German Aerospace Center
DLR

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DLR Robotics and Mechatronics Center becomes an ESA reference laboratory

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The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) and the European Space Agency (ESA) have signed a Memorandum of Understanding (MOU) at the Berlin Air Show on the use of the new DLR Robotics and Mechatronics Center (RMC) as an ESA reference laboratory. By teaming up, DLR and ESA are continuing their successful partnership of the last 20 years. This latest cooperation aims to set up an extensive network of international partners in space-sector robotics with the aims of exploiting synergies between the partners to best effect, further increasing expertise in this area and preparing for the future. The activities of the MOU partners will be conducted mainly at the RMC in Oberpfaffenhofen. Both partners will be appointing a person to take charge of the implementation of their related activities; the precise division of tasks will be determined in later discussions. Prof. Johann-Dietrich Wörner, Chairman of the DLR Board, and Jean-Jacques Dordain, ESA's Director General, signed the MOU.

The DLR Robotics and Mechatronics Center will become an ESA reference laboratory

DLR Robotics and Mechatronics Center

The DLR Robotics and Mechatronics Center has its origin in the Institute of Robotics and Mechantronics and will, in future, consist of many facilities and institutes working in the field of robotics, mechatronics, system dynamics, control engineering and optical information systems. The aim is to further consolidate and enhance Germany's leading position worldwide in both the scientific and industrial areas of robotics. This initiative is being supported by the German Federal Ministry of Economics and Technology (BMWi) and the State of Bavaria.

Satellite capture

DLR is a global leader in robotics. Justin is a humanoid service robot whose deployment is not confined to Earth, as it can also operate in orbit. With its two five-fingered hands, Justin can behave in a similar way to a human. In-orbit servicing is a trendsetting area among space activities. DLR is developing and testing, with great success, systems and techniques for the capture, repair and disposal of satellites that have exhausted their station-keeping propellant or otherwise ceased to be controllable. These components and control systems, which allow for complex dynamic interaction between robotic arms and satellite platforms, are delivering the core elements for future service satellites and systems for dealing with space debris. At present, many telecommunication satellites in geostationary orbit have to be taken out of service when their onboard propellant is used up, even though their payloads are still functioning flawlessly. With this in mind, the Orbital Life Extension Vehicle (OLEV) service satellite is designed to approach a satellite, dock with it and take charge of its orbital positioning for several years. The capture tool and the implementation of the sensor-assisted final approach were developed by DLR.

Robotic exploration technology

The search for life and the conditions that make it life possible on other planets is one of the greatest scientific challenges for space activity. To this end, ESA is undertaking, in two stages (2016 and 2018), the unmanned mission ExoMars, in which a six-wheeled rover will be deployed. The intention is for it to transport scientific instruments to points of interest on the Red Planet's surface. DLR is a partner in an international consortium that is developing the rover. Its main tasks are the equipping of the wheel and steering drives for a test rover with innovative DLR-developed motors, the simulation of the travel dynamics and extensive ground testing under Mars-like terrain conditions. In addition to this, DLR scientists are developing navigation techniques – including for six-legged walking robots or crawlers – for unfamiliar environments. Also under development is a new real-time 3D data processor. Using this technology, both rovers and crawlers will be able to carry out mapping and also have the capacity for self-location. This technology is an essential prerequisite for autonomous movement over unfamiliar planetary surfaces.

Telerobotics and telepresence

Telerobotics and telepresence are essential elements of future exploration strategies that have already translated into a broad range of applications here on Earth. The underlying key technologies are being developed to further speed up the practical application of these concepts.

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