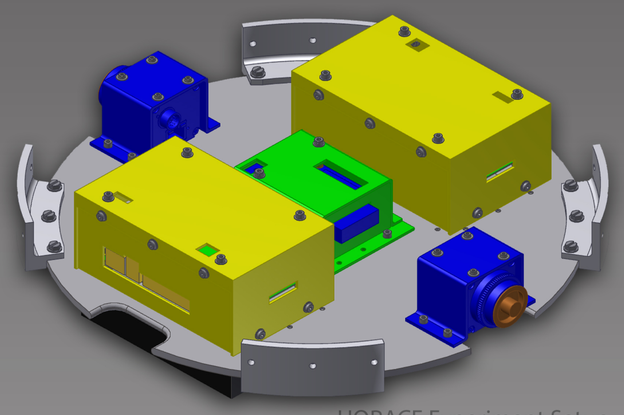


Image: DLR MORABA

Motor:	Improved Orion
Length:	~6m
Diameter:	356mm
Altitude:	80-100km
Flight Duration:	~800sec



HORACE Experiment Setup

The REXUS-Programme

The REXUS programme is realized under a bilateral Agency Agreement between the German Aerospace Center (DLR) and the Swedish National Space Board (SNSB). Through the collaboration with the European Space Agency (ESA), the Swedish share has been made available to students from all ESA Member or Cooperating States.

The Team

The team consists of six students of Aerospace Information Technology, who work on the project besides their regular studies for the full two-year-lifecycle of the mission.

They are supported and supervised by staff of the Chair of Aerospace Information Technologiy (Computer Science VIII) of the University of Würzburg, particularly by Prof. Dr. Hakan Kayal and Dipl. Inf. Gerhard Fellinger.

Any further questions?
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www.horace-rexus.de

HORACE on REXUS 16
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