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The RVS3000 and RVS3000-3D LIDAR Sensors

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Thanks to its robust design and accurate measurements, the Jena-Optronik RVS LIDAR sensors are the most frequently used rendezvous- and docking sensors for space applications. They are used on several ISS re-supply vessels: the European ATV, the Japanese HTV and the US-American "Cygnus". The RVS sensor is limited, though, to rendezvous and docking with so-called cooperative targets, i.e. targets equipped with retro-reflector elements.

For future applications, like on-orbit servicing, space debris removal or planetary landing, a more powerful 3D imaging LIDAR system is required. Following the ESA activity "ILT" (Imaging LIDAR Technology) and the DLR German Space Agency project "LiQuaRD" (LIDAR Qualification for Rendezvous and Docking), a concept for a new powerful, yet compact and cost-effective LIDAR system was developed to both replace the previous RVS sensor and enable additional mission scenarios: the RVS3000 product family. A prototype LIDAR sensor using RVS3000 technology, called LIRIS-2, was developed, integrated and tested by Jena-Optronik for Airbus Defence & Space and ESA for the recording of high-resolution 3D images during the approach of ATV-5 to the ISS. The sensor worked flawlessly during the ATV-5 mission and provided a large amount of 3D point cloud data as well as internal sensor data from the ISS approach.

In the presentation the previous LIDAR activities at Jena-Optronik will be reviewed and an overview over the RVS3000 and RVS3000-3D and its possible applications in LEO ISS servicing as well as potential future space robotics activities in LEO and beyond will be provided. The technical features of the RVS3000 and RVS3000-3D sensors and the differences between the two models are presented. We will also show the first measurement results from RVS3000 engineering model hardware resulting from an ongoing DLR German Space Agency project.