MINISTRY FOR EDUCATION & SCIENCE OF UKRAINE
UKRAINIAN ASTRONOMICAL ASSOCIATION
RESEARCH INSTITUTE "NIKOLAEV ASTRONOMICAL OBSERVATORY"

# ENLARGEMENT OF COLLABORATION IN GROUND-BASED ASTRONOMICAL RESEARCH IN SEE COUNTRIES. STUDIES OF THE NEAR-EARTH AND SMALL BODIES OF THE SOLAR SYSTEM

International conference

# ABSTRACT BOOK

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• автоматическое перемещение телескопа с заданной скоростью по двум осям в режиме наведения и синхронно вращению небесной сферы; при этом выполняется синхронное вращение купола с трубой АЗТ-8;

• наблюдение КО с помощью главной оптической системы до 16 звездной величины за время накопления менее 10 сек в поле зрения не менее 20'; получение угловых координат КО с точностью 0".3÷3";

• прием-передачу информации по локальной сети и сети INTERNET.

С июля 2006 года телескоп АЗТ-8 при совместном участии сотрудников НИИ НАО и НЦУИКС приступил к опытным наблюдениям по задачам Общегосударственной (Национальной) космической программы Украины на 2003—2007 годы. Кроме того, на телескопе начаты наблюдения астероидов, сближающихся с Землей, и других объектов Солнечной системы.

## THE DISTRIBUTED SOFTWARE SYSTEM FOR OBSERVATION AT THE ROBOTIC TELESCOPES

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Software for observations at the robotic telescopes was developed for new Fast robotic Telescope (FRT) in RI NAO. The distributed software system is a set of connected programs which control different telescope units and perform automatic observations of different types of objects. System consists with such programs:

• CCD – observation with CCD cameras made in RI NAO and S1C camera made in Electron-Optronic (Russia).

• Video – observation with TV cameras with using of video capture device;

• Motion – telescope orientation control (engines and angle encoders);

• Control – automatic observations control.

Programs interaction comes through TCP/IP protocol and special server program "Commutator". Software system doesn't have dedicated center

program; programs can be run in any combinations on single or different computers connected in network. Thus the control can be realized for different telescope units from individual computers and observation control from the remote computer.

Automatic observation control is carried out under the objects list and target destinations files. Also automatic control can be carried out under the command file. All programs have several common informational windows, which contain data about telescope, its orientation, observed target, camera field, weather conditions. Operations performed by programs are fixed in log files. Special multilayer directory system and file name format were designed for storage of the received data.

This software system is now used at the Fast Robotic Telescope (RI NAO) and AZT-8 telescope (Evpatoria). This software system for modernized Axial Meridian Circle telescope (RI NAO) will be developed in the same way.

## PRECISION OF DETERMINATION OF METEOR KINEMATICAL PARAMETERS FROM TV OBSERVATIONS

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The problem of errors determination of kinematical parameters and heliocentric orbital elements is investigated for a meteor from double station TV observations. The question about errors determination difficultness is considered for classic methods. Method of random numbers generation in accordance with statistical distributions of input parameters errors, namely equatorial coordinates of points on the meteor image in TV frames, is proposed for solution of this problem. Such approach allows to get the error distributions of all kinematical parameters of a meteor in the Earth's atmosphere, as altitudes over sea level, velocities, radiant equatorial coordinates, distances to the observational points, angles of coming into the atmosphere, etc., and also the orbital elements, as semi-major axis, eccentricity, orbital inclination, longitude of rising node and argument of perihelion. The statistical distributions of errors for all meteor parameters