Hungary-Slovakia-Romania-Ukraine
ENPI Cross-border Cooperation Programme

International scientific and methodological conference

KOLOS 2014

December 04 – 06, 2014

The 1st conference within the project

Space emergency system -

cross-border system for prediction of natural disasters incidents on basis of exploitation of satellite technologies in Hungary, Slovakia, Romania and Ukraine

Book of abstracts

O r a l   p r e s e n t a t i o n :

Plenary Session

Reity, O.

Uzhhorod National University, Ukraine

Space Emegency System project - General overview of the Project

Kablak, N.

Uzhhorod National University, Ukraine

Scientific contributions of the Space Emergency System project

Droščák, B.

Geodetic and Cartographic Institute Bratislava, Slovakia

SKPOS® – Not only positioning service R&D projects supporter

Slovak real-time positioning service (SKPOS®) is not only the positioning service, but with the data from permanent stations or with results from processed permanent stations data contributes to significant national or international research and development projects or networks. Recently Geodetic and Cartographic Institute Bratislava (GKÚ) has contributed with data from SKPOS® to EPN real-time analysis project, EUPOS

combination centre, EUPOS monitoring system and National Centre for Diagnostic the Earth Surface Deformation in the Area of Slovakia. It is planned to support and contribute to the Multi GNSS Experiment project (MGEX), Space Emergency System in Transcarpathian region or EGVAP programme in the near future as well. From that point of view, GKÚ proves that SKPOS® can serve also other purposes than its primary goal, i.e. serving as reference positioning service for Slovak land surveyors.

Kudzej, I.

Vihorlat Observatory, Humenné, Slovakia

The role of Vihorlat Observatory in the Space Emergency System project

Dubovský, P. A.

Vihorlat Observatory, Humenné, Slovakia

Historical overview of variable stars observations at Astronomical Observatory on Kolonica Saddle

We present the history of variable stars observations in Astronomicla Observatory on Kolonica Saddle. The observation program aimed at the research of variable stars is under a constant development. We started with visual observing of eclipsing variables and physical variables were added later. Observations were performed usually only during expeditions and astropractices. The ccd photometry was started after coming of a permanent observer in March 2006. The first testing measurements on the two-channel photoelectric photometer were made in September 2006. The amount of monitored object types grows with the development of observation technology. A conceptual observation program has been created in the interest of an efficient development, which we gradually fulfill. The main targets are: intermediate polars, close bineries, catalcysmic variables with superhumps and semiregular variables.

We present the milestones in development of observing techniques and most important results and papers published so far.

Session I. Observational techniques

Parimucha, Š.

Institute of Physics, Faculty of Science, P. J. Šafárik University in Košice , Slovakia

The first results from ZIGA telescope

Stachowski, G.

Mt. Suhora Observatory, Poland

Observations of bright stars with the small telescope at Mt. Suhora

Bodnár, D.

Institute of Physics, Faculty of Science, P. J. Šafárik University in Košice , Slovakia

Noise in photometric data

We studied types and sources of noise in photometric data in search for satisfactory filtering algorithm. Such algorithm can help discover low amplitude phenomena in noise dominated data of wide field surveys.

Kudak V.I., Perig V.M., Yepishev V.P., Najbauer I.F.

Uzhhorod National University, Laboratory of space research, Ukraine

Astronomical observations in Uzhhorod, Derenovka point

Astronomical observation in Uzhhorod starts from 4th of October 1957 with launch of first satellite. From that time in Uzhhorod was installed many different telescopes and mastered various observation methods like astrometry, photometry, observation with polarization filters and others. Much success has been achieved with the photometric observations of satellites, detection of satellite shape from photometric curve.

From 2011 Laboratory of space research starts to collaborate with ISON project and together we install Takahashi BRC-250M and ChV-400 telescopes. Few months ago we registered in MPC and start to observe asteroids on ChV-400 telescope with CoLiTec program. The 40 cm telescope also has photometric B, V, R filters, so we are able now to do CCD photometry of asteroids and variable stars.

In Derenivka point is installed TPL-1M telescope with 1m mirror that we use now for photometry observation of low-orbit satellites. As a receiver is used photo-electronic multiplier. Telescope has 2 fixed focuses so we can try to install spectrometer to second focus.

