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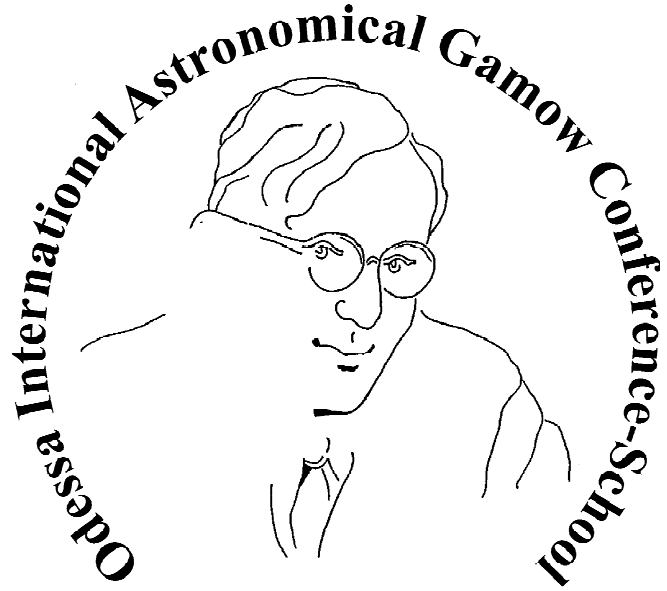

ABSTRACTS

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subtraction, dark and flat field corrections, and cleaning cosmic-ray tracks in the standard manner, using the IDL routines. The morning sky was exposed to provide a flat field correction for the non-uniform sensitivity of the CCD chip. Three fixed linear apertures of ra_1 = 2000 km, ra_2 = 5000 km and ra_3 = 10000 km were chosen to measure the brightness of C/2017 K2 respectively. Some physical parameters were determine from photometric observations. A detailed analysis of coma morphology was made.

RESULTS OF OBSERVATIONS OF NEW DISCOVERED NEAs DURING CLOSE APPROACH TO THE EARTH

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Current investigation is devoted to ongoing follow-up observations of fast-moving Near-Earth Asteroids (NEAs) carried out with RDS CCD technique on small-aperture telescopes in China and Ukraine. The observations were obtained during close approach to the Earth in order to get more observational points and extend observational arc for new discovered NEAs when high-precision astrometry is required (necessary) to determine and improve the orbital elements. The astrometric results of NEAs observations, including new discovered one, are presented and analyzed in order to refine their orbits. The comparative analysis of astrometric and ephemeris positions were done regarding to JPL's HORIZONS system and NEODyS-2 service. The residual differences (O-C) often show high values for newly discovered NEAs during observation date as well as big differences between ephemerid positions of mentioned services. The data for such NEAs is presented.

DETERMINATION AND ANALYSIS OF DISTRIBUTION OF COMETS OF THE SOLAR SYSTEM

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The work is devoted to the topical topic of statistical analysis of the spatial distribution of parameters of cometary orbits to confirm the hypothesis of the existence in the interplanetary space of a system of stable orbits, for which all elements are subject to some deterministic pattern. Estimates of its characteristics are obtained, and histograms act as information carriers on the distributions of the elements of the orbits of comets in the solar system.

USE OF THE MAIN SPHERICAL MIRROR IN TELESCOPES WITH COMPLEX OPTICAL SYSTEMS

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In this talk, we discuss a possibility of replacing the main telescope mirrors with surfaces of the second order and having different eccentricities with a spherical one with zero excentricity using planoidal mirrors with a surface of higher orders.

MONITORING OF THE ORBITAL COORDINATES OF ARTIFICIAL SPACE OBJECTS WITH UKRAINIAN NETWORK OF OPTICAL STATIONS

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We report on the state and efforts of the Ukrainian network of optical stations (UMOS) in recent years in the field of astrometric and photometric observations of artificial space objects for Low Earth Orbit (LEO) and Geostationary Earth Orbits (GEO).

