MINUTES + VIEWGRAPHS SPIRE/QMW/M/0037.10

Matt Griffin, 09:54 21/10/97 +0, Notes on yesterday's meeting

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Subject: Notes on yesterday's meeting
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From : Matt Griffin

To : Jean-Paul Baluteau
Roger Emery
Walter Gear
Ken King
Goran Olofsson
Michael Rowan-Robinson
Paolo Saraceno
Laurent Vigroux
Gillian Wright

Date : 11 October 1997

Subject: Notes on ICC Meeting at IC, 10 Oct. 1997

Below are some notes on yesterday's meeting (not necessarily complete or entirely accurate).

I ask for coments especially on

(i) the revised organogram (minor comments preferred . . .);
(ii) my summary of the ICC available manpower estimates;
(iii) the list of Co-Is and Associates.

BOL organogram:
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Basic format agreed with following modifications:

(i) "Local Management" and "Instrument Development and Procurement" boxes to be merged.

(ii) "Systems Team" box to be included at third level

(iii) "Project Scientists" box to be made subset of "Co-Is" box with dashed link to ICC box

I will send a revised version as a postscript file for your entertainment.

Comments: I'm not quite happy with the dotted link between the Co-Is box and the ICC. There are plenty of other such links that could equally well be included but are not (e.g. between Instrument Scientist and Calibration Facility) . . . but never mind - if this version is acceptable to everyone then let's settle on it.

Note: For your information, this is what the LWS proposal (from a similar international consortium) had:

- PI

- CoIs (19 of them)
- LWS Project Manager
- LWS Project Scientist (from UK)
- 3 National Project Managers (UK, Fr, It)
- 3 National Project Scientists (UK, Fr, It)
  [UK one = LWS Project Scientist]
- 7 Institution Project Managers
- 7 Institution Instrument Scientists (sub-set of the Co-Is)

My proposed model is basically the same except:

(i) National project managers are not explicitly included
(but there is no reason why they should not be)

(ii) Institution instrument scientists are not included
(again, it would be reasonable to incorporate them)

ICC issues:
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* We should plan to provide a powerful Interactive Analysis package to users together with processed/calibrated data, to allow them to do their own processing on (close to) raw data.

* We may need to negotiate with ESA on the application of ESA software standards to internal ICC software

* Gemini software standards are similar/related to those used by ESA. It would be useful to see what how they are operated (GSW to investigate).

* The proposed ICC model was agreed in principle:

  - Operations Centre at RAL (sole interface with ESA/MOC)
  - Distributed Data Processing Software provision
    - Centres at IC and CEA
    - Participation in Data Proc. S/W by other BOL institutions
  - Operations Manager in charge of Operations Centre
  - "Scientific Board or Directorate" in charge of co-ordination and management of Data Proc. S/W provision
  - Clear division of work and responsibilities must be devised for the Data Proc. S/W provision. This will require careful definition and allocation of work-packages
  - UK and France both have strong interest in both imaging and spectroscopic data analysis
  - There is scope for devolving some activities from Ops. Centre to Data Proc. S/W Centres (e.g., Trend Analysis; parts of Calibration)
  - This model differs from what is implied in the AO: we will need to explain convincingly in the proposal why we believe it to be better.

* ICC manpower requirements

  - Requirements as specified in KJK's spreadsheet:

    Approx. 60 SY up to 2006
    Approx. 12 SY/year after that

  - These figures may need revision to incorporate additional effort needed to cater for data proc. S/W provision (MRR and KJK to produce revised veraion)

* Manpower capabilities in participating nations:

Note: These figures below are (i) based on my imperfect notes; (ii) are to be regarded as informal and indicative only.

France:
- Approx. 6 - 7 FTE (full-time equivalent) available from around 2 years before launch
- Around 2 FTE prior to that
- Ability to provide 1 FTE to Operations Centre

Italy:
- 3-6 FTE can be provided covering all three instruments
- Possibilities of Italian concentration on areas of commonality with the other instruments

Sweden:
- 1 or 2 FTE can be available for ICC work

UK:
- Bulk of Operations Centre manpower
- High level of Data-Proc. Manpower
- Capabilities in terms of staff effort to be defined in forthcoming UK review

Other possibilities (not discussed at the meeting):

USA:
- I will talk with Andre Lange about this next week
- I hope they will be able/willing to make a modest contribution to the ICC through staff secondment

Spain:
- To be discussed with Ismael Perez-Fournon

AO Response:
==========

- Proposed basic page division and coordination is agreed
- Additional group, coordinated by KJK is needed to prepare the draft SIP.
- Deadlines need to be established for first drafts: to be specified by the respective co-ordinators
- Data Reduction and Scientific Analysis plan:
  - This should also include a description of the consortium's plan for science exploitation. Some input from the Scientific Case Team will be needed for this.
- Funding proposal:
  - CNES policy is to commit to carrying out tasks not to a certain budget
  - The level of detail specified by ESA in AO is probably much greater than will be possible (and ESA probably understand this)

BOL Co-Investigators and Associate Scientists:
==========

The principles summarised on the viewgraph were agreed with some modifications. Below is a revised version of the criteria based on the discussion.

