

## Twenty Second Meeting of the Hipparcos Science Team

ESOC, 19 September 1989

Attendance:

**HST:** Prof. P.L. Bernacca, Dr M. Cr ez e, Prof. F. Donati, Dr. M. Grenon, Prof. M. Grewing, Prof. E. H og, Prof. J. Kovalevsky, Dr F. van Leeuwen, Dr L. Lindegren, Dr H. van der Marel, Mr C.A. Murray, Mr R.S. Le Poole, Dr C. Turon.

**ESTEC:** M.A.C. Perryman; K. Clausen, R. D. Wills (part time)

**ESOC:** J. van der Ha, A.Sch utz; W. Brado (part time)

**DDID Participants:** U. Bastian, J.L. Falin, J.L. Pieplu, M. Villenave

Apologies were received from H. Hassan

The agenda given in Annex I was adopted.

### 1. Report on SPC Meeting

Perryman reported on the SPC meeting held on 18 September covering the Hipparcos-related aspects. Hassan had reported on the failure, the establishment of the Failure Investigation Board, and the present orbit. Perryman had reported on the operational constraints, expected lifetime (predicted in range 4-30 months) and the expected accuracies as a function of assumed life. R. Bonnet had requested SPC approval to investigate detailed costs of a Hipparcos 2 mission. This authorisation had been given. Approval had also been given to include the third (Kourou) ground station.

The HST reservations about the results that had been presented (as ESA SPC(89)26, distributed at the HST meeting) are presented under Item 4 (see below).

Grewing offered the following comments on the SPC role in any discussions on Hipparcos 2: (a) that the November SPC meeting was an important milestone in the Hipparcos 2 discussions; (b) that for the November meeting the scientific value of Hipparcos 1 is quantitatively assessed (see Item 4 below); and (c) underlined the importance of the AWG/SSAC committees in the decision process.

## 2. Satellite Status

Clausen reported on the establishment of the failure investigation board, from which a report was expected in early October. He reported that a proposal for a Hipparcos 2 had been submitted by Matra. The costs were presently confidential, while a schedule of 3 years had been foreseen from 'authorisation to proceed' to launch. This schedule could be perturbed due to unavailability of hi-rel parts. The intention was now to present the results of this investigation to the SPC in November.

Clausen reported on the present situation of the power budget. He explained that it would be difficult to have a convincing picture of the power degradation by the time of the next SPC meeting.

Clausen explained that the payload had been switched on the previous day. It was now operating in a narrow temperature range given by the payload thermal control. Presently the Cerenkov emission was being determined as a function of orbital position. He noted that there were difficulties acquiring certain critical data in the perigee region. Clausen also stressed that the operational risk for the present mission was higher than for the nominal mission.

Wills presented the first results of the Cerenkov count rate measurements obtained that day. For the most part, for both the IDT and SM, there was reasonable agreement with the predictions. For the SM the count rates exceeded 5000 cts/sec for about 3 hours per orbit. The IDT count rate exceeded 40 counts/sec for 1-2 hours per orbit. The results were with the shutters closed (i.e. without the grid contribution) and undoubtedly variable orbit to orbit.

## 3. ESOC Activities

Van der Ha presented the results of the ESOC activities and studies (see handout distributed at meeting).

On the subject of scientific requirements, Kovalevsky requested that a fourth ground station be seriously investigated (Action 1).

Crézé agreed to provide inputs on aspects of the scanning law and PSF preparation (Actions 2 and 4).

Grenon requested to be given information on the Cerenkov count rates as an input to the INCA photometric studies (Action 3) (preliminary results for the IDT and SM's was handed over by Perryman after the meeting).

Van der Ha reviewed the tentative consequences of the revised mission, the details of the new orbit, the ground station status, RTAD and control aspects and mission planning aspects.

The following points were also raised by van der Ha.

(a) necessity of jitter calibrations: HST agreed with ESOC's recommendation that jitter calibration is not carried out in sun-pointing. If specific requests are made subsequently, such calibration can be done at 43 degrees.

(b) detector chain 1 calibration: HST agreed to proceed with the use of DSS2, and to only perform DSS1 calibration if results appear anomalous.

(c) no DRC tape distribution would take place in sun-pointing.

(d) for the calibration activities in ESOC, Kovalevsky, Le Poole, Lindegren and Schrijver expressed an interest in participating.

