FINDAS-IDIS CWG

FINDAS-IDIS Commonality WG Mtg1 (CWG6_1) - Minutes of Meeting

held at ESTEC, Noordwijk, 02 February 1999 09.00-18.00 hours

1. Welcome and presentation of members

The following members were present:

Pierre Estaria (PE), ESA(SPD)
Jan Tauber (JT), ESA(SSD)
Richard Gispert (RG), IAS(HFI)
Otto Bauer (OB), MPE(PACS)
Rik Huygen (RH), K.U.L.(PACS)
Bart VandenBussche (BV), K.U.L.(PACS)
Jean-Jacques Mathieu (JJM), ESA(TOS-EMS)
Trevor Dimbylow (TD), RAL(SPIRE)
Neal Todd (NT), Imperial College(SPIRE)
Fabio Pasian (FP), (OAT/LFI)
William O'Mullane (WOM), ESA(SSD)
Adam Hazell (AH), ESA(SSD)
Erich Wiezorrek (EW), MPE(PACS)
Peter Claes (PC), ESA(SSD)

Excused were :

Göran Pilbratt (GP), ESA(SSD)
Kevin Bennet (KB), ESA(SSD)
Peter Roelfsema (PR), SRON(HIFI)
Paola Andreani (PA), MPE(PACS)

The chairman (PC) welcomed everyone on the first FINDAS-IDIS Commonality WG meeting (COMM6_1). No HIFI-representatives were present as the CWG members of HIFI were on mission to JPL.

The viewgraphs presented at the meeting are attached to the minutes.

2. Agenda and objectives of the meeting (PC)

A. Agenda

1. Introduction (10 min) (PC) (9.05 - 9.15 am)

2. Status of FINDAS-prototype (10-15 min) (PE) (9.15 - 9.30 am)

3. Development goals, strategies and phases for FINDAS prototype clients (20 minutes + 10 min discussion) (PC) (9.30 - 10.00 am)

4. Presentation of the ESTEC-client (15 min + 15 min discussion) (JJM) (10.15 - 10.45 am)

5. Presentation of the potential FSC-client (15 min + 15 min discussion) (PC) (10.45 - 11.15 am)

6. Presentation of the potential SPIRE client(s) (15 min + 15 min discussion) (ICC) (11.15 - 11.45 am)

7. Presentation of the potential PACS client(s) (15 min + 15 min discussion) (ICC) (11.45 - 12.15 am)

8. Presentation of the potential HIFI client(s) (15 min + 15 min discussion) (ICC) (12.15 - 12.45 am)

9. Presentation of the potential HFI/LFI client(s) (15 min + 30 min discussion) (DPC or ESA/SA)

(2.00 - 2.45 pm)

10. Integration at and Support from ESTEC (+ schedule)(20 min) (JJM) (2.45 - 3.05 pm)

11. Discussion and Selection of clients to be developed (ALL) (20 min) (3.15 - 3.35 pm)

12. FSC-preparations for the development of the Ground Segment/ FINDAS (+ schedule)(20min)(PC)

(3.35 - 3.55 pm)

13. Commonality of OO-business model (including interfaces level 1 (telemetry, telecommanding) and level 4 (Pipeline))(PC+WOL) + discussion (ALL)(45 min) (4.00 - 4.45 pm)

14. Potential of other types of commonality of FINDAS/IDIS and FIRST/Planck GS (networks, ODBMSs, software infrastructure, CMS, procedures, management and approach) (PC+A Hazell) + discussion (ALL) (30 min) (4.45 - 5.15 pm)

15. Actions and next meeting-dates (20 min) (5.15 - 5.35 pm)

16. AOB (5 min) (5.35 - 5.40 pm)

B. Objectives of the meeting

1. to establish goals for the prototype testing : what must we learn from the prototype to have confidence that the full system (i) is a good idea, (ii) can be developed without undue cost and risk

2. strategies and phases for client-development

3. learn from the experience of the 1st ESTEC-client-integration with the O2-database(JJM)

4. motivate other groups to implement clients as well

5. get a good view about the subject area and development methodology of the various clients of the prototype and discuss the proposals

6. presentation of integration and support from ESTEC

7. proposal for FSC-preparations for the Development of the Ground Segment/FINDAS (SIP-related)

8. presentation of opportunities for commonality of the OO-business model between FIRST and Planck

9. discussion of potential for other types of commonality between the two missions

3. status of FINDAS (PE)

Pierre Estaria explained the status of the FINDAS-prototype development as of today.

A new progress report is available in which is stated that Vega has installed a new version of the O2-ODBMS.

This new version did not solve some of the problems they still observed with the system.

The progress report mentions some problems that are remaining with the Ardent COTS-products.

All developed components have been placed under configuration control within the Workshop Teamware environment.

Vega continued to develop the FINDAS Infrastructure libraries and Prototype Demonstration Scenarios.. The prototype will be delivered the 20th and the 21st of April.

They will deliver on the 21st of April system spec, programmes (source code) and overall concept for the entire post prototype system. They will make a system recommendation and design recommendation for the operational system.

The final delivery could not be postponed more, otherwise the warranty period would overlap with the summer holidays.

DPCs and ICCs should send representatives to this meeting and let PE know who comes.

