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TEXUS research rockets, with German experiments onboard, to launch on 31 January and 7 February 2008

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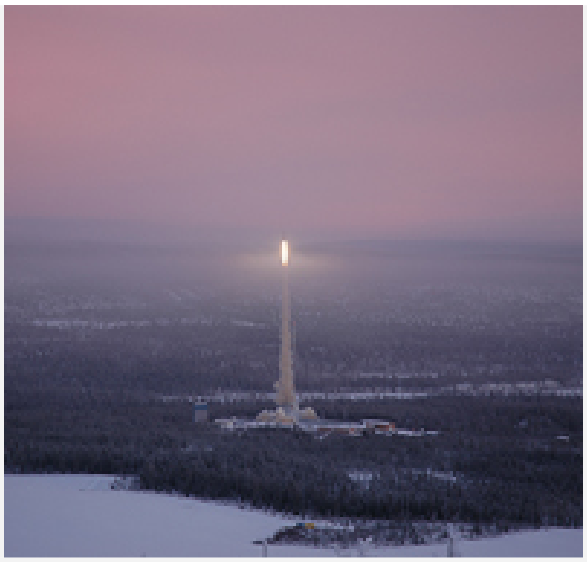


Launch of the TEXUS mission in Kiruna, northern Sweden

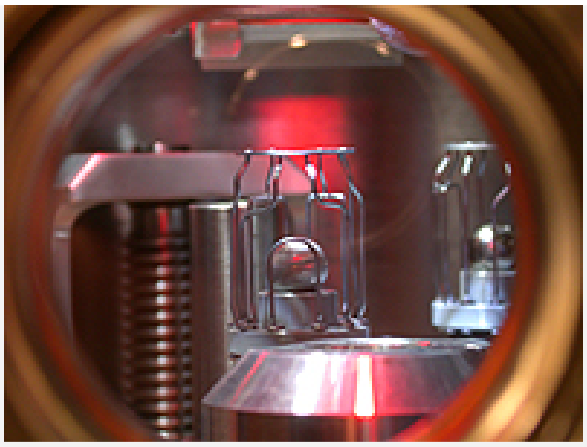
On 31 January and 7 February, two research rockets developed by the German Aerospace Center (DLR) and the European Space Agency (ESA) will be launched from northern Sweden. Both organisations are taking their TEXUS (Technologische Experimente unter Schwerelosigkeit, technological experiments in weightlessness) science programmes into a fourth decade. During the parabolic unmanned flights at an altitude of 270 kilometres, weightless conditions prevail for six minutes. During these special conditions, scientists from German universities and industry will find answers to biological, chemistry and physics questions.

Altogether six of the planned experiments are led by German scientists. Using data communication from Earth, the experiments are supervised and controlled directly as necessary by the scientists. The devices, housed in a cylindrical, approximately three-metre-long light alloy structure, land about 20 minutes after the launch by parachute.

Metal alloys in weightlessness

The main payload of the TEXUS-44 mission on 31 January is the Elektromagnetische Levitationsanlage (EML), a device for melting metal samples while they are floating in weightless conditions. Using the EML, DLR scientists along with others from the University of Ulm use three experiments to investigate the thermophysical characteristics of metal alloys. The results are particularly important to the improvement of industrial casting processes. The levitation device makes it easier to take precise measurements than can be obtained in terrestrial laboratories, as the electromagnetic forces needed for floating of the samples are small. Any disturbance of currents in the liquid metal samples are in this way substantially reduced. The researchers thus obtain highly-precise data - important for improving computer simulations - and help with modern manufacturing processes.

Gravity perception in plants



Close-up of a weightlessness experiment on the TEXUS rocket

A further experiment has been set up by DLR and will be performed by the University of Bonn. Biologists will measure the gravity perception of plants. Special cells in their roots, if the direction of the force of gravity changes, cause certain biochemical processes. This leads to a controlled "growth reaction" in the root. This experiment studies in particular signal and attraction processing at a molecular level of both the thale cress (*Arabidopsis Thaliana*) and maize.

Fish in freefall

On TEXUS flight 45 on 7 February, fish will take a trip into space. During weightlessness humans often suffer from a form of motion sickness because of the way the inner ear deals with gravity. In the inner ear of humans and other vertebrate animals lie otoliths which sense the force of gravity. Otoliths are small particles, composed of a combination of a gelatinous matrix and calcium carbonate in a viscous fluid. Mineralisation of the otoliths is guided by the brain and is different for every individual.

The larval stage of a fish called the *Cichlid* shows a primitive inner-ear configuration and can be considered a model for vertebrate animals. As in past experiments scientists discovered that motion sickness depends on the different mineralisation of otoliths, the TEXUS experiment will see researchers from the University of Stuttgart-Hohenheim determining to what extent otolith mineralising in different individual fish affects their respective adjustment to weightlessness.

Preparation of TEXUS payload for transportation to the launch tower

Spray cooling and capillary flow on TEXUS-45

During many technical procedures, liquids get sprayed onto hot surfaces. This happens for example during the burning of fuel, metal production or during the chemical cooling of human tissue. A goal of an experiment by the Technical University of Darmstadt is to better understand the hydrodynamics and the heat transfer in cases of spray impact onto a heated surface, and thus improve spray cooling methods.

In a third experiment on board TEXUS-45, scientists from ZARM (Zentrums für angewandte Raumfahrttechnologie und Mikrogravitation; Centre for Applied Space Technology and Microgravity) at the University of Bremen together with colleagues from the Institut de Mécanique des Fluides in

Toulouse, will study two-phase flows in capillary channels. The results of this experiment contribute to the answers of fundamental questions within the field of fluid mechanics.

Researchers want to discover with more certainty how liquids behave under weightless conditions in order to improve, for instance, the way fuel is supplied from spacecraft and satellites tanks.

Roll out – TEXUS payload on the way to the launch tower

DLR and ESA have assigned the tasks of both getting TEXUS prepared for launch and post-launch operation to EADS Astrium in Bremen. Kayser-Threde, a firm based in Munich, Germany and DLR's mobile rocket base (MORABA) located in Oberpfaffenhofen are also involved.

TEXUS consists of two VSB-30 rockets developed by the Brazilian Space Agencies CTA (Center Técnico Aerospacial) and IAE (Instituto de Aeronáutica e Espaço) alongside DLR and SSC, the Swedish Space Corporation.

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