

JOINT COMMISSION MEETINGS

JOINT COMMISSION MEETINGS ON

SPACE ASTROMETRY

(Commissions 8, 20, 25, 26, 30, 33, 37, 44, 45)

Chairman - G. Westerhout

G. WESTERHOUT / Space Astrometry - Its Impact on Astronomy and Astrophysics - Introductory Comments	779
E. HØG / The European Astrometry Satellite, Hipparcos	783
W. H. JEFFERYS / The U.S. Space Telescope - Astrometric Capabilities	789
C. JASCHEK / Spectroscopy - What Are the Needs Once Space Astrometry Has Given Us a New Data Base	795
P. O. LINBLAD / The Impact of Star Parallaxes and Very Accurate Proper Motions on Galactic Structure and Dynamics Studies	799
J. ANDERSEN / The Needs in the Radial Velocity Area in View of Impending Space Astrometry Projects	805

SPACE ASTROMETRY - ITS IMPACT ON ASTRONOMY AND ASTROPHYSICS -
INTRODUCTORY COMMENTS

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Astrometry - the determination of positions, motions, and coordinate systems and the entirety of the products of these observations - was the first specialty in astronomy. The value of astrometry for all of the fields of astronomy does not have to be emphasized here; it is clear that the foundation of astronomy and astrophysics is provided by astrometry. What is perhaps not so clear is the fact that, although considerable progress has been made in the seventies, the numerical estimates for many of the basic quantities are much less certain than the average user realizes. Fortunately, astrometry stands at the brink of a technological revolution, involving both ground-based and space techniques. Once completed, this will lead to one or more orders of magnitude improvement in both the precision and quantity of most astrometric observations, with enormous implications for other fields of astronomy.

In this session, one part of the revolution in astrometry is addressed: The area of astrometry observations from space. The session was organized on behalf of Commissions 24 and 33, with the cooperation of Commissions 8, 20, 25, 26, 30, 37, 44 and 45. The U. S. Space Telescope, which is under construction and is planned for launch in late 1983, and which is expected to have a lifetime of at least fifteen years, will have a considerable capability in the area of astrometry. The European Astrometry Satellite "Hipparcos," if the proposal for funding is successful, is expected to be launched around 1985 and is the first satellite planned exclusively for astrometric purposes. Its lifetime would be of the order of three years.

These two instruments together are expected to provide a tremendous increase both in accuracy and in quantity of astrometric data before the end of the next decade. The purpose of this session is to examine work which would be needed in other fields of astronomy and astrophysics to enable the full potential of the enhanced astrometric data to be realized. The emphasis is on the impact of the new space astrometry data on ground- and space-based astronomy and astrophysics,

and on future programs needed to make use of these new data. Therefore, after a discussion of the capabilities of these instruments, a number of specialists in various fields have been asked to give their evaluation of the expectations and needs in their fields, and the advances resulting from the use of this vast new arsenal of astrometric data. The entire structure of astronomy and astrophysics will benefit immensely from these new ventures, and given the long-term nature of astronomical observations, new ground-based programs will have to be started or expanded to absorb the full impact of space astrometry.

The program of the joint session was as follows:

- (1) The European Astrometry Satellite, Hipparcos-- E. Høg, Denmark.
- (2) The U. S. Space Telescope: Astrometric Capabilities-- W. H. Jefferys, USA.
- (3) Astrophysical Applications of a large increase in number and accuracy of stellar parallaxes-- B. E. J. Pagel, U.K.
- (4) Spectroscopy: What are the needs once space astrometry has given us a new data base?-- C. Jaschek, France.
- (5) The impact of new astrometric data on the ground- and space-based photometric studies-- A. D. Code, USA.
- (6) The impact of star parallaxes and very accurate proper motions on galactic structure and dynamics studies-- P. O. Lindblad, Sweden.
- (7) The needs of the radial velocity area in view of impending space astrometry projects-- J. Andersen, Denmark.
- (8) Double stars: interactions of ground-based and space observations-- J. Dommange, Belgium.
- (9) Cepheids in open clusters: The impact of space astrometry on ground-based cluster programs-- W. L. Sanders, USA.

Papers 1, 2, 4, 6 and 7 are presented on the following pages. Paper 3 was more or less identical to the paper presented by B. E. J. Pagel at the Colloquium on European Satellite Astrometry (1). The reader is referred to the proceedings of that Colloquium for a most excellent series of additional papers on the impact of space astrometry. The authors of papers 5, 8 and 9 decided not to submit a manuscript. Paper 8 will be published elsewhere in extended form. Unfortunately, the author of paper 9 could not be present at the session.

An account of this joint session can be found in the Proceedings of the Seventeenth General Assembly in the report of the meetings of

Commission 24 (2). It is hoped that these discussions will highlight for the astronomical community the excitement and anticipation experienced by those of us who have been more closely involved in the planning for this revolution in astrometry.

References:

(1) Colloquium on European Satellite Astrometry, Padova, Italy, 1978; Ed. C. Barbieri and P. L. Bernacca. Consiglio-Nazionale Delle Ricerche, Istituto di Astronomia, Universita di Padova, Italy 1979.

(2) Transactions of the International Astronomical Union, Vol. XVIIB, Proceedings of the Seventeenth General Assembly, Montreal 1979; Ed. P. A. Wayman. D. Reidel Publishing Company, Dordrecht, Holland 1980.