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## Thomas Reiter's Science Operations on ISS

October 17: On invitation of ESA ASTROLAB Project Management and the ESA Education Department (see <http://www.esa.int/esa>) students from the Technical University (TU) of Munich (just recently appointed as one of the three "Elite" Universities in Germany) had the opportunity to have an in-flight call from the ASTROLAB Control Center to ESA Astronaut Thomas Reiter to discuss his activities on-board of the ISS. The ASTROLAB Mission Control Center is located on the premises of the German Aerospace Center (DLR) at Oberpfaffenhofen within the German Space Operations Center (GSOC) as part of the Columbus Control Center (Col-CC) operated under ESA contract.



The call was embedded into a lecture of Prof. Dr. G. Morfill of the Max Planck Institute Garching (<http://www.mpe-garching.mpg.de>) and covered his Plasma Experiment (PK-3 Plus) onboard the Space Station. The focal point of the PK-3 experiment is the investigation of "complex plasmas" in various states of matter and possible practical applications in the future such as unwanted dust removal in various fields like

medicine, crystal production and fusion reactors.

Thomas Reiter explained and demonstrated the PK-3 experiment in flight. Afterwards the students had the opportunity to ask questions about the experiment. The Col-CC facilitated the real-time video and voice participation of 5 European Universities as well.

SpaceOps News had the opportunity to participate in the in-flight call:

**Micha (TU Munich):** What kind of training did you get for the (PK-3) experiment?

**Thomas Reiter:** Theoretical introduction and background for the experiment was provided by the European Astronaut Center (EAC) at Cologne, with a couple of exercises for a total of 24 hours. Afterwards the practical training started -- with the real hardware -- at Star City, Moscow.

**Septica (TU Munich):** After doing the experiment in space, what are the expected findings?

**Thomas Reiter:** It is always hard to predict the outcome of an research experiment, and you have to expect all kinds of surprises. We are using the results from the experiment performed a couple of months ago - performed by my colleague Vinogradov - and we are looking at the kinetic orientation on particle basis at the [temperature] "critical point." The experiment results are being recorded and closely analyzed at the Max Planck Institute and the Plasma Institute in Moscow. The results will be fed back to determine how to proceed in this kind of research.

**Jerry (TU Munich):** Is the experiment dangerous and what are the safety precautions?

**Thomas Reiter:** There is really no danger to the experiment, the only real danger is the glass chamber, which could burst; however, the chamber is designed and critically tested for that environment. Of course we have to watch the experiment very closely during its operation because a lot of kinetic energy is involved. Since the experiment is connected to vacuum conditions, we have to monitor the ISS pressure very closely as well.

**Septica (TU Munich):** What is the difference to the previous PK experiment [flown on MIR]?

**Thomas Reiter:** The PK-3 Plus is more advanced, has higher resolution and enables laser analysis, so we expect a much more detailed view of the plasma behavior. In addition, we have higher telemetry rates for monitoring.

Since we are approaching the end of this contact [the interview was conducted via two Russian ground stations having contact times of approx. five minutes each] I would like to thank you for your interest in this experiment, which combines aspects of fluid, gas and solid state physics. I hope you follow future space experimentation very closely. I wish you good luck for your professional career, and I hope to meet some of you at ESA or even at the Space Station.



Thomas Reiter performs the first long-duration ISS mission (six months) for Europe under an agreement between ESA and Roscosmos, supported by NASA.

Reiter, born in 1958 in Frankfurt, Germany, and a former German Air Force pilot, previously served as an onboard Engineer for ESA's EUROMIR 95 mission

to the MIR space station during a 179-day stay onboard and carried out two spacewalks and performed numerous ESA-developed experiments. The EUROMIR 95 mission was also coordinated by the German Space Operations Center (GSOC) in Oberpfaffenhofen under ESA contract.

An important part of Reiter's mission for ESA is to become familiar with ISS organizational and technical procedures in order to be prepared when Europe's Columbus laboratory is launched and put into service in 2007. The ASTRO mission scientific research activities will utilize available ESA developed experiment facilities like the Pulmonary Function System (PFS), the European Modular Cultivation System (EMCS) and the Minus 80-degrees Laboratory Freezer (MELFI) as well as the "Plasma Kristall" (PK-3 Plus) experiment facility discussed above.



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