# Modeling of space astrometric observations on the microsecond level

**S.M.KOPEJKIN[1], N.V.SHUYGINA[2], M.V.VASILYEV[2], E.I.YAGUDINA[2], L.I.YAGUDIN[3]**

[1]*ASC FIAN RAS,*
*53 Leninskii Prospect, Moscow 117924, Russia.*
[2]*Institute of Applied Astronomy RAS,*
*10 Kutuzov quay, St.Petersburg 191187, Russia. E-mail: eiya@quasar.ipa.nw.ru*
[3]*Pulkovo Observatory,*
*196140 St.Petersburg, Pulkovo, Russia. E-mail: eiya@qipa.rssi.ru*

The accuracy of the astrometric observations obtained by means of the space optical interferometers, orbiting the Earth is expected to be of the order of 1 microarcsecond. The processing of such extremely high precision measurements demands the using of a rigorous theoretical model developed in the framework of the General Relativity [1].

The special software for the processing of angular distance observations with microarcsecond accuracy is developed. Using this software the simulation was made for the observations of stars received by space optical interferometer located on the artificial satellite, orbiting the Earth. The satellite orbit parameters and telescope characteristics are chosen rather close to that of Hipparcos mission. Even numerical tests with a small number of simulated measurements show the possibility to obtain spherical coordinates of stars with the accuracy better than 40 microarcsecond. The applied relativistic model did not show the valuable enlargement of the accuracy of the adjusted stellar parameters. Evidently this result arises from the strong correlations between parameters of stars and small value of addition relativistic effects. The implementation of the ”real life” observational program has to improve the accuracy of the stars position determination (of the order of 10 $\mu$as). At the first step of this ”real life” program it is considered to put the satellite at the Sun-Earth Lagrangian point L2, located 1.5 million kilometers from the Earth in the direction away from the Sun. Secondly, it is assumed to use one of the versions of the Guide Star Catalogue as the input one. It seems the impact of the systematic errors caused by the described above additional relativistic terms will become detectable at the noise level of measurements.

REFERENCES 1. S.A. Klioner, S.M. Kopejkin, Microarcsecond astrometry in space: relativistic effects and reduction of observations., 1992, The Astron.J., 104, N2, p.897.