

FIRST | ESA | M | 0006-1
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Ref: PT-MM- 02833

26 July 1996

MINUTES OF THE FOURTH FSODG MEETING

The fourth meeting of the FIRST Science Operations Definition Group (FSODG) was held in RAL on July 22-23, 1996. H. Schaap and P. Roelfsema were absent.

AGENDA

The agenda (attachment) was adopted.

1. APPROVAL OF MINUTES OF THE THIRD MEETING

The minutes were approved.

2. REPORT ON SAG AND PWG MEETINGS (ESTEC 25-27 JUNE)

Pilbratt and Estaria reported on the outcome of these meetings w.r.t. the FIRST Science Operations concept presented on the 25th June 1996 and re-discussed on the 26th. Main points are;

- The Instrument Control Centre (ICC) concept is endorsed by SAG and PWG.
- "Across- the- board" commonality (i.e. max. level of commonality in instrument design, operations, interface with the Ground Segment as well as continuity between testing and operations) is endorsed by both groups.
- The B scenario (recommended by the FSODG) is favoured by SAG and PWG, although, and for various reasons, the roles of the FIRST Science Centre and Archive were not clearly understood. The FSC was perceived by some of the participants as an "empty" shell, whereas others would like it to assume overall responsibility for science operations as well as distribution of "final" products to the observers. These points are discussed below.
- SAG and PWG requested the FSODG to elaborate on the tasks of the FSC, the interfaces between ICCs, FSC and MOC as well as to refine the scenario for the commissioning and PV phases.

3. REPORT ON THE MEETING WITH D/SCI

Scenario B was presented to D/SCI on the 4th July, 1996. No violent reaction. Pr. Bonnet, however, wants the concept to be reviewed by others with ISO experience in addition to SAG and PWG. A formal review is being organised for

early October. A dry run with participation from J-L Puget, J. Clavel and J. Riedinger will take place on the 12th September.

4. REVIEW OF ACTION ITEMS FROM PREVIOUS MEETINGS

- Action Items from the 2nd FSODG meeting;

- AI # 2/1: Due date extended to 31 October '96
- AI # 2/3: Preliminary results are available (Attachment # 2). It was agreed that the final results can only be produced at the end of the ISO mission (ISO SOC manpower limitation). Since the issue is not urgent this AI is kept open till end-December '97.
- AI # 2/7: Functional description has been provided. MOC preliminary costing due 31 October '96.

Als # 2/2 and 2/5 are not yet due. All other AIs are closed.

- Action Items from the 3rd FSODG meeting;

- AI # 3/1: Acronym list produced. To be expanded as work progresses. FSODG members to send request for correction and extension to P. Estaria.
- AI # 3/2: Due date: long term
- AI # 3/3: closed (see Attachment # 3)

Als # 3/4 and 3/5 are closed.

5. ELABORATION OF SCENARIO B (SAG REQUEST)

Upon SAG request Scenario B which includes ICCs (one per Instrument), the FSC and the MOC was discussed in more detail in order to prepare for the Science Operations reviews in September and October.

The following points were agreed;

- The FSODG will produce for the review on the 12th September a document describing the proposed operations concept. This document will be distributed to the reviewers one week prior to the review. The document's table of contents is given in attachment # 4.

- The level of definition of the FSC tasks as presented to the SAG on 25-26 June 1996 is adequate. A deeper level of detail can only be provided once implementation starts. It was confirmed that no "formal" instrument-training of FSC staff nor permanent co-location of ICC staff at the FSC were foreseen. It is expected that the FSC staff will acquire the required instrument knowledge through early involvement in instrument issues.

- It is necessary to show that the operations concept (scenario B) works in the five major phases of mission (and mission preparation), namely; (i) Simulations, (ii) Instrument-level tests and check-out, (iii) Satellite Commissioning phase, (iv)

Performance Verification phase, (v) Routine phase. This will be addressed in the concept document.

- During the early mission phases (satellite commissioning and PV) as well as during simulations, some ICC and (possibly) some FSC staff will need to be co-located at the MOC. ICC and (possibly) FSC equipment is also likely to be required at the MOC for these phases. These aspects will be addressed in the concept document.

- It is necessary to define early (i.e. before the Instrument-level tests) a "raw" data format which would be the standard input for every data processing system such as RTA/QLA and/or scientific data processing software. (this could be analogous to the ISO LTDF format but should contain a thorough definition of any MOC provided data). Such a format shall be defined in a "Data Definition Document". (see AI # 4/1) It is noted that such a document is required for the definition and set-up of the FIRST Archive. In any case it is essential that the "raw" format thus defined does **not** imply any loss of the original raw data coming from the instruments.

