New ideas in retroreflector array development

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OJS «PPC «PSI» provides some new ideas and in retroreflector array development.

As a low-orbit spacecraft, a new compact system «Pyramid» is proposed weighing less than 30 grams in the form of four cube corner reflectors with a common vertex, oriented towards the Earth center. The target error of retroreflector array is less than 0.5 mm.

As a medium-orbit spacecraft, «BLITS-M» is developed with target error less than 0.1 mm, mass about 20 kg, diameter about 220 mm and maximum value of cross section about 10^6 m^2. Also a full-glass satellite is developed, made from heavy flint glass with approximately the same dimensions and mass with 60 CCRs, recessed to prevent simultaneous operation of multiple CCRs.

For high-orbit navigation spacecraft we propose a ring retroreflector array, composed from 36 CCRs with a two-spot FFDP, which forms two short laser pulses at slant incidence of light. It allows more accurate determination of the center of CoM retroreflector array and also provides increasing of cross section.

For the lunar spacecraft «Luna-Resurs», a non-flat array is developed consisting of 11 large CCRs to compensate for the attitude variations relative to the Earth direction.

Construction, specification and results of thermal/vacuum testing of the retroreflector arrays are provided.