Co-Investigators

- Shall represent institutes which have hardware or ICC responsibilities
- Shall be senior scientists in those institutes
- Shall have corresponding obligations to the BOL consortium
- Shall have access to Guaranteed Time data in recognition of these duties
- Recommendation: Normally, there will be a maximum of 2 Co-Is

per institute

Associate Scientists

- Shall contribute to the BOL project either:
  - by playing a significant role in the project work at Co-I institutes

    or

  - by being involved in formulating the scientific case for the BOL or the definition of the Guaranteed Time programme
- Shall not have any formal obligations to the BOL consortium
- Shall have access to Guaranteed Time data in keeping with the magnitude of their contribution to the project
- Flexibility: New associates can be appointed as the project progresses

CONFIDENTIAL Revised draft list of co-investigators:

Arcetri		Gianni Tofani
Caltech		Jamie Bock
		Andrew Lange
CEA, Grenoble		Lionel Duband (if He-3 fridge)
CEA, Saclay		Laurent Vigroux
		Louis Rodriguez
CRTBT, Grenoble		Alain Benoit (if dilution fridge)
IAS		Francois Pajot
		Jean-Michel Lamarre
IC		Michael Rowan-Robinson
		Tim Sumner
IFSI		Paolo Saraceno
		Ricardo Ceruli
LAS/Obs. Marseille		Jean-Paul Baluteau
		Kjetil Dohlen
MSSL		Walter Gear
		Ian Hepburn
NASA, Goddard		Harvey Moseley
Padua		TBD
QMW		Matt Griffin
		Peter Ade
		One other (TBC)
RAL	Two of:	Bruce Swinyard
		Roger Emery
		Ken King
ROE		Colin Cunningham
		Gillian Wright
Stockholm		Göran Olofsson
Total: 26		France 7
		UK 11
		Italy 4
		Swe 1
		USA 3

Additional possibilities:	Canada	David Naylor
		Gary Davis
	Spain	Ismael Perez-Fournon

Notes:

(i) Names of Co-Is representing IAS should be checked with Jean-Loup Puget.

(ii) Marseille Co-Is: should be checked with Jean-Paul Baluteau

(iii) Walter Gear to confirm MSSL Co-Is

(iv) Possibility of additional Co-I from QMW (since MJG busy with PI role): MJG + Peter Ade to consider

(vi) Possibly only 2 Co-Is from RAL: RJE and KJK to consider

Comments: - I think we should not let the number get much bigger
- France seems relatively under-represented now

CONFIDENTIAL Revised list of Associate Scientists:

Philippe Andre
Mike Barlow
Francois Bouchet
Bruno Carli
Pierre Cox
Anna Di Giorgio
Andreas Efstathiou
Jim Emerson
Alberto Franceschini
Andy Lawrence
Emmanuel Lellouch
Bruno Maffei
Suzanne Madden
Felix Mirabel
Ramon Nartallo
Seb Oliver
Reanto Orfei
Jean-Loup Puget
Marc Sauvage
. . . + Others to be added

Notes:

(i) No problem in principle with having a large number of associates.

(ii) However, associates are expected to participate actively in the project, so should not be added arbitrarily
==========

BOL Co-Investigators and Associate Scientists

Co-Investigators

- Shall represent institutes which have hardware or ICC responsibilities
- Shall be senior ~~astronomers or engineers~~ scientists in those institutes
- Shall have corresponding obligations to the BOL consortium
- Shall have ~~an automatic right~~ access to Guaranteed Time data in recognition of these duties
- Recommendation: Maximum of ~~3~~ 2 Co-Is per institute

Associate Scientists

- Shall contribute to the BOL project either:
  - by playing a significant role in the project work at Co-I institutes or
  - by being involved in formulating the scientific case for the BOL or the definition of the Guaranteed Time programme
- Shall not have any formal obligations to the BOL consortium
- Shall have ~~rights~~ access to Guaranteed Time in keeping with the magnitude of their contribution to the project
- Flexibility: New associates can be appointed as the project progresses

Draft list of BOL Co-Investigators

CONFIDENTIAL

1.	Caltech	Jamie Bock
2.		Andrew Lange
3.	CEA, Grenoble	Lionel Duband
4.	CEA, Saclay	Laurent Vigroux
5.		Louis Rodriguez
6.	CRTBT, Grenoble	Alain Benoit
7.	IAS	Francois Pajot — HFI Calibration Facility
8.		Jean-Michel Lamarre
9.	IC	Michael Rowan-Robinson
10.		Tim Sumner
11.	IFSI	Paolo Saraceno
12.		Renato Orfei
13.		Gianni Tofani
14.	LAS/Obs. Marseille	Jean-Paul Baluteau
15.		Kjetil Dohlen
16.	MSSL	Walter Gear
17.		Ian Hepburn
18.	NASA, Goddard	Harvey Moseley
19.	QMW	Matt Griffin
20.		Peter Ade
21.	RAL	Bruce Swinyard
22.		Roger Emery
23.		Ken King
24.	ROE	Colin Cunningham
25.		Gillian Wright
26.	Stockholm	Göran Olofsson

France	8
It	3
Swe	1
UK	11
USA	3

Possibilities:

Canada	David Naylor
	Gary Davis
Spain	Ismael Perez-Fournon

Draft list of initial BOL Associate Scientists

CONFIDENTIAL

1. Philippe André CEA
2. Mike Barlow UCL
3. Francois Bouchet
4. Bruno Carli IROE, Florence
5. Pierre Cox IAS
6. Jim Emerson QMW
7. Alberto Franceschini
8. Andy Lawrence U of Edinburgh
9. Emmanuel Lellouch
10. Bruno Maffei QMW
11. Suzanne Madden
12. Felix Mirabel
13. Ramon Nartallo QMW
14. Jean-Loup Puget
15. Marc Sauvage CEA
16. ~~IC1~~ S. Oliver
17. ~~IC2~~ A. Efstathiou
18. Etc.