Estaria distributed a document describing the interfaces between ICCs, FSC and MOC. The document was reviewed by the group. To complete it, it was agreed that the missing parts will be provided by Robson (see AI # 4/2) and Pilbratt (see AI # 4/3). The document will then be updated to issue 2 (Estaria) and incorporated into the operations concept document.

6. ARCHIVE

Estaria distributed a document containing a list and a short description of every data-item to be stored in the Archive. The document was reviewed by the group. It will be correspondingly updated to Issue 2. (Estaria)

It was noted that for some specific data items a working copy was required in addition to the master copy kept in the Archive. This can be achieved by file-copy (according to an agreed procedure) or via mirroring which is automatic. The proper option will be selected during implementation.

A document containing an overview of the Archive, as well as the top level requirements on the Archive Management System was also distributed. The document needs to be updated in the following areas; Browser, Configuration Control and near real-time access (see AI # 4/4, 4/5 and 4/6). The document will then be updated to issue 2 (Estaria) and incorporated into the operations concept document.

7. INSTRUMENT ISSUES

- A list of "Radiation Hard and Radiation Tolerant ASIC Technologies and

Microprocessors" generated by ESTEC-TD was distributed to the FSODG members via H. Schaap. The instrument representatives within the FSODG will relay this information to their respective groups. A more comprehensive document will be compiled by ESTEC -TD in September and can be made available if required. It is recalled that commonality between instruments is one of the major requirements of the FIRST programme. Instrument groups will require a common base when instrument design will start.

- A meeting to identify possible problems in the area of EMC with the HET Instrument has been organised by H. Schaap. The minutes have been distributed to the FSODG.

8. AOB

8.1 FSODG - SAG- PWG communications

- It was agreed that the link between FSODG on one hand and SAG and PWG on the other hand needs to be strengthened. In particular the FSODG needs (or will need soon) answers to the issues already raised with SAG e.g. confirmation of the type of mission (open-type versus key-programmes) and/or preferred instrument operations scenarios (one versus multiple instruments per orbit, serendipity mode of operations, etc.)

It was decided that SAG and PWG minutes of meeting shall be made available to the FSODG members (Pilbratt to organise. see AI # 4/7) and that FSODG minutes shall be made available to SAG and PWG members (Estaria to organise. see AI # 4/8)

In addition it was agreed that a list of assumptions and open points will be maintained and regularly updated by the FSODG. (AI # 4/9). If required specific items from this list will be brought to the attention of SAG and/or PWG.

8.2 Terms of Reference for the FSODG

The members of the FSODG felt that since the group was now formally established, since its workload was increasing and since its work was submitted to external reviews it would be appropriate that; (i) the FSODG Terms of Reference be formally written, (ii) members be formally nominated through a letter of appointment issued by the FIRST Project Manager, (iii) mission expenses be paid when members have to travel on FSODG business. Estaria has been requested to bring this issue to the attention of the FIRST Project Manager. (AI # 4/10)

8.3 Cost estimates

In order to be able to compare the estimated cost of the FIRST Science operations with the ISO Science operations cost it is necessary to generate an

estimate (it is difficult in most cases to extract exact figures) of the man-power spent by the PI-teams on ISO ground segment/operations-related matters. Estaria has obtained estimates from CAM and PHOT. It is necessary to consolidate these numbers (AI # 4/11). Bauer and King will obtain the SWS and LWS figures respectively (AI # 4/12 and 4/13). The figures should be given in man-years. When possible individual figures should be given for the major items e.g. RTA/QLA, off-line Processing, Interactive Analysis, etc.

8.4 Next FSODG meeting

The next meeting will take place at ESTEC on the 12-13 September 1996. Start time: 9:00 on the 12th. End time: lunch time on the 13th. Estaria will provide the agenda. The first day will be dedicated to the preliminary review of the FIRST Science Operations concept by the external reviewers.

9. LIST OF ACTIONS

The following actions have been allocated as a result of this meeting:

- **AI 4/1: Bauer: Due date: 30 September '96**
Provide a Table of Contents for the FIRST "Data Definition Document"
- **AI 4/2: Robson: Due date: 16 August '96**
Provide section 5 of MOC to FSC interface document ("Deliveries FSC to MOC"). E-mail to Estaria.
- **AI 4/3: Pilbratt: Due date: 23 August '96**
Provide sections 1,2 and 3 of "FSC to External Users Interfaces" document. E-mail to Estaria.
- **AI 4/4: Bauer: Due date: 16 August '96**
Provide requirements for near real-time Archive access. E-mail to Estaria.
- **AI 4/5: King: Due date: 16 August '96**
Provide updated requirements for Browser as well as requirements for handling of priorities in Archive access. E-mail to Estaria.
- **AI 4/6: Roelfsema: Due date: 16 August '96**
Provide requirements for Archive Configuration Control. E-mail to Estaria.
- **AI 4/7: Pilbratt: Due date: 12 September '96**
Check feasibility and arrange for SAG and PWG minutes of meeting to be distributed to members of the FSODG.

