RVS

Parking aid in space

Twelve years after its maiden flight on ESA‘s ATV-1 “Jules Verne“, our Rendezvous and Docking Sensor (RVS®) successfully completed its last mission.

JAXA’s H-II Transfer Vehicle (HTV) spacecraft, HTV-9 successful berthed to the International Space Station on May 25th, 2020.

RVS was used by the European Space Agency ESA and the Japanese Space Agency JAXA, as well as on the American “Cygnus” in order to support and control the automated docking of unmanned transfer vehicles with the International Space Station ISS. An RVS prototype has already been successfully demonstrated in orbit during two campaigns of the Space Shuttles STS-84 and STS-86 docking to the MIR space station in 1997.

The automated docking is proceeded with the help of the Rendezvous- und Docking-Sensors RVS TGM (telegoniometer) und RVS VDM (videometer). From a distance of around 1.500 meters the system RVS is able to measure the distance and approaching direction of the unmanned spacecraft to the International Space Station: RVS sends laser beams as short light pulses, refelcting mirrors in the RVS channel these light pulses to the ISS. This light is re-captured by the RVS. From the time difference between the first and the re-captured light pulse and the viewing direction of the reflector system it will then be calculated how far the two space vehicles are remoted to each other, which relative speed they have and in which angle they are resting to each other so that a pinpointed and secure docking of the supply vehicle can finally be allowed.

Future missions will not only be able to autonomous dock to so-called cooperative targets like the ISS, but also non-cooperative targets. The advanced technology will enable new mission scenarios and the next generation rendezvous sensors are already on their mission: RVS 3000 and RVS 3000-3D.