

RVS

Rendezvous- and Docking Sensor

Jena-Optronik develops the RVS for the European Space Agency ESA and the Japanese Space Agency JAXA, as well as the American "Cygnus" in order to support and control the automated docking of unmanned transfer vehicles with the International Space Station ISS.

In 2008 the first ATV named "Jules Verne" has approached the International Space Station with a successful docking manoeuvre. Since then the RVS is used on these unmanned vehicles.

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 3.000 meters the system RVS is able to measure the distance and approaching direction of the ATV to the International Space Station: RVS sends laser beams as short light pulses, reflecting mirrors in the RVS channel these light pulses to the ISS. On the Russian module „Zvezda“ of the ISS, the ATV is docking to, special retro-reflectors are installed – comparable to the back lights of a car, but far more precise and thus more efficient – which blast back the laser light.

This light is re-captured by the RVS. From the time difference between the first sent and then re-captured light pulse and the viewing direction of the reflector system it will then be calculated how far the two space vehicles are removed 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.

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.