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ABSTRACT BOOK

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These problems require a solution at this preprocessing stage, since their contribution to the final error is quite high and often difficult identification of ruler lines, as well as images of the observed objects.

At the current stage of work after the correction of plate grid, the image is saved in standard FITS format for calculating the object coordinates by existing programs. In the future, to get more precise coordinates of the objects, we are going to create an interface for transmitting the raw coordinate information of objects into other software developed in NAO.

The first tests of this method and software, produced using the plate with the Pleiades open clusters, showed positive results.

FORMATION OF CATALOGUE OF GEOSYNCHRONOUS OBJECTS IN RI NAO

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The catalogue of the orbital elements of geosynchronous objects was generated from observation results obtained in the period of 2008-2010. Observations were carried out by the combined CCD observation method at Fast Robotic Telescope. The catalogue contains orbital elements of 67 objects. The orbital elements were used to calculate ephemerides on the interval from 2 to 200 days. The comparison of calculated ephemerides with new observation results was made. This made possible to estimate the calculation error of ephemerides and the necessary term of new observation.

The software for generation of geosynchronous objects observation list was developed, which consider the analysis of obtained results. The conception of Internet site for catalogue presentation was developed.

OBSERVATIONS OF NATURAL AND ARTIFICIAL OBJECTS IN NEAR-EARTH SPACE USING THE COMBINED OBSERVATION METHOD

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Near-Earth objects, such as artificial satellites and potentially hazardous objects are difficult for optical astrometry observations. High

apparent motion makes difficult to use long exposure time and to determine coordinates relatively to reference stars at once. This problem is most serious for middle and low Earth orbits. A combined observation method (COM) is effective for astrometry observations of near-Earth objects. COM gives high accuracy for faint objects with high apparent motion. The idea of COM is to accumulate images of object and reference stars separately using different accumulation modes. First COM was used in 1960-s for photographic observations of artificial satellites.

A great experience of COM using with CCD cameras was gained in RI NAO since 2000 year. The implementations for full-frame CCD and TV CCD matrix were designed. In both implementations there is no mechanical movement during frame accumulation.

For full-frame CCD, COM uses time delay integration mode (TDI) and camera rotator which performs electronic level tracking during the object accumulation. Images of object and stars is obtained in separated frames with different accumulation modes. This observation method is effective for Earth artificial satellites on any orbit altitude (from 200 to 300’000 km) as well as for asteroids during close approach to the Earth (on distance less than 0.05 AU).

For TV CCD, COM uses track & stack technique which performs digital level tracking during object accumulation. Images of object and stars are stacked simultaneously with different tracking speed. This observation method allow to observed low Earth orbit satellites with mass more then 50kg using only photographic lens and TV CCD camera on stare telescope.

A video stream meteor detection method was designed in RI NAO and was used for basis meteor observations. This detection method can be also used for low Earth orbit satellites and become a base for developing of low Earth orbit satellites searching and surveillance for orbit determination.

RT-70 RADIO TELESCOPE IN “SPEKTR-R” AND “FOBOS-GRUNT” SPACE MISSIONS

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The paper presents issues of preparation and upcoming use of Yevpatoria RT-70 radio telescope in “Spektr-R” and “Fobos-Grunt” space missions.