Session II. Variable stars research

Gális, R. (1), Hric, L. (2)

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(2) Astronomical Institute, Slovak Academy of Sciences, Slovakia

AG Draconis - a symbiotic mystery

AG Draconis is one of the best studied symbiotic systems which regularly undergoes quiescent and active stages. The latter ones consist of the series of individual outbursts probably caused by increased thermonuclear burning on the white dwarf accreting matter from the wind of the cool component. The general behaviour of the symbiotic system AG Dra was studied. The period analysis of new and historical photometric data, as well as radial velocities, confirmed the continued presence of the two periods. The longer one around 550 d is related to the orbital motion and the shorter one around 355 d could be due to pulsation of the cool component of the AG Dra binary system. In addition, the active stages change distinctively, but the outbursts are repeated with periods from 359–375 d.

Ogloza, W.

Mt. Suhora Observatory, Poland

Eclipsing system with eccentric orbits

Fedurco, M.

Institute of Physics, Faculty of Science, P. J. Šafárik University in Košice, Slovakia

Eclipsing binaries with pulsating components from Kepler database

We have analysed selected eclipsing binaries from Kepler Eclipsing Binary Catalog with suspected delta Scuti components. We used PHOEBE package to obtain basic parameters of binary systems and we have studied pulsation periods of the components.

Gajdoš, P.

Institute of Physics, Faculty of Science, P. J. Šafárik University in Košice, Slovakia

Reanalysis of parameters of Kepler's exoplanets

We have verified parameters of Kepler's exoplanets published in exoplanet's database. We have found that parameters of many of analysed planets are incorrect. We discuss possible causes of these discrepancies.

Hric, L.

Astronomical Institute, Slovak Academy of Sciences, Slovakia

Intermediate polar V709 Cas is still our target of opportunity

Hegedüs, T.

Baja Astronomical Observatory, Hungary

New Hungarian network of astronomical education and popularisation

Szing, A.

Baja Astronomical Observatory, Hungary

Session III. Other astrophysical areas, education in astronomy, astrotourism

Troianskyi, V.,

Astronomical Observatory of Odessa National University, Ukraine

Determination of small Solar system bodies orbits elements on astrometrical observations with OMT-800 telescope

Savanevych, V. (1) (2), Bryukhovetskiy, O. (3), Sokovikova, N. (1), Movsesian, Ia. (1), Dihtyar, M. (1), Pogorelov, A. (1).

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CoLiTec – multifunction software for the CCD image processing

Modern asteroids detection systems in one night make images of considerable sky area. A specialist will be unable to verify these frames promptly with uniform quality in the blinking mode. This obstacle is a

challenging one for large-aperture wide-field telescopes, the field of view of which can include concurrently up to many dozens of faint asteroids.

It necessary for such automatic processing systems frames to solve many tasks simultaneously. Such tasks include observation, discovery of asteroids and comets, including PHA, GRB detection in the optical range, by the frame series, with automatic sending of the observations results. Many astronomers also interested in searching for other kinds of optical transients.

Presently, CoLiTec software is solving the problem of processing frames of current night asteroid surveys to detect asteroids automatically with subsequent visual confirmation of results. This software includes the search module GRB. The program input data is represented by series of CCD-images showing a part of celestial sphere and stellar catalog. CoLiTec has abilities for detecting very slow and very fast objects. The very slow objects detection module allowed discovering, for example, the comet ISON. CoLiTec software presents results with viewer of obtained results with a user-friendly GUI.

In total, out of 7 recently discovered in the CIS and Baltic countries comets 4 comets were discovered due to the CoLiTec. About 500,000 CoLiTec-used measurements were reported to MPC, including over 1,500 preliminary discovered objects. These objects include 21 Jupiter Trojan asteroids, 4 NEAs and 1 Centaur. Three other discovered asteroids were reported via dedicated electronic MPC circulars. In 2012 the CoLiTec users were ranked as No. 10, 13, and 22 in the list of the most productive observatories in the world by the number of conducted observations of small Solar System bodies. The observatory ISON-NM took 7th place in the world based on both the number of conducted observations and the number of preliminary discoveries made in 2011–2012.

CoLiTec developers are co-authors of 7 GRB circulars.

Savanevych, V. (1) (2), Bryukhovetskiy, O. (3), Sokovikova, N. (1), Khlamov, S. (1), Bezkrovniy, M. (4), Dahskova, A. (4)

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Precision of astrometry measurements for asteroids survey made using the CoLiTec software

Software for automated frames processing of asteroid surveys given as series of frames is necessary for the most effective astronomical observations.