BOL ICC Meeting, Imperial College, Oct. 10 1997

Aims of this meeting:

1. Review AO requirements for delivery of the ICC
2. Consider a first-cut estimate of the manpower requirements
3. Establish the essential features of the BOL ICC organisational and management structure
4. Establish how the ICC work should be distributed amongst the participating institutes and nations
5. Reach an agreement on how to proceed with definition of the ICC for the AO response

Agenda

1.	Introduction and agenda	10:30	Griffin
2.	AO Schedule	10:45	King
3.	BOL management structure	11:00	Griffin
4.	The Instrument Control Centre		King
	- AO and SIRD requirements	11:30	
	- Division of the work	12:00	
	- Work-packages		
	- Operations Centre		
	- Data processing definition and S/W		
	- Manpower needed to deliver the ICC		
5.	Lunch	13:00	
6.	Proposed plan for the ICC	14:00	King
7.	Discussion	14:30	All
8.	Agreement on base-line scheme		
	- ICC structure		
	- Division of work (staff effort) by country		
	- Division of work by Institution		
9.	AO response format (H/W + ICC)	16:00	Griffin
10.	BOL Co-Investigators and Associate Scientists	16:30	Griffin
	- Principles		
	- Draft list of Co-Investigators and Associates		

AO Response Format

- Part 1: Scientific and Technical Plan
  - 100 pages max. (excluding Cover page, Table of contents, Executive summary) [12-point typeface]
- Part 2: IID-B
- Part 3: Funding proposal
- Draft SIP

1: Scientific and Technical Plan

1. Cover page
2. Executive summary — MJG
3. Table of contents
4. Scientific objectives and capabilities — 20 pages — MJG +
5. Technical description — 25 pages — BMS
   - Instrument design
   - Compatibility with IID-A technical constraints
   - Design options
   - Instrument lifetime, reliability, redundancy
   - Status of key technologies
   - Development risks and options
   - Operating modes (max. 3 - 5)
5. Data reduction and scientific analysis plans — 20 pages — KJK
   - ICC detailed description
     - Means of fulfilling SIRD requirements
     - Justification of deviations from SIRD and SMP
     - Technical description
     - Infrastructure and hardware configuration
     - Management
   - Programme
     - Development
     - Operations
     - Resources
     - Schedule

     Include Red Source
   - Commonality between Operations and Instrument Testing

6. Test and calibration plans — 6 pages — BMS

- Ground tests
  - Subsystem-level tests
  - Instrument-level tests
  - Test and calibration facility
- Pre-launch tests
  - Satellite-level tests
- In-Orbit tests

7. System-level Assembly, Integration and Verification — 4 pages — BMS

- Compliance with satellite AIV plans
- Services required from launch vehicle

8. Flight operations — 3 pages — WKG

- Operational concept
  - Calibrations
  - Mode changes
- Requirements for flight operations support

9. Qualification and experience of PI team — 4 pages — MJG

- Experience of PI, Co-Is, key technical personnel

10. Organisation and management structure of PI consortium — 6 pages — MJG, LV

- Functional organisational chart
- Management structure and organisation
  - Instrument development phase
  - ICC development phase
  - Post-launch operations
- Management organogram
- Names/experience of Project Manager and key personnel
- Post-operations phase
- Archive phase

Total no. pages above = 88 (margin of 12 pages)

2: Instrument Interface Document (IID-B)

CRC

Contents

- System requirements
- Interface requirements
- Ground support equipment
- Development and verification
- Testing and operations
- Product assurance
- Programme, schedule and management

