

SPACE DEBRIS SYMPOSIUM (A6)
Measurements (1)

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OPERATIONAL AND EXPLOSION FRAGMENTS IN GEO AND HEO REGION DISCOVERED AND
OBSERVED BY ISON NETWORK**Abstract**

As of early December 2012 part of the International Scientific Optical Network (ISON) performing regular observations of objects at high geocentric orbits joins 46 telescopes of different class (including those operated by the ISON partners) located at 27 facilities in 11 countries. We will present overview of results on search, regular observations and identification of origin for GEO and HEO region fragments we obtained since 2005 when ISON started to work on a permanent basis. At present ISON network continuously tracks more than 1800 objects in GEO region (mean motion between 0.7 and 1.3, inclination is less than 30 deg, eccentricity e less than 0.2) including nearly 500 fragments discovered as a result of our efforts during the last 7 years. Also more than 1600 objects at highly elliptical orbit (HEO) of different classes are tracking. During 7 years of ISON operation it is collected more than 12 million of positional measurements along with brightness estimations for those GEO and HEO objects. Each obtained observation is associated with an object in the ISON database (including newly discovered ones) or remained as a part of an uncorrelated track. Measurements associated with objects are using for regular updating of orbital parameters. We developed and implemented a technique of regular GEO region surveying that enables to discover and establish a good orbit for all newly launched or manoeuvred objects within a few nights and to maintain orbits for all other objects in the ISON database. This technique permits also to discover existing but previously unknown debris objects. Some discovered debris objects are correlated with particular launches and can be considered as operational fragments. Other fragments can be clustered by orbital parameters that one can consider as an indication of possible common origin. We performed analysis of several such cases and will present our findings in this paper. Comparison of GEO and HEO objects were made. Despite of higher angular velocity the number of faint HEO fragments observed in surveys is larger than for GEO region due to less distance. Results of comparison will be demonstrated and discussed. We will present also data on current population of found high AMR objects in GEO and HEO region in comparison to 'normal' AMR objects.