Paper ID: 30586
oral

66th International Astronautical Congress 2015

SPACE DEBRIS SYMPOSIUM (A6)
Operations in Space Debris Environment, Situational Awareness (7)

Author: Dr. Vladimir Agapov
Keldysh Institute of Applied Mathematics, RAS, Russian Federation, avm@kiam1.rssi.ru

CAPABILITIES OF ISON OBSERVATION NETWORK AND THE SPACE DEBRIS DATA CENTER IN SUPPORT SPACE OPERATIONS SAFETY IN GEO REGION

Abstract

Space debris data center at Keldysh Institute of Applied Mathematics (KIAM SDDC) is established in 2003 as a central information node to support space debris research in Russian Academy of Sciences (RAS) and to support International Scientific Optical Network (ISON) development and operations. Following tasks have been solving at the KIAM SDDC: maintenance of the ISON master database on space objects, related events (launches, fragmentations, re-entires etc.), measurement data and derived products (orbits etc.); development and implementation of optical observation strategies; daily scheduling of the ISON sensors for routine and special survey and tasking observations of GEO, HEO and MEO regions of the near-Earth space; collecting and processing of the ISON produced optical measurements; determination of parameters of orbits and their accuracy estimation for each observed object; evaluation of physical characteristics of observed objects; search and analysis of probable close conjunctions at GEO, HEO and MEO. The KIAM SDDC is receiving and processing customer's requests and prepares output products (conjunction assessment messages, sets of raw measurements assosiated to given objects, orbital data/ephemerides etc.).

In our paper we will present description of key elements of the KIAM SDDC. We will also present results of analysis of various characteristics describing current operational capabilities of KIAM SDDC in scheduling, processing and analysis of observations. We will discuss results of analysis of the ISON network current performance to observe active and non-active GEO objects (observation revisit time for individual objects, average observation arc per night per objects etc.). We will also discuss characteristics of quality of the output products (orbits, conjunctions etc.) essential from the point of view of on-orbit operation safety and will present examples of the real results obtained by the KIAM SDDC.

We will demonstrate on the example of the KIAM SDDC and ISON acievements that valuable results for improvement of awareness on space objects and events in the near-Earth space can be obtained within the framework of an international cooperation at relatively low cost.