Remote Observatory ISON-NM. Survey of Minor Solar System Bodies. L. Elenin[1], I. Molotov[1], V. Savanevich[2], A. Kozhukhov[3], A. Bryukhovetskiy[3], V. Vlasenko[3], E. Dikov[4], A. Yudin[1,5], [1]Keldysh Institute of Applied Mathematics RAS, Miusskaya sq., 4, Moscow, 125047, Russia (info@keldysh.ru), [2]Kharkiv National University of Radioelectronics, 14 Lenin Av., 61166, Kharkiv, Ukraine (domsv1@rambler.ru), [3]National Centre of Space Devices Control and Test, 97419, Evpatoria – 19, AR Crimea, Ukraine, [4]Recearch and Design Institute of Micrography, 1/60 Parkhomenko Lane, 61046, Kharkiv, Ukraine, [5]Santel Ltd., 16 Parkovaya, 26, Moscow, Russia.

Introduction: The first remote Russian observatory in the western hemisphere, ISON-NM, began it's work in May of 2010. Two months later, the basic scientific program of the observatory was launched - a survey of small Solar System bodies. The project is a testing ground to address the organization and carrying out of survey observations of small Solar System bodies, as well as development of software systems under real conditions.

Observatory: The Observatory is located on Mt. Joy, in Lincoln National Park, at an elevation of 2217 meters above sea level. The main optical instrument of the observatory is an Astroworks - Centurion 18 wide-field astrograph. This is a hyperbolic reflector with a corrector plate at prime focus. The primary mirror has a diameter of 455 mm, with focal ratio of f/2.8. A full format FLI ML09000-65 camera is at the telescope's prime focus. In this configuration, the optical system has a field of view of 100 x 100 minutes of arc, with an image scale of 2"/pix. The limiting magnitude with a 240 sec. exposure is approximately mag. 20-20.5m.

Software: For this project no specialized observatory control software was developed. Instead, commercial software or freeware has been used, the nucleus of which is a software package called ACP Observatory Control Software [1].

Processing and data analysis is obtained using the CLT software package [2], and is developed within the framework of this observing program. The CLT software package allows for the organizing of a complete processing pipeline of received images, including calibration, cosmetic correction, astrometric and photometric reduction, identification and measurement of known objects, and also search for new uncatalogued objects. The CLT software package allows for parallel processing of multiple data streams, working both on a single computer, as well as distributing the tasks among the computers in the network.

Monitoring of results is done by the operator with the aid of the program's graphic interface. The operator must confirm the reality of the object, after which CLT generates a report with measurements in the standard MPC format.

Results: At this time, the survey has made more that 250 000 measurements of small Solar System bodies, and registered more than 1 000 preliminary asteroid designations [4]. It has discovered several near-Earth asteroids, two comets: C/2010 X1 (Elenin) [5] and P/2011 NO1 (Elenin) [6], as well as several unusual objects, including asteroid 2011 RC17 [7].

For two years the ISON-NM observatory includes in top ten observatories in the world by the number of observations [3].

Prospects: In 2012-2013 there are plans to modernize the survey. The Centurion-18 telescope will be replaced by a promising telescope [8], a Santel-650WA with an aperture of 650 mm. and focal length 1300 mm. (f/2.0). In the first testing stages, the telescope will be equipped with the current camera which will give an identical field of view, but with greater mag. limit. Working with a limiting magnitude of 20.5-21m, we will be able to increase the total sky coverage per night by 50%. In the future we plan to replace the camera with a mosaic of four CCD chips, moving in quality to a new level of survey work.

References: [1] http://acp.dc3.com/index2.html [2] Savanevich, V. E. et al (2011) LPS XLII, 1140 [3] http://minorplanetcenter.net/iau/special/CountObsByYear.txt [4] http://spaceobs.org/DISCSTATUS.txt [5] IAU Electronic Telegram №9189, CBAT, 2010. [6] IAU Electronic Telegram №9227, CBAT, 2011. [7] MPEC 2011-W34, MPC, 2011. [8] Yudin A. N. and Sankovitch A. V. (2011) SPIE 8172, 817218.