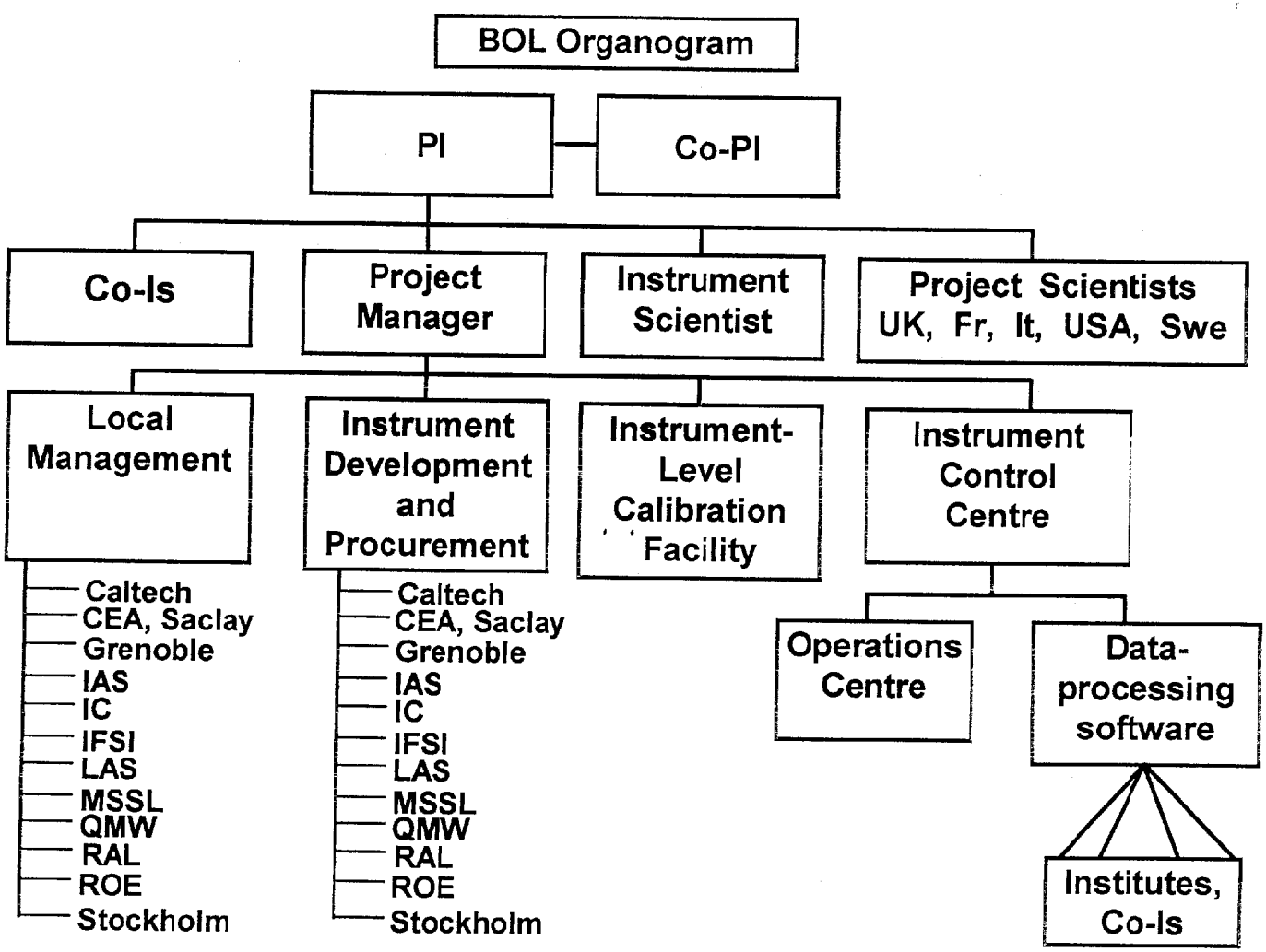
Status

- Detailed BOL Draft has already been drawn up with ESTEC project team
- Some sections are as yet blank
- Whole document must be completed with reliable and up-to-date figures and information

3: Funding Proposal

MJG, LV, PS, GO, AEL

- PI resource provision and funding status
- Co-I resources and funding
  - For each Co-I: Details of estimated resources under three headings:
    - Instrument development
      - Internal staff resources
      - Internal institute resources
      - External contracts
      - Total funding requirements
    - ICC development
      - Internal staff resources
      - Internal institute resources
      - External contracts
      - Total funding requirements
    - Post-launch operations
      - Internal staff resources
      - Internal institute resources
      - External contracts
      - Total funding requirements
    - Justification and status
      - Funding sources (national agencies)
      - Status of funding


BOL Organogram
PI
Co-PI
Co-Is
Project Manager
Instrument Scientist
Project Scientists UK, Fr, It, USA, Swe
Local Management
Instrument Development and Procurement
Instrument-Level Calibration Facility
Instrument Control Centre
Caltech
CEA, Saclay
Grenoble
IAS
IC
IFSI
LAS
MSSL
QMW
RAL
ROE
Stockholm
Caltech
CEA, Saclay
Grenoble
IAS
IC
IFSI
LAS
MSSL
QMW
RAL
ROE
Stockholm
Operations Centre
Data-processing software
Institutes, Co-Is

AO Schedule

AO Issued	30 Sept 1997 (5 Oct 1997)
Management Team Meeting #1	20 Oct 1997
FTS Design Splinter Meeting	28 Oct 1997 (QMW) ?
Detector Array Meeting	29-30 Oct 1997
Questions for Clarification due	31 Oct 1997
Scientific Case Team Meeting #1	6 Nov 1997 (QMW) ?
Management Team Meeting #2	} IC
Clarification Preparation Meeting	7 Nov 1998 (QMW) }
Technical Team Meeting #1	12 Nov (Paris) Saclay
AO Clarification Meeting	3 Dec 1997
Scientific Case Team Meeting #2	5 Dec 1997 (Paris)
Consortium Meeting	8-9 Jan 1998 (Italy, TBC) Florence
Management Team Meeting #3	
Scientific Case Team Meeting #3	21 Jan 1998 (London, ~~RAS~~) QMW
Management Team Meeting #4	26 Jan 1998 (London, TBC) or RAS
Proposals Due	16 Feb 1998
Evaluation Phase	Feb - May 1998
Clarification Meetings	Mar - Apr 1998
Recommendation by Evaluation Committee	End Apr 1998
AWG/SSAC Review	May 1998
Preselection of PIs by SPC	28 May 1998
SPC Confirmation of Payload	Feb 1999

Responsibilities of the PI

Defined in the Science Management Plan under the headings:

- **Management**
  Consortium Organisation
  Reporting to ESA
- **Product Assurance**
  Response in Scientific and Technical Plan

- **Scientific**
  Attend FIRST Science Team
  Calibration
  Definition of FIRST Observing Plan
  Exploit Scientific Results
  Support ESA Public Relations
  Response ???

- **Instrument Hardware**
- **Instrument Software**
  Requirements defined in Instrument Interface Document (IID) Part A
  Response in IID Part B

- **ICC Hardware**
- **ICC Software**
- **Operations**
- **Relation with Scientific Users Community**
  Requirements defined in Science Operations Requirements Document (SIRD)
  Response in Science Implementation Plan (SIP)

- **Financial**
  Response in Funding Proposal

<u>The ICC as defined in the SIRD does not address the exploitation of scientific results</u>

ICC Requirements

The SIRD identifies the following areas to be addressed:

ICC Development

1. **Science Related Inputs**
2. **Instrument Information**
3. **Management**
4. **Software Development**
5. **ICC Operations Preparation**

ICC Operations

1. **Management**
2. **Software Maintenance**
3. **ICC Operations**
4. **Facilities Maintenance**
5. **Consortium Support**

ICC Development

1. Science related inputs

Calibration inputs:

- In-flight calibration plan - ground calibration addressed as part of the instrument build
- Inputs to FSC Calibration Programme
- Provision of Calibration Database - ground calibration data, calibration files

2. Instrument Information

Instrument Users Manual

Instrument Database

- Definition of TM/TC Packet structure
- Provision of Instrument Database - parameters, conversions, limits etc
- Definition of Health and Safety Parameters - limits
- Provision of OBS images
-

Definition of Instrument Observations

- Definition of Modes and AOTs
- Implementation of Observations (in Command Translator?)
- Definition of 'Transparent Data'
- Definition of Instrument Command Sequences

Definition of Instrument Operating Procedures

- Definition of Permanent Command Sequences - used by MOC
- Nominal Procedures - activate, deactivate, calibrate, observing ,OBS update etc.
- Contingency Procedures - reset, switch off, select redundancy, recovery

ICC Development

3. Management

Planning
- Provision of SIP
- Definition of Interfaces with FSC/MOC
- Definition of ICC documentation

Control of Schedule
- Reporting to ESA

Ground Segment Meetings
- Ground Segment Reviews - 6 identified in SIRD
- Ground Segment Advisory Group (GSAG)
- Commonality Working Group (CWG)

Product/Quality Assurance
- QA Plan
- Setup Configuration Control System (using FINDAS?)
- Setup Change Control System
- Execute Change Control

Team Setup and Management

ICC Development

4. Software Devlopment (1)
The following systems are identified

Instrument Time Estimator

- Provided to FSC
- User Astronomical input ⇒ Simulation of Observations ⇒ Time + expected results (S/N etc)

Instrument Command Translator

- Provided to MOC
- Definition not clear - converts symbolic 'instrument command language' into binary patterns for MOC to uplink
- Does this implement full instrument language for designing test scripts, AOTs, special observations? - if not another system is required.

RTA/QLA

- Used in Ground Testing, ICC and MOC
- Real Time Assessment - monitoring telemetry correctness, parameter changes, limits, command verification ⇒ Log
- Quick Look Analysis - conversion to engineering units, display of instrument data (detectors, mechanisms) against time, mechanism position, spectra. Monitoring instrument operations ⇒ Log
- Required early for use with EGSE - the only means to display instrument output at this time.
- Used for instrument checkout in Commissioning Phase

ICC Development

4. Software Development (2)

Trend Analysis

- Used in ICC
- Extracts data from instrument housekeeping - run regularly on each days data
- Displays changes in parameters as a function of time, configuration etc.

Calibration Analysis

- Used in ICC
- Processes special calibration observations into cal data files
- Processes ordinary observation products into cal data files
- Processes cal data files into calibration files for delivery to FSC
- Generates trend files from cal data files and displays changes as a function of time, configuration etc (c.f. Trend Analysis)

Interactive Analysis

- Used to test processing algorithms
- Not deliverable (unless forms part of Science Processing Software)
- General data analysis system e.g. IDL

ICC Development

4. Software Development (3)

Science Processing Software

- Used in ICC, FSC (and by Observers?)
- Standard processing to validated science data through a series of modules.
- May be based on Interactive Analysis, but with fixed modules (interaction allowed?)

Science Analysis

- Used by Observers (and ICC?) - distributed by FSC?
- Allows manipulation of standard science data into scientifically useful products (Maps, Spectra)

Diagnostic Tools

- Used in ICC
- Built up through time as instrument is developed, tested and used
- Allows in depth investigation of instrument telemetry, data, etc.

ICC Development

4. Software Development (4)

General Comments:

A. Scope for common development

Between Instruments:

- Time Estimator - GUI (instruments want the same inputs for an observation), calculation (use of Command Translator engine).
- Command Translator - same scripting language, conversion to similar command format based on instrument database.
- RTA -works on common Telemetry Packet structure, uses common Instrument Database structure, ESA want same Log file format. - Available as ISO RTA/QLA?
- QLA uses input from RTA, similar display facilities required
- Science Processing - common environment with plug-in modules? Benefits FSC if they have to do the processing

Internally in Instrument Software:

- Extraction of data from telemetry packets into convenient form - used by RTA, Calibration Analysis, Interactive Analysis, Science Processing
- Cleaning data (deglitching etc.) and conversion to engineering units - used by QLA, Calibration Analysis , Interactive Analysis, Science Processing

B. ESA Software Engineering Standards

ALL software used by ICC/FSC/MOC must be developed using ESA Software Engineering Standards. (Modified for Small Projects)

Software Engineering Standards

	Major Activities	Deliverable Items	Reviews	Major Milestones
Initialisation	• Planning • Setup configuration Control Procedures	• SPMP • SCMP • SVVP		Project Start
User Requirements Phase	• Identify User Requirements • Determine Operational Environment	• URD • Plans Update		
UR Review			Technical Reviews	URD Approved
Software Requirements/ Architectural Design Phase	• Identification of Software Requirements • Construction of Model • Definition of Major components	• SSD • Plans Update	Walkthroughs Inspections	
SR/AD Review			Technical Reviews	SSD Approved
Detailed Design and Production Phase	• Module design • Coding • Unit Tests (80%Coverage) • Integration Tests • System Tests against SSD	• SUM • Code • Plans Update	Walkthroughs Inspections	
DD Review			Technical Reviews	SUM Approved Code Approved
Transfer Phase	• Installation • Provisional Acceptance Tests against URD	• STD		STD Delivered
Operations and Maintenance Phase	Final Acceptance Tests Operations Maintenance	• PHD		PHD Delivered
Repeat for each Delivery				