- **AI 4/8: Estaria: Due date: 12 September '96**
Check feasibility and arrange for FSODG minutes of meeting to be distributed to members of SAG and PWG.
- **AI 4/9: Estaria: Due date: 31 October '96**
Generate and maintain a list of FIRST operations-related open points and assumptions.
- **AI 4/10: Estaria: Due date: 12 September '96**
Arrange for FSODG Terms of Reference and letters of appointment to be issued.
- **AI 4/11: Estaria: Due date: 14 October '96**
Provide (based on CAM and PHOT supplied figures) an estimate of the manpower spent on Ground-Segment and operations-related matters by CAM and PHOT.
- **AI 4/12: Bauer: Due date: 14 October '96**
Provide estimates of the manpower spent on Ground-Segment and operations-related matters by SWS.
- **AI 4/13: King: Due date: 14 October '96**
Provide estimates of the manpower spent on Ground-Segment and operations-related matters by SWS.

P. Estaria

P. Estaria

From: PESTARIA--ESTEC Date and time 96-07-05 16:04:49
 To: HSCHAAP --ESTEC AROBSON --ESOC
 BAUER --EXTERNAL bauer KJK --EXTERNAL Ken King RAL
 PJOTR --EXTERNAL Peter Roelfsema PILBRATT--EXTERNAL Goeran Pilbratt

FROM (my name)

Subject: FSODG meeting # 4

(Attachment # 1)

FSODG meeting # 4 will take place at RAL as follows;

22.07.96 - Conference Room 2, Building R1

23.07.96 - Conference Room 14, Building R71

Andy and the ESTEC crowd could be at RAL at around 10:30, so let's try and start at 11:00.

The following agenda is proposed (taking Andy's input into account)

----- AGENDA -----

1. Approval of Agenda and Minutes of Meeting # 3.
2. Report on SAG and PWG meetings (25-27 June) Pilbratt/Estaria
3. Report on meeting with D/SCI (4 July) Pilbratt/Estaria
4. Review of AIs from previous meetings
5. Elaboration of the following items (SAG request)
 - improve definition of FSC tasks
 - improve definition of interfaces between ICCs, FSC and MOC
 - define "colocation" during Commissioning and PV phases
 - explore if "minimum" "standard" processing of "raw" data is required before data is made available to observers on the Archive.
6. ARCHIVE:
 - List+(ultra-short) description of products to be archived
 - Note: at some point we will need to make a rough estimate of volume of data and required network capacity.
 - Top level functional requirements on the Archive.

7. Instrument Issues

8. AOB

Notes: Please give some thought to the listed topics before the meeting.

Could Peter start on the first point on the Archive? I will provide a DRAFT for the top-level functional requirements.

At some point we will have to compare our figures (manpower/costs) with the ISO figures. We will then need an estimate of the manpower spent by the PIs on Ground Segment matters (e.g. RTA/QLA, support to simulator work, support to EEs, IA work, OLP work, etc.) for ISO.

Could Otto and Ken start gathering data for SWS and LWS ?

In order to cross-check I will try to get similar figures from CAM and PHT.

regards

End of Message

From: AROBSON --ESOC Date and time 96-07-01 15:18:28
To: PILBRAT --EXTERNAL PILBRATT GOERAN OTTOB --EXTERNAL BAUER OTTO
ROELF --EXTERNAL ROELFSMA_PETER HSCHAAP --ESTEC
cc: PESTARIA--ESTEC Estaria, P. G.

FROM : Andy Robson

Subject: FSODG action A2/3: relative merits single/multiple inst ops ISO

gentlemen, my response to this action item is a few days late and i also have to admit that due to the operational workload in VILSPA, i cannot complete it satisfactorily at the moment. nevertheless, a few relevant pieces of info have come out.

