

Industrial Design Studio and directed by Professor Werner Granzeier.

In the future, the Dornier 728 will offer a unique opportunity for testing new cabin systems and new developments using simulation methods. By conducting mock-up investigations in advance of flight testing, it should be possible to significantly improve the scientific and technical information content of measurements and, above all, to develop suitable noise reduction measures.

Psychological studies show

that conditions in the cabin have a material impact on passenger well-being. Air quality is not the only contributory factor here, but perceived sound level is also important. Under the direction of the DLR Institute of Aerodynamics and Flow Technology, experts in flow mechanics, thermodynamics, acoustics, aeroelastics, medicine, psychology and structural mechanics are now working on the interdisciplinary Comfortable and Silent Cabin (CoSiCab) research project.

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Institute of Space Systems, Stuttgart

Where else but to the moon?

MATTHIAS GRÜNDER

Anyone who has overcome the obstacles to admission to study at this acclaimed teaching establishment can be proud just have got there, as admission in itself is the first step on the career ladder.

At the University of Stuttgart there is an Aerospace Engineering and Geodesy faculty, below which there are twelve institutes. One of these is the Institute of Space Systems, and there is an abundance of would-be students keen to study here: one-tenth of applicants have to be rejected due to limited capacity. So anyone lucky enough to get through the selection process can be proud of having gained one of the much sought-after places at Europe's biggest teaching establishment for future space engineers. But why do so many young, future engineers covet a place at this particular institute?

Professor Hans-Peter Röser, the Director, believes one reason

is that here, "Space technology is not just pursued in research but it is also offered in the teaching." Over 1,500 students are trained at the Institute on about 50 different courses, while around 50 degree and diploma theses and five doctoral theses are successfully completed every year. Some 70 scientific and technical staff carry out research here in space systems, propulsion systems and space applications. To this end ambitious programme are pursued on small satellites and astronomy missions, amongst other things. Areas which are the subject of research include:

- ▶ astronautics and space stations
- ▶ the development and operation of small satellites and the associated instrumentation
- ▶ infrared astronomy
- ▶ terrestrial observation
- ▶ space transport technology
- ▶ electrical propulsion
- ▶ measurement methods and sensors
- ▶ plasma technology
- ▶ mission and systems analysis
- ▶ re-entry research and aerothermodynamics
- ▶ spaceflight qualifications

The Astronautics and Space Stations department headed by the former German astronaut, Professor Ernst W. Mess-

erschmid, alone is pursuing two main areas of research: mission design, system design and the analysis of manned spaceflight scenarios and, secondly, in situ gas sensors, a subject which emerged out of the measurement of molecular oxygen in the course of re-entry scenarios. As manned spaceflight will shortly be moving away from earth orbit towards the Moon and Mars, software tools have been developed in-house enabling preliminary designs of such systems and scenarios for lunar flights to be designed, analysed and optimised.

The Stuttgart small satellite programme aimed at developing, building and operating such spacecraft is especially high-powered and at the same time practical in nature. Four missions are planned for the end of this decade, and the first satellite - Flying Laptop - is already under construction at the moment. This will be followed by the Perseus multi-role micro-satellite and the Cermit re-entry mission.

The last in this development series is IRS's own lunar satellite, Lunar Mission BW1, and the implementation of this project is at the same time a personal dream of Professor Röser: "Small satellites will be built and operated at other universities as well, but no teaching establishment has yet managed to send one to the moon. Our ambition is to implement such a mission successfully."

In this way, even during their courses students have the opportunity to participate in real-life satellite projects as part of their degree, diploma or doctoral dissertation, so that industry is later able to take on graduates with a practical training.

Just how close the interaction between theory and practice already is is demonstrated by the implementation of another ambitious project: already this year construction work is starting on the Baden-Württemberg Space Centre (BWSC), under which the University, together with the federal government and numerous partners from the state of Baden-Württemberg, will create a nationwide space fo-

rum for academia, industry and the public. The BWSC will promote and improve the transfer of technology and the exchange of ideas, and from 2010 cutting-edge research and development will be carried out there.

A wide range of laboratories and test rigs are already available to the Institute. In conjunction with access to high-performance computer equipment, research is thus being carried out at an excellent level. Naturally the students will be involved in different phases of the project, and partners from industry will also be welcome to use the Institute's facilities. The equipment available includes:

- ▶ a central vacuum system
- ▶ plasma wind tunnel equipment
- ▶ engine test rigs
- ▶ a satellite ground station with control centre
- ▶ a satellite integration laboratory with the appropriate test rigs
- ▶ a mechanical workshop and space electronics laboratory
- ▶ facilities for process development for industrial applications
- ▶ and last but not least, SOFIA, the Stratospheric Observatory for Infrared Astronomy.

SOFIA is a collaborative programme involving the German Aerospace Centre (DLR) and NASA. Using an infrared stratospheric observatory mounted on a converted Boeing 747SP, young stars and planetary systems will be observed over the next 20 years, and the scientists involved hope that as part of this they will witness the birth of some new stars. The fact that the German SOFIA Institute has been located at the IRS Stuttgart is a special honour and recognition of the work accomplished and still to be accomplished here.

There is a steady flow of guest lecturers to the Institute from partners in industry and other research establishments. This enables the students to establish contacts with leading space companies from the region and all over Germany right from the start of their training. As a result career prospects are excellent for all the graduates.

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