ICC Development

5. ICC Operations Preparation

Operations Planning
- Write ICC Operations Plan
- Write Science Validation Plan
- Definition of ICC Operations Procedures
- Definition of ICC/FSC/MOC Operational Interfaces

FINDAS Support
- Definition of FINDAS facilities, Interfaces
- Definition of Instrument Data Model

Training
- ICC Staff Training
- FSC/MOC Staff Training

Facilities
- ICC Infrastructure
  Assumed little cost
- ICC Hardware and System Support
  Development System + Operational System
- Comissioning Phase System
  System to run RTA/QLA in MOC
- Instrument Simulator
  Design and Build, Test, Deliver to MOC, Test in MOC
  Second model for use in ICC?
- On Board Software Maintenance Facility

Integration and Test
- ICC Integration Test - system validation
- ICC Operations Simulation
- Ground Segment Tests
  System Validation Tests, End-to End Tests, Simulations

ICC Operations

1. Management

Product/Quality Assurance
- Change Control
- Configuration Control

Operations Management
- Schedules

2. Software Maintenance

ICC Software Maintenance
- ESA Standards

OBS maintenance

Science Processing Software Maintenance
- Standard S/W maintenance - ESA Standards
- Science Validation - requires scientific input
- Delivery to FSC

ICC Operations

3. ICC Operations (1)

Support to MOC
- Commissioning and PV phases

Support to FSC
- Helpdesk support

Health and Status Monitoring

Performance Monitoring

Calibration Processing
- Generation of Calibration Files
- Maintenance of Calibration Database
- Cross Calibration

Trend Analysis

Diagnostics

Performance Maintenance
- Anomaly Analysis
- Simulation Tests

Ground Segment Interaction
- Reporting
- Data/Software Deliveries
- Provision of Uplink Requests

ICC Operations

3. ICC Operations (2)

Partner Mode Analysis

Serendipity Mode Analysis

Science Quality Checking
- Checking of selected observations
- Requires scientific input to specify what to look for

Science Support
- Support by consortium to ICC work e.g.
  Science Processing Software Validation
  Science Quality Checking

4. Facilities Maintenance
- Infrastructure
- Hardware
- System Mangement

5. Consortium Support

Support to CoI's investigations

ICC Development Summary

WBS	Task_Name	1998	1999	2000	2001	2002	2003	2004	2005	Cost SY	Cost £K	Requirement(s)
4	**ICC Development**											
4.1	**Science**											
4.1.1	Calibration		0.30	0.05	0.05	0.05	0.05	0.25	0.25	**1.00**		ICCF-135,ICCF-140,ICCF-145
4.2	**Instrument Operations**											
4.2.1	Provision of Instrumment Users Manual							1.00		**1.00**		ICCF-090
4.2.2	Provision of Instrument Database			0.50	0.10	0.10	0.10	0.30	0.10	**1.20**		ICCF-050,ICCF-075,ICCF-085,ICCF-0160
4.2.3	Definition of Instrument Observations			0.25	0.35	0.65	0.70	0.80	0.25	**3.00**		ICCF-055,ICCF-060,ICCF-070,ICCF-080
4.2.4	Definition of Operating Procedures							1.50		**1.50**		ICCF-065,ICCF-095,ICCF-100
4.3	**Management**											
4.3.1	Planning	0.35	0.05	0.03	0.03	0.03	0.03	0.03	0.03	**0.55**		ICCF-005,010,025,040,PAQA-010,MNGT-010,011,025
4.3.2	Control and Maintenance of ICC Shedule	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	**0.80**		ICCF-020,MNGT-024
4.3.3	Support to Ground Segment Meetings			0.10	0.10	0.10	0.10	0.10	0.10	**0.60**		ICCF-030,ICCF-035,MNGT-022,MNGT-023
4.3.4	Product/Quality Assurance	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	**0.80**		ICCF-180,185,190,PAQA-001,002,030,032,033
4.3.5	Team Setup and Management						0.30	0.30	0.50	**1.10**		ICCF-015,ICCO-005
4.4	**Software Development**											
4.4.1	Provision of Instrument Time Estimator (ITE)				0.20	0.20	0.35	0.10	0.10	**0.95**		ICCF-105,PAQA-011
4.4.2	Provision of Instrument Command Translator (ICT)				0.20	0.20	0.70	0.10	0.10	**1.30**		ICCF-110,PAQA-011
4.4.3	Provision of RTA/QLA		0.40	0.40	2.50	0.20	0.20	0.20	0.20	**4.10**		ICCF-130,PAQA-011
4.4.4	Provision of Trend Analysis (TA)				0.20	0.20	0.35	0.10	0.10	**0.95**		ICCF-130,PAQA-011
4.4.5	Provision of Calibration Analysis (CA)				0.30	0.40	2.00	0.50	0.50	**3.70**		ICCF-130,PAQA-011
4.4.6	Provision of Interactive Analysis (IA)				1.00	1.00	1.00	1.00	1.00	**5.00**		ICCF-130
4.4.7	Provision of Science Processing Software (SPS)				0.60	0.60	2.00	1.00	1.00	**5.20**		ICCF-130,PAQA-011
4.4.8	Provision of Science Analysis (SA)						0.70	1.50	1.00	**3.20**		ICCF-130,PAQA-011
4.4.9	Provision of Diagnostics Tools (DIAG)			0.10	0.10	0.20	0.35	0.20	0.20	**1.15**		ICCF-130,PAQA-011
4.5	**ICC Operations Preparation**											
4.5.1	Operations Planning				0.10	0.20	0.20	0.20	0.20	**0.90**		ICCF-115,ICCF-165,ICCF-170
4.5.2	FINDAS Support		0.10	0.10	0.10	0.10	0.10	0.10	0.10	**0.70**		ICCF-120,ICCF-125,ICCF-175
4.5.3	Training							0.25	0.25	**0.50**		ICCO-005,ICCO-010
4.5.4	Facilities											
4.5.4.1	*Provision of ICC Infrastructure*									**0.00**	**35.00**	ICCF-045
4.5.4.2	*ICC Hardware*		0.50	0.10	0.10	0.10	0.10	0.20	0.20	**1.30**	**150.00**	
4.5.4.3	*Commissioning Phase System*							0.20	0.05	**0.25**	**10.00**	ICCF-205
4.5.4.4	*Provision of Instrument Simulator*		0.20	0.20	0.40	1.50	0.50	0.25	0.25	**3.30**	**50.00**	ICCF-150
4.5.4.5	*Provision of On Board Software Maintenance Facility (OBSMF)*						0.40	0.35	0.10	**0.85**	**5.00**	ICCF-155
4.5.5	Integration and Tes						0.50	1.00	2.00	**3.50**		ICCF-195,ICCF-200,PAQA-020,,022,023,024,025,026
	Total	**0.55**	**1.75**	**2.03**	**6.53**	**6.03**	**10.93**	**11.73**	**8.78**	**48.40**	**250.00**	

