German Aerospace Center

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Student experiments on board REXUS 4 successfully launched

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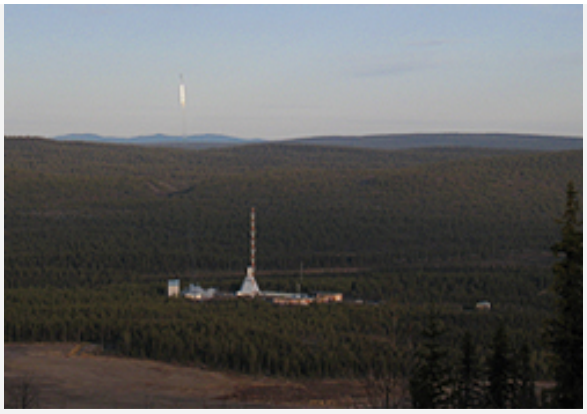

Perfect countdown: REXUS 4 launched

Perfect countdown - a return trip into space

The technicians and engineers of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) announce the successful launch of the REXUS 4 sounding rocket (**R**ocket-borne **EX**periments for **U**niversity **S**tudents). After a three-hour countdown, the two-stage rocket lifted off at 14:30 on Wednesday 22 October 2008 from the Swedish launch site in Esrange near Kiruna.

The REXUS programme is an annual sounding rocket programme for students from European universities which aims to provide them with practical experience in the form of a "real" space project. REXUS is a cooperative programme of the Swedish Space Corporation (SSC) and DLR's Mobile Rocket Base (Mobile Raketenbasis; MoRaBa). It is funded by the Swedish National Space Board (SNSB) and DLR.

This year, a two-stage REXUS rocket carried five student experiments and one of DLR's own experiments into space, reaching an altitude of 175 kilometres.

Rocket research for Earth and other planets

REXUS 4 in the assembly hall

As planned, the rocket's first stage was jettisoned after four seconds. The second stage boosted the payload to a speed of about 1.7 kilometres per second. After burnout of the rocket motor, REXUS 4, carrying the six experiments on board, reached an altitude of 175 kilometres during its ballistic flight through space. Its payload then plummeted back into the atmosphere upon completion of the experimentation phase, decelerating due to aerodynamic drag and finally landing safely, suspended from a parachute.

During the REXUS 4 campaign the so-called Service System developed by EuroLaunch, a joint venture between DLR's Mobile Rocket Base (MoRaBa) and the Swedish Space Corporation (SSC), was used for the first time. The Service System offers standard power supply and data transfer interfaces for five experiments. "This enables us to provide scientists with a standardised platform for the first time, which makes it substantially easier to integrate the experiment modules", said Markus Pinzer, DLR project manager for REXUS 4. "We are quite pleased with the outcomes of our first analysis of the data we obtained", Pinzer added.

DLR's IGAS experiment: Intelligent antennas for sounding rockets

Students with the HISPICO and VERTICAL experiments

Apart from DLR's IGAS experiment (Intelligent GPS Antenna System), aimed at improving reception of GPS signals for fast-rotating rockets such as REXUS, the scientific payload consisted of five other student experiments. These included the three German experiments HISPICO (Highly Integrated S-band transmitter for PICOsatellites), VERTICAL (Verification and Test of the Initiation of CubeSats After Launch) and MIRIAM (Main Inflated Re-entry Into the Atmosphere Mission test for Archimedes), as well as two Swedish experiments: EMSADA (Experimental Multiple Sensors And Data Acquisition) and REWICAS (REXUS WIreless Camera System).

HISPICO and VERTICAL: for use on miniature satellites

The HISPICO experiment of the Technische Universität Berlin tested a so-called high-rate "S-band transmitter" developed for use on miniature satellites (picosatellites). The VERTICAL experiment of the Technische Universität München, which was conducted during REXUS 4's microgravity phase, has a similar goal. It tested a special deployment mechanism for the solar panels of a so-called CubeSat (cube-shaped miniature satellite) during the same microgravity phase.

MIRIAM test balloon: a performance test in space

Payload of REXUS 4's recovery system

The technologically sophisticated MIRIAM experiment (Main Inflated Re-entry Into the Atmosphere Mission test for Archimedes) was jointly conducted by the Mars Society Deutschland and the Universität der Bundeswehr München. After leaving the dense layers of the atmosphere, the nose cone was jettisoned at an altitude of 70 kilometres. The MIRIAM experiment, which was attached to the underside of the nose cone, separated from the main payload at an altitude of about 100 kilometres, after which it started to deploy a balloon envelope. This balloon envelope was then filled with helium gas. In a few years' time, the Mars Society wants to use a similar system to enter the Martian atmosphere in order to conduct measurements in the atmosphere of the red planet. Unfortunately, before it was fully inflated MIRIAM was hit by the payload as it separated from the rocket motor, for reasons that are currently under investigation.

REXUS 4 during the flight simulation test

The two Swedish experiments EMSADA and REWICAS of the Luleå University of Technology had on-board sensors for measuring pressure, temperature, acceleration, magnetic field and radiation. In addition to this, three cameras on board the rocket recorded images during the flight.

REXUS and BEXUS - a programme for young scientific talent

The newly developed REXUS Service System is now available for the REXUS/BEXUS student programme - REXUS is an acronym of "Rocket-borne EXperiments for University Students", and BEXUS is an acronym of "Balloon-borne EXperiments for University Students". The next selected student teams will already be flying their experiments in March 2009 during the REXUS 5/6 combined campaign. DLR is currently still accepting submissions for its call for proposals for REXUS rocket flights in 2010. The deadline is 17 November 2008.

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