UMOS was established in 2012 as a joint partnership of organizations interested in satellite observations for scientific purposes and practical monitoring. The main purpose of the UMOS is to combine scientific and technical means and regular optical (positional and/or non-positional) observation of objects in Earth orbits. The UMOS maintains its own "partial" catalog of the current osculating orbits of resident space objects (RSO), maintains operational interaction with the Space Observation Center of the State Space Agency of Ukraine.

Statistic information is done in a form of the tables and graphs. We developed a method of the photometric synchronous observations from several points (observatories) to improve accuracy of RSO attitude determination and practical use it.

The low level of financial support of governmental scientific organizations and the lack of understanding of the importance of Ukraine's awareness of the space situation at the level of senior administrations almost stopped the development of space research. It is needed to be refreshed.

THE ANALYSIS OF OPTICAL MEASUREMENTS EXCHANGE FORMATS IN THE SPACE SURVEILLANCE AND TRACKING DOMAIN

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The quantity of objects on the Earth orbit has been steadily increasing. ESA estimate the number of objects with the size lager than 1 cm about 750000. Every of these objects can damage or destroy other satellites, creating yet more fragments. Space Surveillance and Tracking (SST) comprises of technologies for detecting and cataloging of near-Earth objects and predicting of their orbital motion properties. Each SST system developed its own standard in the measurement exchange domain of space object tracking data. These standards are implemented as observation data message exchange formats.

In this work, we discuss the exchange formats of tracking data message in the context of optical measurements of space object visible positions. Last decade, the following formats are wide used in Ukraine for exchange of measurements:

- RES (or Telegram) – format for observation exchange in the International Scientific Optical Network (ISON),
- MPC-1992 – format for observation exchange with using Minor Planet Center (MPC),
- MEA – format for observation exchange and storage in The Ukraine Network of Optical Stations for near-Earth space research (UMOS),
- CKKP – the set of similar formats for observation exchange and storage in Space Monitoring and Analysis System of State Space Agency of Ukraine (SMAS).

The Consultative Committee for Space Data Systems (CCSDS) recommends the Tracking Data Message (TDM) format for exchange of tracking data between space agencies and observation networks.

In this work we consider:

- how the measurement exchange mechanism is implemented in RES, MPC-1992, MEA, CKKP, TDM formats,
- what problems in the interpretation of measurements occur as a result of the measurement exchange between two or more storages.

We propose the ways of solving the problems in measurements exchange between several storages.

USING PHOTOMETRIC DATA TO DESCRIBE THE BEHAVIOUR OF OBJECTS IN GEOSTATIONARY ORBIT

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One of the challenges of satellite characterisation is the ability to not only determine the spacecraft orbit, but also satellite operating status, orientation, size, bus type, and material properties. Positional observations allow us to determine and/or update orbital elements of satellites, but they do not afford an insight into the behaviour of a satellite in orbit.

The article discusses the results of solving the inverse problem of astrophysics. How you can use photometric, astrometric information about a satellite, its lighting conditions, supplemented by additional information, to understand the behaviour of a satellite in orbit. The results are shown using examples of four satellites in geostationary orbit. An algorithm for calculating the photometric and dynamic characteristics of geostationary objects is provided.

DYNAMICAL PROPERTIES OF BASALTIC ASTEROIDS OUTSIDE THE VESTA FAMILY

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Through numerical modeling, Nesvorny et al. (2008) showed that asteroids can migrate due to Yarkovsky drift and resonances to outside of the boundaries of the Vesta family.

We performe photometric observations and determine spins and shapes of V-type objects in Cell I and Cell II in order to characterize the dynamical properties of these asteroids more accurately. The results of dynamical modelling show that some asteroids may have migrated to their current location from the Vesta family within ~2 Gy. There are objects, however, whose origin in another parent body may also be plausible. This may support the hypothesis that the number of differentiated basaltic objects in the inner and middle Main Belt should be much higher than previously assumed.

Numerical integration for ~10 asteroids in Cell I and Cell II performed in different variants allowed us to estimate the maximum and average values of Yarkovsky drift that could potentially occur depending on the chosen rotation model.