ICC Operations Summary

WBS	Task_Name	2006	2007	2008	2009	2010	Cost SY	Cost $K	Requirement(s)
5	**ICC Operations**								
5.1	**Management**								
5.1.1	Product/Quality Assurance	0.50	0.50	0.50	0.50	0.50	**2.50**		PAQA-002,PAQA-030
5.1.2	Operations Management	0.50	0.50	0.50	0.50	0.50	**2.50**		MNGT-024
5.2	**Software Maintenance**								
5.2.1	ICC Software Maintenance	1.50	1.50	1.50	1.50	1.50	**7.50**		
5.2.2	OBS Maintenance	0.10	0.10	0.10	0.10	0.10	**0.50**		ICCO-020
5.2.3	Science Processing Software (SPS)								ICCO-065
5.2.3.1	*SPS Maintenance*	1.00	1.00	1.00	1.00	1.00	**5.00**		
5.2.3.2	*SPS Validation*	0.30	0.30	0.30	0.30	0.30	**1.50**		
5.3	**ICC Operations**								
5.3.1	Support to MOC	0.50					**0.50**		ICCO-015
5.3.2	Support to FSC	0.20	0.20	0.20	0.20	0.20	**1.00**		ICCO-025
5.3.3	Health and Status Monitoring	1.20	1.20	1.00	1.00	1.00	**5.40**		ICCO-035
5.3.4	Performance Monitoring	1.00	1.00	1.00	1.00	1.00	**5.00**		ICCO-040
5.3.5	Calibration	1.00	1.00	1.00	1.00	1.00	**5.00**		ICCO-050
5.3.6	Trend Analysis	0.50	0.50	0.50	0.50	0.50	**2.50**		ICCO-050
5.3.7	Diagnostics	0.50	0.20	0.20	0.20	0.20	**1.30**		ICCO-045
5.3.8	Performance Maintenance	0.20	0.20	0.20	0.20	0.20	**1.00**		ICCO-055 ICCO-075
5.3.9	Ground Segment Interaction	0.45	0.45	0.45	0.45	0.45	**2.25**		ICCO-030 ICCO-085
5.3.10	Parallel Mode Analysis	0.50	0.50	0.50	0.50	0.50	**2.50**		ICCO-060
5.3.11	Serendipity Mode Analysis	0.50	0.50	0.50	0.50	0.50	**2.50**		ICCO-060
5.3.12	Science Quality Checking	0.50	0.50	0.50	0.50	0.50	**2.50**		ICCO-070
5.3.13	Science Support	1.00	1.00	1.00	1.00	1.00	**5.00**		ICCO-065 ICCO-070
5.4	**Facilities Maintenance**	0.75	0.75	0.75	0.75	0.75	**3.75**	**70.00**	**ICCO-080**
5.5	**Consortium Support**	0.75	0.75	0.75	0.75	0.75	**3.75**		
	Total	12.7	11.9	11.7	11.7	11.7	**63.45**	**70.00**	

Plans for an ICC (1)

The ESA Ground Segment concept grew out of a desire to 'minimise the total overall operations effort (and thus cost)'.

1. It was seen as a way to retain the instrument expertise within the Ground Segment - *experts are reluctant to go to a central Science Centre and it is very difficult to transfer the expertise.*
2. It provides 'clear areas of responsibility and interfaces'
3. It gives strong incentives for the PI to consider the Operations and Data Processing requirements of the instrument from the beginning.
4. It 'minimises overheads and needs for infrastructure' - *(especially for ESA), assuming Institutes provide infrastructure for free.*

We could use similar reasons to argue for a **decentralised ICC**

1. It would allow retention of expertise - experts are reluctant to leave their institutes.
2. It is possible to provide clear areas of responsibility.
3. It gives strong incentives to CoIs to consider the instrument in the light of their data processing responsibilities.

But

ESA assumes a single ICC location

- Single Manager - AO
- Single Set of Interfaces - GSID
- Single Link to FSC (FINDAS) - GSID

They will require convincing that a distributed ICC is able to fulfill its responsibilities and can be managed.

Data Access

- ESA may be unhappy about allowing access to 'proprietary data' to more than one location.
- ESA assumes use of FINDAS for configuration control. This will require update access which ESA may not wish to give.

- We should attempt to make it appear as a single Centre

Plans for an ICC (2)

Costs

- A distributed ICC will require good communication between the different Centres (e.g. ISDN lines carrying internet traffic, video etc) and may need duplication of infrastructure, management, support staff, configuration control facilities, software and hardware.
- However, distributed Centres would reduce travel and subsistence costs for members of the ICC from outside the host nation.

