

Retroreflector systems to determine the coordinates of SC moving parts

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The paper is dedicated to development and perspectives of using the retroreflector systems consisting of several retroreflectors or their combination located at different distances from each other. The first such system is the spacecraft (SC) "Reflector" developed as a result of the cooperation between Russia and UK for determination of the optical resolving power of telescopes based on simultaneous measurement of range to various corner reflectors on the spacecraft. The next such system is the combination of two retroreflector devices (RD) installed on the SC «Lomonosov» to control the opening of the rod with the secondary objective mirror. As such, the «Pyramid» system consisting of four corner reflectors with the total mass of 41 grams is used wherein the target error does not exceed 0.5 mm. As in the case with the SC «Reflector», this space experiment has demonstrated the possibility of measuring the differential range to two RDs.

In general, such retroreflector systems are additional independent source of information on positions of SC moving parts (mostly LEO and triaxial orientation ones). Depending on a task and its complexity, the different number of RDs should be used.

If it's necessary to detect the opening of the rod or of a solar battery, it should be enough to use only two «Pyramid» devices. Only two retroreflector devices are also sufficient when it is required to measure the inclination angle of the rod which is slowly turning in a certain plane (SC «Condor-E»).