#### 4(a) Results of Consortia Studies

Lindegren summarised the conclusions of his note NDAC/LO/127, distributed previously. (The MATRA technical note MAT-HP-45530 was also distributed at the meeting). The main reservations that emerged after discussions were (a) that scientifically the mission could not be considered successful if the lifetime is less than 18 months, due to the poor parameter separability and poor sky coverage (see Item 4(b)); (b) a contingency of 50 per cent should be applied to all numerical values to allow for operational overheads, presently unquantifiable.

Kovalevsky presented the FAST simulation results. He stressed that only for an 18-month mission, or longer, is the sphere solution well-conditioned. HST agreed that the inclusion of ground-based data into the data reductions would be undesirable.

Concerning attitude studies, FAST had included gravity gradient effects, but not magnetic torque or air drag) and shown that at perigee, jet firings intervals were still  $> 60$  sec. For attitudes above 4000 km the intervals exceed 250 sec (i.e. for approx.  $\pm 20$  min around perigee) and attitude reconstruction was then possible. Eclipse durations derived by FAST are given in Annex II.

Cr ez e reported on his sky-coverage simulations. He showed that holes around the galactic centre and anti-centre still existed after one year. It was possible that these holes could be improved by tuning of the NSL parameters (Action 2).

H og reported on simulation of great-circle results with shorter set durations (NDAC-C308), concluding that 6-12 hour sets result in good determinations of abscissae and instrument parameters (Annex III).

#### 4(b) AWG/SSAC/SPC Report

A report would be drawn up by the HST detailing the extent to which the scientific goals of the mission are likely to be satisfied according to mission lifetime. Inputs to Perryman, via e-mail, by 6 October at the latest for review distribution by FAX or e-mail by Perryman on 9 October, comments by HST by 10 October and presentation of the preliminary report to the AWG on 11 October (final report to be ready for the SPC meeting of 20-21 November):

Subject	Inputs	Pages
1. Lifetime estimate	ESA	0.5
2. Operational difficulties	ESOC	0.5-1
3. Overview/expectation/second mission	Kovalevsky	0.5
4. Poor results for < 18 month mission	Kovalevsky	1
5. Situation for 18-30 months	Lindegren	1
6. Sky coverage	Cr�ez�e	1
7. Photometry	Grenon	1
8. Double stars	Lindegren	0.5-1
9. Tycho	H�og	0.5-1
10. Scientific yields	Turon	2-3
11. Figure of merit summary	HST	0.5
12. Concluding remarks	Blaauw	0.5

For the scientific assessment the following cases would be considered (values in milli-arcsec):

Case	Duration (months)	Positions	Parallaxes	P.M.
1	<18	10	-	-
2	18	6 (4)	6 (4)	8 (5)
3	24	3 (2)	4.5 (3)	6 (4)
4	30	3 (2)	3.5 (2.5)	5 (3)

Figures in brackets are those derived by Lindegren. The figures to be used in the assessment are degraded by a factor 1.5.

#### 5. INCA Publication Schedule

Turon considered that a publication date of end 1990 could still be targeted.

#### 6. Miscellaneous

(a) Perryman noted that he had received copies of letters of support for Hipparcos 2 from:

- Netherlands Committee for Astronomy (E.P.J. van den Heuvel)
- Division of Dynamical Astronomy of AAS (A. Uppgren)
- IAU President (Kozai)
- Techn. University of Munchen (H. Ruppe)
- Bern (P. Creola)

Høg also drew attention to the letter from:

- IAU Commission 8 ( M. Miyamoto)

(b) SP1111 distribution: HST to indicate further required distribution.

(c) IAU 141/Cospar 1990: no changes foreseen to present plans.

(d) e-mail: Perryman would maintain Vaghi's e-mail distribution list and Astronews. The BBS updates would be discontinued.

(e) Perryman referred to the ESA D/Sci's 'Invitation for New Ideas' for the next medium-sized mission. HST considered the time schedule unsuitable, and did not propose to respond to it.

## 7. DDID

Discussions on the DDID were held in the afternoon.

## Future Meeting

Tuesday 7 November was set aside as a *provisional* date, but the HST would only meet on that occasion (at ESOC) if urgently required for SPC preparations or other reasons. Otherwise, the HST meeting would take place at ESOC on 12 December, starting at 09.00 hrs, and continuing until mid-afternoon.

