SPACE DEBRIS SYMPOSIUM (A6)
Measurements and Space Surveillance (1)

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APPLICATION OF THE ISON WIDE FIELD OF VIEW OPTICAL TELESCOPES FOR SPACE DEBRIS RESEARCH

Abstract

International Scientific Optical Network (ISON) [1] at present is the only civilian non-governmental project which is covering whole GEO and producing significant data output for various purposes including scientific research of space debris problem as well as space situation awareness in the interests of commercial and other civilian spacecraft operators.

New strategy of the ISON development foresees the large surveying of the sky using the wide field optical of view (FOV) telescopes capable to perform searching and tracking of the space objects at GEO, HEO and LEO orbits.

In order to achieve this goal few series of the telescopes of apertures between 12.5 and 60 cm with wide (FOV) are elaborated under ISON project [2]. During last year 10 new telescopes are produced and put into operation at the ISON facilities - two of VT-15e type with FOV of 15 deg, three of 22-cm ORI-22 type with FOV of 5.5 deg, one of 25-cm GAS-250 type with FOV of 2.8 degree, two of 40-cm ORI-40 type with FOV of 2.3 degree, one of 50-cm VT-40/500 type with FOV of 1.8 degree and one of 60-cm F-600 type with FOV of 2 degree.

The special version of the Apex II software package [3] for automated CCD frame processing is elaborated which is including detection of space objects and it's identification with orbital archive. The new version of the CHAOS software module for mount control is in elaboration for the automated survey of the sky in different modes.

These wide field telescopes and new software are successfully tested during the observations of various space objects at GEO, HEO and LEO. Different survey modes for each kind of orbit are in adjustment phase. New improved survey mode for the GEO region can provide up to 7500 measurements in 700 tracks of space objects down to 16 magnitude per night. Thanks to using of the wide FOV telescopes in survey modes it is obtained more than 700000 measurements in 70000 tracks in 2008 that is three times more comparing to 2007. It is expected that about 2000000 measurements in 200000 tracks will be obtained by ISON in 2009. The paper will discuss newly developed instruments and software in more details.

References 1. Molotov I., Agapov V., Kouprianov, et al. International scientific optical network for space debris research, Advances in Space Research, Volume 41, Issue 7, 2008. p. 1022-1028. 2. Molotov I., Agapov V., Kouprianov V. Standard approaches used for the integrated work with ISON network. Proceedings of 59th International Astronautical Congress, Glasgow, Scotland, DVD ISSN 1995-6258,2008,IAC-08-A6.1.09. 3. Kouprianov V. Distinguishing features of CCD astrometry of faint GEO objects. Advances in Space Research, Volume 41, Issue 7, 2008, Pages 1029-1038