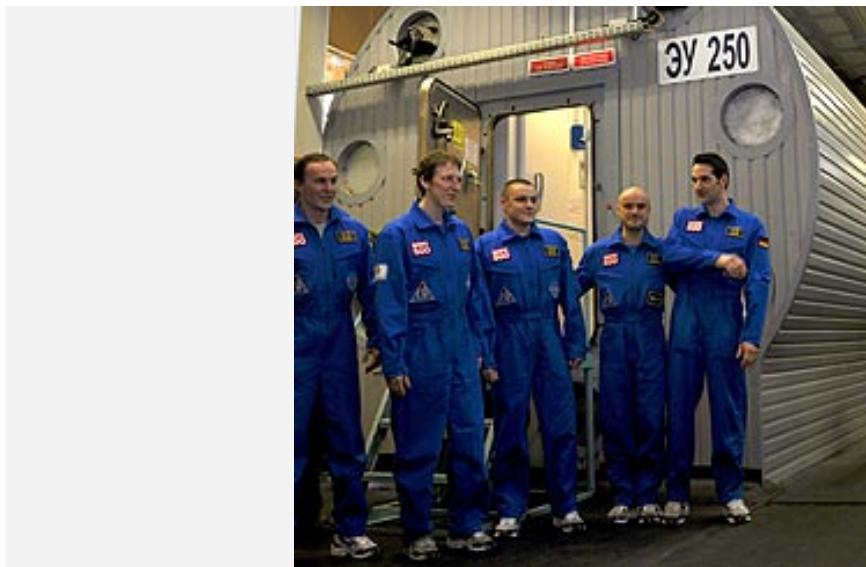


News Archive Space 2009

Mars500 crew safely 'landed' - First phase of isolation study ended on 14 July 2009 in Moscow

14 July 2009



The Mars500 crew shortly after completing their Mars mission simulation

The 105-day space travel simulation experiment 'Mars 500', based in Moscow with German involvement, has just finished. On 14 July 2009, the crew, including Oliver Knickel, a member of the German Army, left the module system at the Institute for Biomedical Problems (IBMP) at the Russian Academy of Sciences. The six people taking part in the experiment will be subjected to a rigorous series of examinations over the next few days, before returning to their families. The central question in the Mars500 study is this: how can the physical and psychological performance capabilities of a human being be maintained at normal standards under the extreme conditions faced during a long-term space mission? The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) is heavily involved in Mars500, alongside the IBMP and the European Space Agency (ESA). DLR research institutes have contributed towards several of the experiments. Furthermore, DLR has been able to assure financial support from the German government, acting in its capacity as the national space agency.

"We are highly satisfied with the initial results of Mars500," stated the Chairman of the DLR Executive Board, Prof. Johann-Dietrich Wörner, in Moscow. "DLR has shown great commitment to this project. Collaboration with our partners at ESA and IBMP has been very fruitful indeed. DLR has contributed towards several of the Mars500 experiments, the outcomes of which will help to shape the future of manned, long-term space missions. In addition, we have been able to support Mars500 on a large scale with funds from the German Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie; BMWi)", Prof. Wörner went on to say.

It is anticipated that, in March 2010, the experiment will enter its second phase with a close-to-reality flight and simulated stay on Mars lasting 520 days. To this end, an artificial Martian surface is being constructed, on which three 'cosmonauts' will spend a total of 20 days.

Germany satisfied with the interim 'state of play'



The Mars500 crew

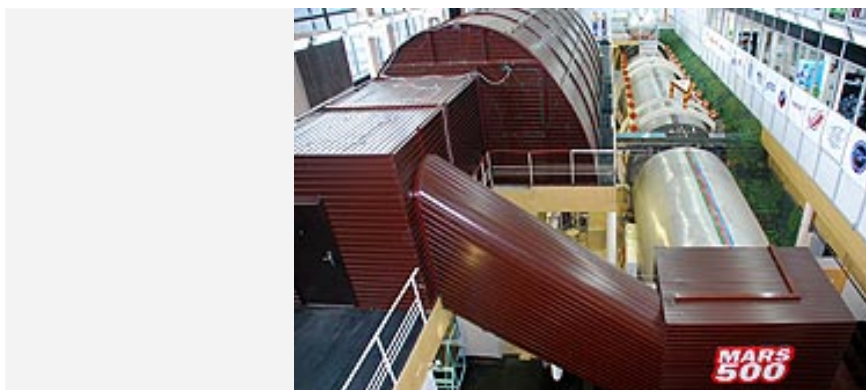
An evaluation of the measuring results from the 'electronic nose' – a sensor system for detecting microbial contamination – that was co-funded by DLR has been conducted and everyone involved has expressed satisfaction with the outcome. The apparatus, constructed by the Schwerin-based company Airsense Analytics, functioned perfectly. As part of the 105-day study, no major changes to the artificial atmosphere in the module system were detected. As the next step, DLR, IBMP and the Centre for Environmental Research and Sustainable Technologies at the University of Bremen will now be working on preparations for long-term application of the electronic nose on the International Space Station (ISS).