1. scheduling simulations performed by paul barr in '93 showed that single instrument ops per orbit showed a reduction in science efficiency of between 5% and 20% where sci. efficiency is the ratio between observing time and time available for science. this was based on an MDB of 21000 observations (50% PHOT, 30% CAM, 10% LWS, 10% SWS).
2. according to jean clavel, the current science efficiency being achieved is between 88% and 95%.
3. losses in SE would come from
 - a) not having enough observations to use up every minute of the available science time
 - b) increased total slew time due to a reduction in clustered observations

In order to compare the two instrument operations scenarios, simulations with the iso MDB would have to be done and this can't be done currently.

4. we tried to get an impression of the number of occasions when there were consecutive observations of the same source by different instruments. we looked at 18 revs(139 to 157) and found 42 occasions. taking an average of 60 observations per revolution, this amounts to ~~2-3%~~ and of course, there still a slew for the instrument aperture offsets which takes between 20 and 30 seconds before aocs settling. best regards

Regards
End of Message

2.3 occasions per rev.

(Attachment # 2)

26 JUL '96 14:40
24 JUL 1996 16:43

ESA FIRST PROJECT
ESA-ESUC-T1007/S10 06151 903409

NR.444 S.1/P.10/11

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From: S.Pallaschke
To: A.Robson

2. June 96

(Attachment # 3)

Subject: ISO Orbit Accuracy

Some time ago you requested for the satellite FIRST information on the achievable orbit accuracy. Within our discussion we agreed that I could give you some figures related to ISO, which has a similar orbit to the one of FIRST.

Within the past months we observed for ISO the following orbit inconsistencies within subsequent orbit determination runs:

semi-major axis	.025 km
eccentricity	.0000054
inclination	.0220 degrees
ascending node	.2478 degrees
arg. of perigee	.2462 degrees
true anomaly	-.0003 degrees

It should be mentioned, that the errors in ascending node and arg. of perigee are strongly correlated.

Using the above orbit uncertainty figures, the following errors along the orbit would be obtained:

Time rel. since perigee (hours)	True Anomaly (deg.)	Radius (km)	Position error (km)	Velocity error m/s
.00	0	7430	.5	3.7
.07	20	7640	.7	3.7
.16	40	8320	1.7	3.4
.26	60	9590	2.9	3.0
.41	80	11850	4.3	2.3
.66	100	15810	6.0	1.6
1.14	120	23020	8.1	.9
2.29	140	36740	10.4	.3
5.34	160	59990	10.7	.2
8.24	170	71810	8.4	.3
10.04	175	75570	6.5	.3
11.97	180	76910	4.3	.4

INSTRUMENTS
OBSERVATION

Unfortunately I could not reply via PROFS, as the system was not properly working, therefore I used this back-up mode.

Kind regards

S.Pallaschke

To P. ESTARJA fm A. ROBSON 85244

AI 3/3 INSTRUMENT OPERATING MODES WHICH WOULD PUT SPECIFIC REQUIREMENTS ON FIRST ORBIT ACCURACY DETERMINATION

THE ABOVE INFORMATION WAS PRODUCED IN ORDER TO PROVIDE THE HET RESPONSIBLE WITH AN IDEA OF THE UNCERTAINTY IN VELOCITY (→ DOPPLER SHIFTS) OF FIRST DURING A REVOLUTION. IT WAS GIVEN TO GORDON PILBRATT & K. KORNELIUSE. APPARENTLY THE UNCERTAINTY WOULD HAVE NO IMPACT ON HET MEASUREMENTS (REPORTED BY CORAN). INWORK PROPOSE THAT THE ACTION BE CLOSED BUT THAT THE INFO. BE CALLED THROUGH INTO THE SYSTEM SPEC OR SOME OTHER REFERENCE DOCUMENT ON SATELLITE.

Andy

FIRST										PT-02835			
JAS	MA	MVH	HS	FE	RO					FILE			
JC	CP	OD	OJ	MIB	OG	DC	PU						
DATE													

Attachment # 4

Table of contents for the "concept" document

1. Introduction and purpose
2. Assumptions and constraints
3. Overview of concept
 - classical functions in science operations
 - allocation of functions to "centres" (scenario B)
 - justification for selection of scenario B
 - . operations during the five mission phases
 - . data flow
 - costing
4. FIRST Data Archive System
5. Instrument Control Centres (ICCs)
6. FIRST Science Centre (FSC)
7. Mission Operations Centre (MOC)
8. Interfaces

Responsibilities

The responsibilities for the generation of the document are as follows;

- chapters 1, 2 and 7: A. Robson
- chapter 3: O. Bauer & K. King
- chapter 4: P. Roelfsema
- chapters 5, 6, 7, 8: P. Estaria
- overall coordination and editing: P. Estaria & G. Pilbratt