APPENDIX B

ACKNOWLEDGEMENTS

Appendix B. Acknowledgements

Acknowledgements by the Hipparcos Science Team

The Hipparcos project developed over a period of some 20 years. During this period, some two hundred or more scientists, and several hundred engineers, managers, computer system managers, secretaries, administrative assistants, politicians, and others have contributed directly or indirectly to the gradual, and sometimes very difficult, progress towards the final Hipparcos and Tycho Catalogues. Most main participants owe a debt of gratitude to many individuals who supported their work during this period, and they are offered a warm, if generally anonymous, expression of gratitude.

ESA's involvement with the hardware development began with the project's acceptance in 1980, but even before then, many scientists and engineers had been involved in the preparations for the mission. The earliest concept for a space astrometry mission was put forward in 1966 by P. Lacroute, who retained an active interest in the project's evolution throughout its development, and launch, until his death in 1993.

The work of industry and the work of the scientific study team, during the course of the ESA Phase A studies was essential to the acceptance of the Hipparcos project. This work laid the foundations for a mission both technically feasible and scientifically justifiable. The contributions of those individuals and companies, as well as the ESA technical staff, involved in those early studies, are acknowledged.

The contributions of the members of the ESA Project Team in ESTEC are acknowledged. The technical foundations of the satellite construction owes particular acknowledgement to the first Hipparcos Project Manager in ESTEC, L. Emiliani (1980–84). H. Hassan thereafter supervised the engineering aspects of the satellite development through integration, testing and calibration, to satellite launch in 1989.

The Hipparcos Project found in its prime contractor, Matra (now Matra Marconi Space), in the co-prime contractor Aeritalia (now Alenia Spazio), and in their many industrial subcontractors, great competence, and dedication to a successful mission. The technical difficulties that had to be overcome were considerable, and it is a great tribute to the work of industry that the satellite development was completed largely on schedule (a one year delay of the programme was introduced by launcher problems), and within 10 per cent of the originally approved cost-to-completion.

Noteworthy in this context was Matra's emphasis on developing a global error budget for the mission. A system analysis team in industry, supported by software consultants, identified those areas having the most fundamental effect on the final accuracy. The effort undertaken by Matra to interface with scientific advisors, and hence to appreciate the scientific goals, illustrated this approach. Many innovations, ranging from the predicted performance of the attitude control system and the outstanding quality of the modulating grid, to the introduction of the Tycho experiment and the thorough on-ground calibration of the scientific payload, benefited from this commitment.

Some 1800 persons in Europe were involved in developing the Hipparcos satellite. The Matra (now Matra Marconi Space) Project Managers, C. Guionnet and M. Bouffard, and Aeritalia (now Alenia Spazio) Project Manager B. Strim, as representatives of this major industrial effort, are thanked for their dedicated work over a number of years. With dual burdens of financial and schedule considerations, they were nevertheless receptive to the advice and aspirations of the scientific community.

During the course of the Phase B and Phase C/D activities, the scientific advisory team, the Hipparcos Science Team, was fully involved in the industrial design and the corresponding project reviews, aside from its involvement in the more scientific aspects of the project as a whole. The parallel activities of the scientific consortia during the evolution of the satellite design greatly strengthened the overall project development. The work of many consortia members who participated directly and indirectly in the optimisation of the satellite, payload, and operations is acknowledged.

Even in the present days of frequent satellite launches, the successful launch of the Hipparcos satellite was a noteworthy achievement, a remarkable event that will be remembered with awe by those that witnessed it. The contributions to the mission by the large number of people involved in the Ariane Flight V33 launch activities are gratefully acknowledged. As representatives of the enormous launch commitment undertaken by Arianespace and CSG we thank in particular the Mission Director, Roger Solari, and the Deputy Mission Director, Yves Guerin.

Preparations for launch, early orbit operations and routine mission operations, was an extensive programme lasting for several years and involving hundreds of individuals. The ESOC Ground Segment Manager, J. van der Ha, was an efficient and highly appreciated interface between the ESTEC Project Team and the Hipparcos Science Team. A. Schütz is also acknowledged for his important contributions to the implementation of the scientific observing programme at ESOC.

With the failure of the apogee boost motor, the mission was in jeopardy. The remarkable efforts of many individuals, under the direction of the Satellite Operations Managers, H. Nye and D. Heger, and the Ground Segment Manager, J. van der Ha, allowed the mission to continue. The entire missions operations team engaged itself in a prolonged and strenuous effort to maintain satellite operations for the four years necessary to the bring the mission to a successful scientific conclusion. All individuals and teams involved in this effort (cited in Volume 2) are acknowledged with gratitude. The Satellite Operations Manager, D. Heger, and the operations team at ESOC, are particularly thanked for the enthusiasm and tenacity with which they maintained efficient satellite operations under conditions which were extremely difficult after launch, and became more problematic as the mission proceeded, and as the complexity of operations increased. In ESTEC, M.F. McCaig, M.R. Weinberger, R.L. Crabb, E.J. Daly, G. Dudley, H. Fiebrich, and A. Errington provided significant post-launch support in the areas of attitude control, solar array degradation, power supply, and on-board data handling.

During operations, industrial support was provided with considerable ingenuity: for their contributions to maintaining satellite operations in the face of radiation degradation of the satellite in its geostationary transfer orbit, and associated gyroscope and thermal control failures, the dedicated support of D. Pawlak, P. Peyrot, J. Degremont, A. Benoit, S. Val Serra, P. Delagnes, and J.M. Oberto of Matra Marconi Space is acknowledged. Matra Marconi Space also supported the in-orbit performance monitoring of the satellite.

