

BOL.
ATC.
ROE.

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Minutes: Eli Atad, Richard Bennett, Colin Cunningham, File, Walter Gear, Ken King (RAL) Peter Hastings, Fraser Morrison, Gillian Wright.

Summary: Donald Pettie, Stuart Pitt, Adrian Russell.

MINUTES OF MEETING

Subject: Design Progress Meeting #002

Date: 15th October 1997

Location: Technology Meeting Room (ROE)

Present: Eli Atad, Colin Cunningham, Walter Gear, Peter Hastings, Fraser Morrison, Gillian Wright.

Apologies:

SUMMARY:

The meeting was held to discuss the overall instrument layout, the likely impact on it of recent changes to the telescope design, and to review the provisional chopper motor specification.

The instrument layout presented was accepted as baseline for the spectrometer option by those present. The design remains, however, subject to approval by Matt Griffen. It was generally recognised that the layout would require minor modifications due to the repositioning of the telescope focal plane and also when the telescope f# has been finalised.

A chopper motor specification was presented in draft form and as expected several sections were expanded while other areas were identified as being in need of further investigation. This specification will also be affected by future decisions on the telescope f# etc. it will therefore remain in draft form until those issues are resolved and included.

1. Optical Design.

1.1 Opto-mechanical Layout.

At the last consortium meeting in Marseilles an action was given to GFM to produce an overall instrument opto-mechanical layout for the spectrometer option. This has been done with optical input from EA and Kjetil Dohlen from the Observatoire de Marseille. The drawings were presented to the meeting and have been accepted as baseline for that option. (See Appendix B)

A Fax. from Matt Griffen was received on 6th October which included several changes to the system optical design. Eli has reviewed these changes and has decided that their impact will be fairly minor and he is confident that our baseline layout can be adapted to suit. He also feels that any further work, until such issues as the telescope f# have been finalised, would be wasteful of effort.

Action number IWGC4-4 (Marseilles) is therefore considered closed subject to agreement by Matt Griffen.

Action 002-01: CRC.

1.2 Grating Efficiency.

Bruce Swinyard has recently produced a paper which compares the FTS and grating options for the spectrometer. In response Kjetil Dohlen has made it clear that he is not in total agreement with it's findings. It is therefore considered prudent for the ROE team to study both papers so that they can input to the, FTS v Grating, final selection.

Action 002-02: WKG, GSW, EA.

1.3 FTS Working Group.

The project feel that it is important to have a mechanical engineering representative from ROE at this meeting. It is proposed that GFM or PRH attend.

Action 002-03: CRC.

Details of the type of FTS to be used should be obtained from Grunnigen.

Action 002-04: CRC.

2. Review actions arising from ROE meetings.

Action 001-01: GFM to provide draft spec. for chopper motor.

Comments: Presented at meeting, **Complete.**

Action 001-02 Is a physical stop required in front of chopping mirror.

Comments: Yes at 15K. Size and shape TBD.

Complete.

Action 001-03: CRC to contact Phoc team re collaboration.

Comments: Meeting will be held in Heidelberg in early November.
Complete.

Action 001-04: Chopper motor conceptual design required by 15:10:97.

Comments: PRH has done some preliminary work but can not proceed until optical design is finalised and spec. issued.
Continuing.

Action 001-05: CRC to advise Matt Griffen of revised power consumption estimate.
Complete.

Action 001-06: CRC to formalise project management system.

Comments: CRC – Consortium's UK systems engineer.
GFM – Project Manager ROE. **Complete.**

3. Review provisional chopper motor specification.

A copy of the provisional chopper motor specification was issued along with the meeting agenda. (See Appendix A) Each section was discussed in turn and the need for additional information or further investigation highlighted as follows.

Chopping Mode: The angular displacement target should be increased to +/- 5° but should be reviewed when the optical layout is finalised.

The chopping profile should include a target duty cycle and this should be set such that the rise time of the chopping action is matched to the response time of the bolometers. The profile of the rise time should also be sinusoidal to reduce high frequency vibration. This should be a major topic of conversation during meetings with the PHOC team. The first meeting should be arranged for early November.

Action 002-05: CRC.

Jiggling Mode: This should include the resolution of discrete positioning and the requirement for D.C servo offset. It is probably more sensible to define this mode as a specification on the sky.

Action 002-06: GSW.

A separate mode for fine pointing should also be included.

Action 002-07: GSW, WKG.

- Optical: Should the chopper mirror be gold coated.
Action 002-08: EA.
- Mechanical: This section should be expanded to include a mass estimate for the moving parts.
Action 002-09: PRH, GFM.
- Electrical: This section should include vibration and EMF specifications.
Action 002-10: CRC.

4. Discuss conceptual design of chopper motor.

See section 2 action number 001-04.

5. Review actions arising from consortium meetings.

Actions were reviewed and CRC will contact Ken King to ensure consortium action list is updated as necessary.
Action 002-11: CRC.

6. Document and Drawing numbering and control.

ROE ATC system will be devised and implemented a.s.a.p.
Action 002-12: GFM, CRC.

Appendix A.

Provisional Chopper Motor Specification.

1. General Description.

The chopper motor required by the Bolphot instrument will be capable of tilting a mirror, placed at the telescope's re-imaged focal plane, about two axes. This will provide both chopping and jiggling modes of operation.

2. Chopping Mode.

The baseline chopping frequency has been set at 4 Hz. (TBC)
The angular displacement target is $\pm 2.5^\circ$. (TBC)
The profile of the chopping action is TBD.

3. Jiggling Mode.

The baseline jiggling frequency is 0.1 Hz. (TBC)
The angular displacement target is $\pm 0.25^\circ$. (TBC)
The profile of the jiggling action is TBD.

4. Optical.

The mirror should be approximately 20 % oversize to allow for diffraction effects with a surface finish better than 0.8 microns RMS.
The mirror thickness may be $1/20^{\text{th}}$ of the diameter and is assumed to be made from Aluminium alloy which is diamond machined and then gold coated.

5. Mechanical.

The target mass for the chopper mirror assembly shall be 3000 grammes.
A structural model of the mechanism shall be life tested prior to delivery of the flight model. (TBC)

6. Electrical.

The target power consumption of the motor is 4 mW.

Appendix B. Baseline Photometer / Spectrometer Layout.

