

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**

September 25–28, 2006,  
Nikolaev, Ukraine

**ABOUT SCIENTIFIC COLLABORATION  
BETWEEN NATIONAL OBSERVATORY  
OF TURKEY, KAZAN STATE UNIVERSITY  
AND NIKOLAEV ASTRONOMICAL OBSERVATORY**

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Scientific collaboration between TUBITAK National Observatory (Turkey), Kazan State University (Russia), and Nikolaev Astronomical Observatory (Ukraine) is continuing from 2000. It started as an International Joint Project in the framework of collaborated observatories from China, Russia, Turkey, and Ukraine on the refinement of linking optical and radio reference frames which finished with good results.

In the presented paper on international collaboration between three astronomical institutions positional and photometric observations are outlined for small Solar system bodies, with special reference to the GAIA project, for determination of positions and their masses. The observations of selected asteroids in the range 11 to 18 magnitudes began at the RTT150 in May 2004. In particular, it concerns positional observations of the near-Earth asteroids in order to improve their orbits. It also concerns some asteroids which are useful for mass determinations both at present time and in future GAIA mission. At present there have been obtained about 3.5 thousand asteroid positions with the internal errors in the range 30 to 80 mas for a single determination. The accuracy of asteroid positions from the observations at the RTT150 is at the level of best achievements in this field, and the positions are good enough for use in mass determinations of large asteroids.

In general, when using reference catalogue of high accuracy and density like the UCAC with the RTT150, the expected positional accuracy of small bodies of the Solar system down to 20 magnitudes, including asteroids in the near-Earth space, could be about  $0''.03 \div 0''.1$ . Preliminary calculations for mass determinations for few asteroids were made by the adjustment of dynamical model parameters (both initial conditions and perturbing masses for asteroids).