- We should attempt to minimise any additional costs

Team Size

- Health and Status, Performance Monitoring and other operational tasks will require 7 day a week manning for the first year - at least two staff required to be trained for each task, in order to provide continuous cover.
- Need for mixture of expertise in operations team to respond to anomalies and make sensible day to day decisions.

- We need a realistically sized team for routine ICC Operations

Plans for an ICC (3)

A single Operations Centre located at RAL

Responsible for

ICC Management, Confirguration Control
Interfaces to ESA - Deliveries, FINDAS
Software Maintenance (Ops S/W + OBS)
Support to PV and Commisioning Phase
Day to day processing of instrument data

- Health and Status Monitoring
- Performance Monitoring
- Calibration
- Trend Analysis
- Quality Checking

Performance Maintenance

Team:

Manager
Instrument Expert
Calibration Expert
Operations Expert (0.5)
S/W Engineer (2)
Operations Staff (2)

Plans for an ICC (4)

Additional Data Processing Centre(s) location(s) TBD

Responsible for

Interactive Analysis Software
- Development
- Maintenance

Science Processing Software
- Development
- Maintenance
- Scientific Validation

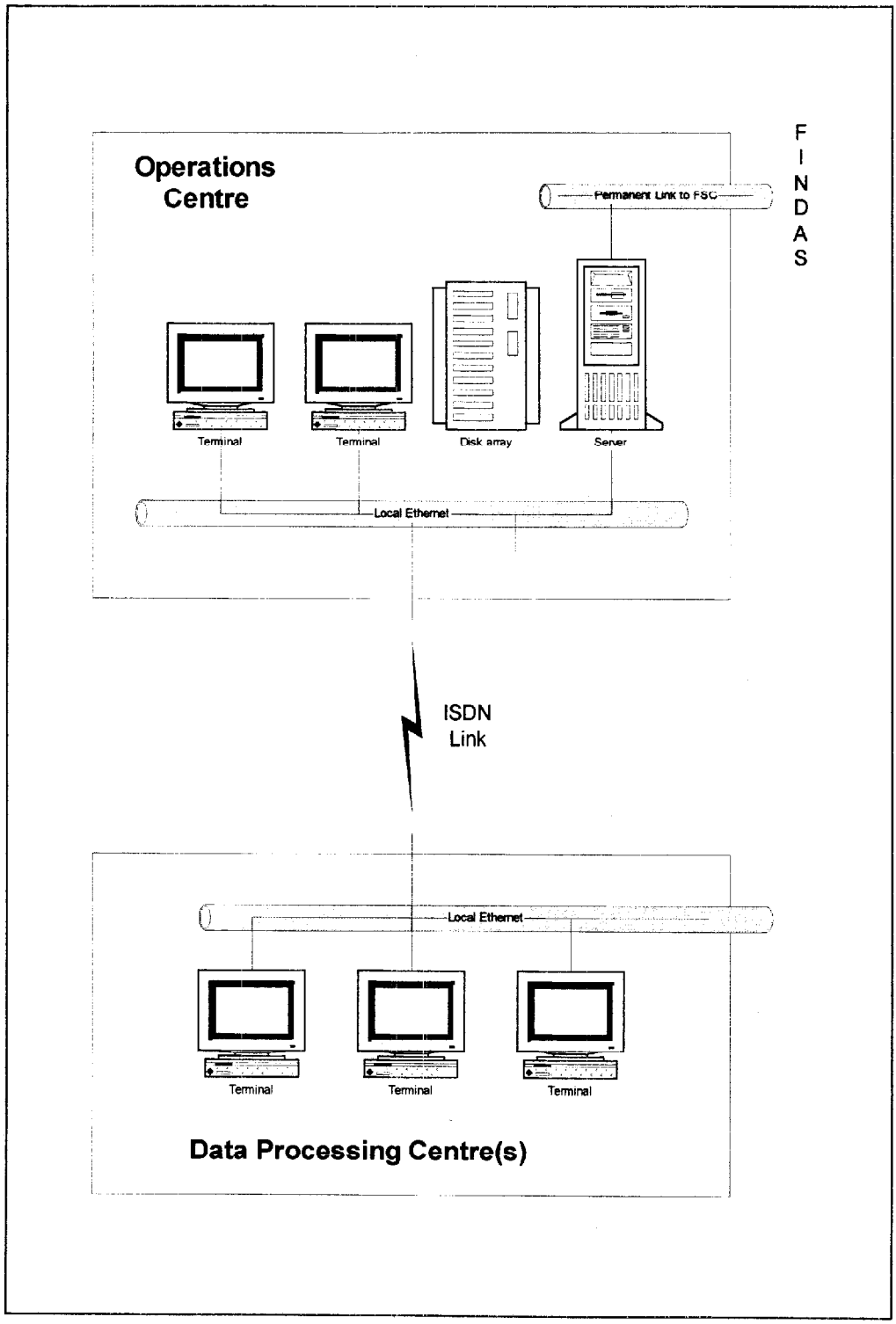
Science Analysis Software
- Development
- Maintenance

Partner Mode Analysis
- Development
- Maintenance
- Generation of Products

Serendipity Mode Analysis
- Development
- Maintenance
- Generation of Products

Science Support to Ops Centre

Consortium Support


Operations Centre
Permanent Link to FSC
FINDAS
Terminal
Terminal
Disk array
Server
Local Ethernet
ISDN Link
Local Ethernet
Terminal
Terminal
Terminal
Data Processing Centre(s)