The efforts of staff at the four ground stations (at Odenwald, Perth, Goldstone, and Kourou) in maintaining the efficient collection of satellite data throughout the operational phase is acknowledged. NASA's collaboration, through the rapid provision and continual and efficient support of the Goldstone station to the Hipparcos operational network, is noted with appreciation.

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During the satellite development, before launch, and during mission operations, numerous scientific advisory groups of ESA were called upon to make sometimes difficult decisions: the members of the Astronomy Working Group, and in particular its then Chairman, J.P. Swings, gave the mission, and the Project Scientist, unqualified support, especially at the time that such support was in greatest need. The Hipparcos Project expresses gratitude to members of the ESA Space Science Advisory Committee, and the ESA Science Programme Committee, for their crucial support through the various phases of the project development, launch

and operations, and especially their support given to the extension of satellite operations to further the scientific goals of the mission. The scientific teams acknowledge the contribution made by K. Mattila during these deliberations. That this support was given in times of financial pressures on the ESA science programme budget is fully acknowledged. In this context contingency financing of the satellite operations was supported by the ESA Director General and the ESA Council.

The various ESA advisory groups also gave their support to the scientific teams in allowing proper and adequate time for completion of the Hipparcos and Tycho Catalogues before distribution of the final data. The Hipparcos Science Team advocated that the release of preliminary data would not be in the long term interests of the Hipparcos mission: that this advice was heeded has been appreciated. The ESA Director of Science, R.M. Bonnet, supported the Hipparcos Project in various tangible ways; in particular the Hipparcos Science Team wishes to extend its appreciation for his support during the recovery mission implementation, operations and, subsequently, of the final publication strategy.

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The entire data reduction process was a complex exercise. Maintaining projected schedules in the face of continuous unexpected developments, and insisting on convergence in the activities of nearly a hundred active scientific participants, was a continuous challenge. The commitment, skill, ingenuity, and energy devoted by the members of the four scientific consortia has been essential to the healthy progress of the scientific aspects of the mission, and to its successful conclusion.

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The work performed at Lund Observatory has been generously supported by the Swedish National Space Board through yearly grants to L. Lindegren and co-workers. Support from the University of Lund and the Royal Physiographic Society, Lund, is also gratefully acknowledged.

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The Centre National de la Recherche Scientifique (CNRS) was another very important contributor through the provision of scientific and technical staff, and through its support within the 'Groupement de Recherche Hipparcos'. The Ministry in charge of the Universities has similarly provided scientific and technical staff working in the various teams. In addition, the Bureau des Longitudes, CERGA (included since 1988 in the Observatoire de la Côte d'Azur) and the Laboratoire d'Astronomie Spatiale of the CNRS have also contributed from their own funds and provided the necessary facilities.

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The Italian participation in the FAST Consortium, which comprises the Italian institutes and individuals participating in the FAST Consortium, was formed in 1981 by P.L. Bernacca (University of Padova), V. Castellani (IAS–CNR, now at the University of Pisa), the late M.G. Fracastoro (University of Torino) and I. Galligani (University of Bologna). Its precursor was the involvement of P.L. Bernacca as System and Mission Analysis Leader during the Phase A study of the satellite performed by Aeritalia (Torino) under contract to ESA.

In the pre-launch phase, the Italian contribution to the FAST work was sponsored by the Piano Spaziale Nazionale of the Consiglio Nazionale delle Ricerche (CNR–PSN), which monitored and supervised the work, independently from, but in coordination with, the FAST management, by means of a CNR–PSN project team, which comprised G. Cecchini (Project Manager), G. Rossetti (Contract Officer) and P.L. Bernacca (Project Scientist).

Every year from 1982 until 1988, CNR–PSN entrusted contracts to the Department of Astronomy of Padova (for missions and computer time of the scientific institutes involved), and to the Centro di Studi sui Sistemi in Torino and to Tecnopolis–CSATA in Bari (for manpower and computer time).

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The work performed in France dealt mainly with the coordination of the Consortium, the production and publication of the Hipparcos Input Catalogue, new astrometric observations and measurements, work on variable stars, minor planets and satellites, and mission simulations, during the Hipparcos Input Catalogue construction; merging of the two astrometric catalogues from FAST and NDAC, processing of some categories of double stars, and production of *Celestia 2000*. It was supported by the Centre National de la Recherche Scientifique (CNRS) and Ministère de l'Education Nationale, de l'Enseignement Supérieur et de la Recherche (MENESR) by providing scientific and technical staff dedicated to the project for up to fifteen years, and by funding through the 'Groupement de Recherche Hipparcos' and each contributing URA for CNRS and through each Observatory for MENESR. It was also constantly and unfailingly supported by the Centre National d'Etudes Spatiales (CNES), the Institut National des Sciences de l'Univers (INSU), by Observatories of Besançon, Bordeaux, Marseille, Paris-Meudon and Strasbourg, by University of Montpellier and by the Bureau des Longitudes. The SIMBAD project is supported by INSU. The Centre National d'Etudes Spatiales is also acknowledged for grants for operating the two data bases: SIMBAD, and INCA. The host of the two data bases was the Computer Centre of Paris-Sud University (Paris-Sud Informatique) from 1985 to 1990, and its director, J.B. Johannin, is especially acknowledged for his constant support.

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