Scientists at the University of Erlangen-Nuremberg also view the interim 'state of play' in favourable terms. They have been able, over a period of several months, to collect metabolic products and blood pressure readings from the Mars500 participants. The strictly monitored nutrition programme featured an alternating sequence of high-salt and low-salt phases. An evaluation has now been initiated. This would appear to confirm the impression that a reduction in daily salt intake from twelve to nine grams is sufficient to achieve a sustained reduction in human blood pressure levels.

German experiments on Mars500

Bilateral agreement between DLR and IBMP:

- Friedrich-Alexander University at Erlangen-Nuremberg: Long-term monitoring of salt levels and self regulation of bodily fluids
- DLR Cologne, Institute for Space Medicine: The effects of isolation on long-term blood pressure regulation, taking due account of the water-electrolyte balance
- DLR Cologne, Institute for Space Medicine: Impact of long-term isolation on bone metabolism



The Mars500 modular system at Moscow

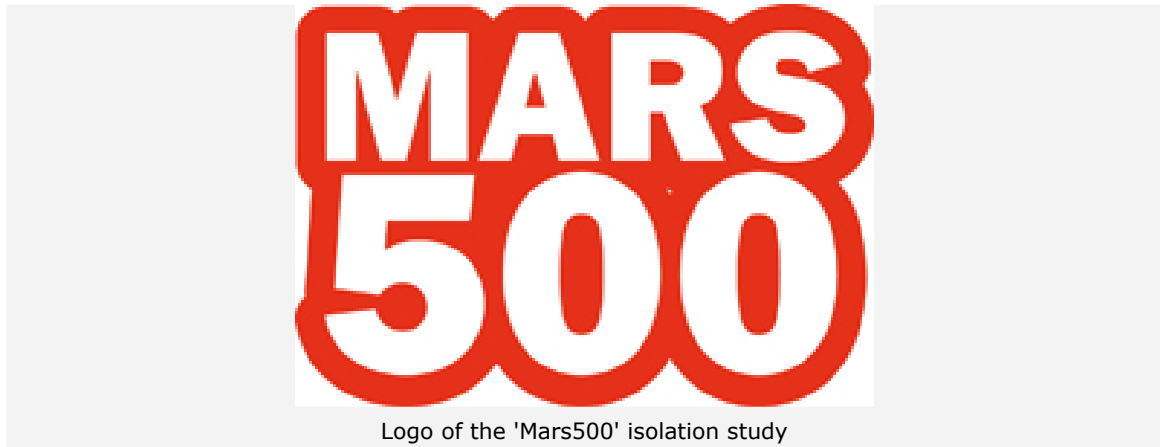
In cooperation with ESA:

- DLR Hamburg: Development of a learning and training programme for the retention of space-specific complex capabilities

- German Sport University, Cologne: Influence of physical activity and diet-based nutrition on the serotonin system and on performance and mood
- Ludwig-Maximilian University, Munich: Simulation of a Mars mission – evaluation of stress and immune system

Mars500

The Mars500 container is a tubular module system with a living and working surface area of 180 square metres. In addition, there are cooling cells for foodstuffs, the majority of which are being provided by German suppliers, as well as a quarantine station. The gravitational field and air pressure are unchanged, while the oxygen content of the air is checked and adjusted at regular intervals. Radio communication with the 'ground station' involves a 40-minute time lag in each direction. On completion of this, the first phase of the mission, the Mars500 crew comprised the following members: Oliver Knickel (Germany), Cyrille Fournier (France), Commander Sergey Ryazanskiy, Aleksei Baranov, Aleksei Shpakov and Oleg Artemiev (all from Russia).



DLR is the national aerospace research centre of the Federal Republic of Germany. It is engaged in a wide range of research and development projects in national and international partnerships, covering the fields of aeronautics, space, transportation and energy. In addition to conducting its own research projects, DLR also acts as the German Space Agency. As such, it is responsible for planning and implementing the German space programme on behalf of the German federal government, and for advancing German interests on the international scene. DLR serves as the umbrella organisation for the largest project management agencies in Germany.

The Institute of Biomedical Problems of the Russian Academy of Science is Russia's lead agency in fundamental research in space biology and medicine, biomedical support for piloted space missions, development of methods and means ensuring safety and effective functioning of space crews, and of maintaining human health and performance in extreme conditions. The IBMP includes research divisions, the Chief Designer's facility and auxiliary departments and services. The institute has unique benchmark testing facilities.

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