This possibility is provided by the CoLiTec software that allows not only to detect asteroids, but also to perform astrometrc measurements in real time, http://www.neoastrosoft.com/.

100% reliability of the detection of moving objects is retained up to the lower limit of SNR equal to 3 in case of a minimum series consisting of four frames, with no stars covering of asteroid, and decreases to 50% for SNR equal to 2 at the same conditions.

CoLiTec has abilities for detecting very slow and very fast objects. Range of visible velocities of detected asteroids is 0.7-40.0 pix./frame. For example, the fasters NEO is K12C29D asteroid (40.0 pix./frame) or the slowest object is ISON C/2012 S1 comet (0.8 pix./frame).

CoLiTec software performs frames processing of asteroid surveys during observations by using multiprocessor mode.

Visual control with user-friendly interface is used to increase the reliability of the discovered asteroids identification.

CoLiTec supports telescopes with very wide field of view (up to 10 degrees²).

CoLiTec has assisted in making over 1.500 preliminary discoveries of asteroids, including 4 NEO, 21 Trojan asteroids of Jupiter and 1 Centaur. It has been used in roughly 600 000 observations, during which four comets (C/2010 X1 (Elenin), P/2011 NO1 (Elenin), C/2012 S1 (ISON), P/2013 V3 (Nevski)) were discovered.

By the overall results of 2011 and 2012, observatory ISON-NM, equipped with a 45-cm telescope and CoLiTec software, ranked 7th worldwide in both amount of asteroids observations and the amount of their preliminary discoveries.

The communication describes astrometric reduction of the frame based on UCAC4 catalog and provides an analysis of its results. The comparative analysis of the accuracy was performed between the CoLiTec and Astrometrica software. The analysis showed the benefits of the CoLiTec software using with astrometry of asteroids in relation with Astrometrica using, especially when using widefield and low quality frames.

Frame storage and publication software is a perspective of CoLiTec developers. This software allows maintaining a frame archive and searching for frames by specified parameters (coordinates). External access to the archive is provided via the own web interface and the Aladin software. It allows receiving additional frames from such external resources as SDSS and 2MASS. The software has been implemented with the use of VO technologies, including the SIAP (Smart Image Access Protocol).

Considerable attention will be soon given to the possibility of individual binding astrometric reduction to telescopes and increasing observations accuracy.

Hricová Bartolomejová, M.,

Slovak Astronomical Society, Slovakia

8 years of the Astronomical olympiad in Slovakia

Bury, R.

Astrodom, Krosno, Poland

Astrotourism in Karpaty mountains

Prajsnar, R.

Jasło Obserwatorium Astronomiczne ILO, Poland

The influence of the Karpatian Sky Project on the development of astronomical & astronautic interests on the basis of tourism and state-of-the-art technologies in education

Activity of Astronomical Observatory I LO in Jasło:

Modernisation of educational process in science field; encouraging students to conduct studies of the Sun and the Milky Way themselves.

Fruitful participation in NASA projects: MoonKam, EarthKam and Hands-on Universe, Europe aimed at learning astronomy by using up-to-date technologies.

International tourism promotion basing on astronomy as the main aim of Polish-Slovak project 'Carpathian Sky'.

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KALEIDOSCOPE - an opportunity for everyone

The paper deals with the results of cooperation between the regional youth center in Kosice and Kosice physical institutions (PF UPJŠ, IEP SAS and FEaI TUKE) in the popularization of physics and astronomy. Organisations working together since 2004. The stimulus for the first joint project of popularizing was interesting astronomical phenomenon, Venus transit across the solar disk. A decade of mutual cooperation, to allow the complementary series of popularizing physics-oriented events. The primary target group for these events was high school students, and additionally, for a particular event and the wider public. Specialization these events approached Youth wide range of physics (nuclear and subnuclear physics, meteorology, space physics and the like), Astronomy and Astrophysics.

Complementary approach to the implementation of popularisation events allow use of a wide range of activities that enable the participation of young people who had a clean-cut interest in science disciplines. Our intention was to sensitize secondary school students on the topic suggestions exploration in physics and astronomy.

In this work, we prioritize methods of informal learning, experiential learning, with an emphasis on youth participation in the preparation and implementation of the event itself. Then allow them to prepare their own events for popularizing peers and successful participation in the national as well as international inspections youth research projects.