

## THE IAU WORKING GROUP “THE FUTURE DEVELOPMENT OF GROUND-BASED ASTROMETRY”

M. STAVINSCHI

Astronomical Institute of the Romanian Academy

Str. Cutitul de Argint 5, RO-752121 Bucharest, Romania

e-mail: magda@aira.astro.ro

**ABSTRACT.** The “Space and Ground Based Astrometry” section of the international colloquium JOURNES 2002 is dedicated to the main problems of IAU WG “The Future Development of Ground-Based Astrometry”. This paper shortly reviews the group’s activity and the present situation in order to open the debates concerning future programmes.

The third section of the colloquium JOURNES 2002 is dedicated to space and ground-based astrometry. Naturally, this is not about a competition between the two, but the establishment of the measure in which ground-based astrometry can complete space one or can still work independently, in clearly set programs.

The recent performances of the space missions, the astrometric ones included, such as Hipparcos were those which began to doubt the present and especially the future of the ground-based programs, of the astrometric ones in particular. Actually, this has been the main reason why the XXIVth IAU General Assembly has decided to set up a working group within Division I Fundamental Astronomy “The Future Development of Ground - Based Astrometry”, according to the following :

“The post-Hipparcos era has brought an element of uncertainty as to the goals and future programs for all of ground-based astrometry. In order to identify such programs and make assessment of the whole situation including available instrumentation, a new WG on “The Future Development of Ground-Based Astrometry” headed by Magda Stavinschi (Romania) and Jean Kovalevsky (France) has been established. The main objective of this WG is to identify scientifically important programs that can be realized using ground-based astrometric or related observations, and to study what kind of modifications, upgrades or additions to the existing instruments should be performed in order to provide useful astronomical information with necessary accuracy, keeping in mind what the future astrometric satellites will contribute.”

The working group began to function from the middle of 2001, when its site <http://www.astro.ro/wg.html> was set up.

On 10 November of the same year its first reunion took place, as a Joint Discussion - Astron-

omy with Telescopes, within the international reunion JENAM 2001. The main conclusions were drawn on the basis of the interventions of several participants, from among which we would like to mention J.-E. Arlot, W. Thuillot, C. Delmas, H. Rovithis-Livanou, A. Riffeser, N. Bochkarev, M. Andrade, A. Irbah, M.B. Ignatyev (Stavinschi M., Kovalevsky J., 2001).

Jean Kovalevsky, who led the debates, managed to select the most topical fields for the researches made by means of small telescopes, both for the benefit of some theoretical studies and of the space missions that are to be launched in the following decade, such as DIVA or GAIA. They refer to:

- double star observations (with CCDs or speckle interferometry) for orbital elements and stellar masses;
- dynamics in the Solar system: observation of minor planets and natural satellites;
- solar diameter and shape;
- stellar diameters with speckle interferometry or occultations by the Moon;
- study of crowded fields: determination of proper motions within clusters for dynamical studies or search of microlensing events;
- radial velocities of stars: this is the most needed kinematic parameter for stellar dynamics and double star mass determination;
- proper motions of young stars and associations to establish connection with star formation regions. Observations should be coupled with a reduction of old plates;
- position of radio source optical counterparts All programs need coordination within some well-defined networks, such as the observations of occultations of stars by minor planets, Earth grazing asteroids, mutual events of Galilean satellites, light curves of variable stars or rotating minor planets, etc. They are programs of long duration, even if intermediate results must generally be released as they go along. These results concern long period variable stars, minor planet monitoring, double. A number of fields was then reviewed, in keeping with the above criteria. Another effect of this characteristic is also the homogeneity of the data and the possibility to detect some long periods in the dynamics of the bodies in the solar system.

After the joint discussion of 2001, the working group continued to function and a part of the programs discussed last year were set to work. We shall mention the largest of them, that of the PHEMU 2003 campaign, which covers a period of about 14 months, from October 2002 until the end of 2003. It is carried out under aegis of IMCCE (Institut de Mécanique Céleste et Calcul des éphémérides). As we also showed at JENAM 2001, by means of this campaign J.-E. Arlot brings a proof on the importance of continuous observations of large and small satellites in the Solar system. All the photometric or astrometric programmes during this campaign may be performed on small telescopes. In addition, the observation of mutual events between Galilean satellites of Jupiter is a major input to the dynamical study of these satellites. Even a 30cm telescope is enough to observe them. To collect a sufficient number of such observations, they must be programmed in many observatories all around the world.

Naturally, the debates of this WG reunion will also bring forth other problems or programs which will become working topics of the following period for the astrometry researchers who are still working with small instruments.

## REFERENCES

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