M.A.C. Perryman

22 September 1989

Distribution: Participants, H. Hassan, K. Van Katwijk, B.G. Taylor, M. Le Moine

S. Volante (25/9/89) by fax

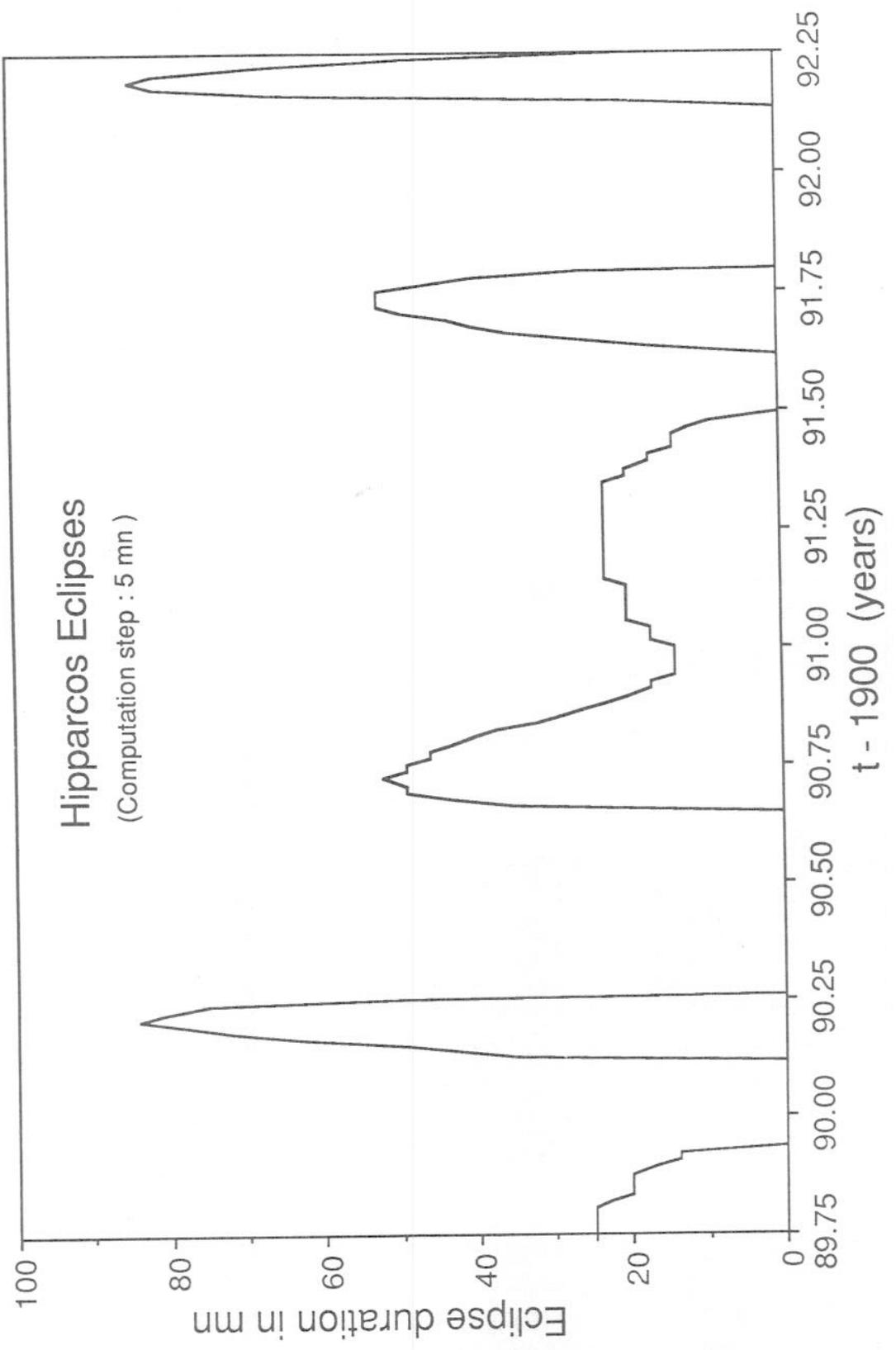
Annex I

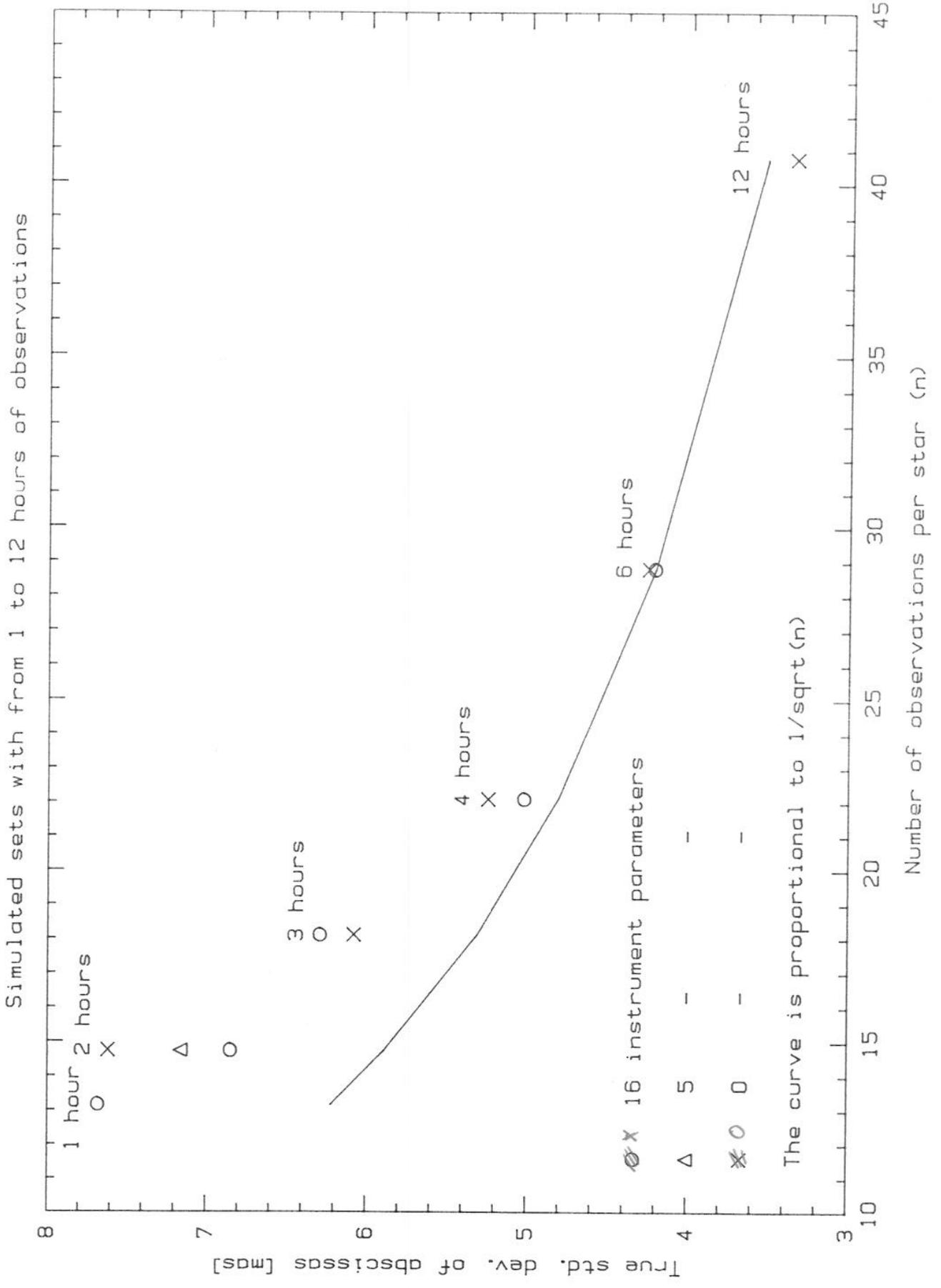
Twenty Second Meeting  
of the  
HIPPARCOS SCIENCE TEAM  
ESOC, 19 September 1989  
(Portacabin 3, 09:00 hrs)

PROVISIONAL AGENDA

1. Debrief of SPC Meeting (Perryman)
2. Project report (Hassan)  
(failure investigation board, industrial studies for Hipparcos II, etc)
3. Satellite Status (van der Ha)  
(orbit, payload status, power degradation, ground station coverage, future schedule of activities)
4. Results of Consortia studies (where relevant):
  - NDAC accuracy predictions (Lindegren)
  - FAST comments (Kovalevsky)
  - TDAC comments (Hoeg)
  - photometric aspects (TBC)
5. INCA publication schedule
6. Miscellaneous:
  - reimbursement of Kourou expenses, MO's, etc
  - SP1111 distribution
  - IAU 141
  - COSPAR 1990
  - comments on e-mail communications
  - next HST meeting
7. DDID discussions (afternoon):
  - comments on test tape 5 and 6
  - finalisation of DDID 6 (for nominal mission)
  - potential DDID impacts due to revised mission
  - first look data constraints (< 12 hours)
  - etc.

FAST





NDAC, Fig. 1 of C308