PE mentioned the following upcoming meetings of relevance to FINDAS-IDIS or FIRST-Planck commonality :

a. commonality workgroup meeting 4 : 10th February.

b. commonality workgroup meeting 1 and 2 : 3th March.

c. commonality steering group meeting : 16th of March.

d. overall GSAG meeting the 17th of March.

e. technical meeting with Vega in March one month before prototype delivery.

main themes of the FINDAS final presentation

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a. history

b. demo

c. proposal for operational system architecture

Action 1: DPCs and ICCs to prepare a list of people who will be present at the prototype delivery meeting, and send this list to PE.

Action 2: All CWG members to suggest how the VEGA final presentation at prototype delivery should be structured (main themes and additional items) and send this information to PE, JJM.

4. Goals, strategy and phases of client development (PC)

PC explained the goals and what we want to achieve by developing FINDAS-prototype clients.

The many different architectures for development were described and their advantages/drawbacks.

PC outlined the different steps to be followed for client development.

He mentioned briefly the differences between O2 and Objectivity.

PC pointed out that the availability of OQL (an ODMG-standard) is one of the strengths of the O2-ODBMS.

WOM explained the differences between OQL and extended SQL, but stressed that the capabilities are very similar. WOM also mentioned that the Objectivity-database is widely used at locations where very high datavolumes are a requirement such as CERN and at ESO.

PE pointed out that it is strongly recommended to use the FINDAS Infrastructure libraries as integral part of FINDAS-subsytem development. At a first development phase they can be left out for the sake of simplicity but they should be included in the final version of a prototype-client.

PE requested the ICCs whether they have enough manpower to develop a client, to prepare a schedule and plan of manpower deployment.

Action 3: ICCs and DPCs to present a schedule and plan of available manpower for client development and integration and send it to PC, PE, JJM.

OB made it clear that training is absolutely needed for his people. He would like to send his people to an O2-course and get additional training from VEGA.

Action 4: PE to discuss with VEGA the conditions for a training course on client-integration and a possible splitting of the warranty period.

Action 5: BV, OB to draft a list of items which are wanted to be included in a course to be organised by VEGA about client-integration and send this list to PE.

Action 6: JJM to request to Ardent and circulate to all the next date of O2-courses.

The following book is essential to understand the ODMG-standard and the way applications are integrated with an ODBMS : *"Object Database Standard: ODMG 2.0*, R.G.G. Cattell et al., 1997, Morgan and Kaufmann.

5. ESTEC client (JJM)

JJM gave a presentation of his client-application which was integrated at Vega with the O2-ODBMS last december. There was however no time to integrate the client as well with the FINDAS Infrastructure Libraries as developed by Vega. JJM stressed the importance of examining granularity and efficiency of transfer. Transfer times could quickly rise in a 3-tier architecture if the design is not carefully chosen.

The importance of a clean architecture with layers like the International Standards Organisation (OSI)-model, was outlined. He asked also to be cautious with WWW-applications. The WWW is made for output, displaying information, and is not so suitable for extensive processing.

JJM mentioned the problems he experienced in using freeware CORBA in the same architecture together-with commercial CORBA. He experienced incompatibilities between libraries and a lot of difficulties to get

both environments working together as well as a lack of the very much needed support in the case of free-ware CORBA.

RH asked how much time the overall development of this client took.

JJM said it was about 2 months.

6. FSC client (PC)

PC presented his plans for client development in all its phases and compared the benefits/drawbacks of RMI versus CORBA as well. The overall theme of the client will be Proposal Handling.

PC stressed as a general remark on client development that it is not the purpose to develop a sophisticated client for prototype testing but that it is more important to test interfaces and the capabilities of the ODBMS.

7. SPIRE client (TD)

TD realised that training is really needed and asked whether it is not possible to extend the warranty period.

He presented an application where a RTA client would be wrapped in IDL.

8. PACS client (BV)

BV presented in all the details a Real Time Assessment-client to be integrated with the FINDAS-prototype including a preliminary class diagram. BV also requested to get a course from VEGA about how to integrate a

client and stressed that commonality within the FIRST Ground Segment such as commonality between the OO-models developed by the different development groups of the Ground Segment is important and is needed fairly early on. In March a decision about the choice of implementation language for the client will be taken.

The operational client must be ready by March 2001 (first ILT phase)

BV and OB pointed out that there is a problem with the definition of the telemetry and telecommanding packets.

The details of telemetry and telecommanding packets are documented by the MOC.

PE mentioned that the MOC only exists from phase-B onwards.

PE mentioned that INTEGRAL will use SCOS-2000 and suggested FIRST and Planck should do the same.

Action 7: PE to request via Serge Valera a demo on the MOC's system SCOS2000.

9. HIFI client (not presented)

HIFI has no manpower (budget) to develop a prototype client themselves, but will be involved by contributing to the clients of the other ICCs.

Action 8: PR to write down an official statement/description by HIFI where its contribution/responsabilities for FINDAS-prototype client development are.

10. HFI/LFI client (WOM, AHA)

WOM presented the design methodology that has been followed in the Planck project so far. I.e. the interfaces approach to data management. AHA presented the four HFI/LFI-clients, including a development plan for it. The four clients are a “MPA prototype pipeline”- client, a FITS client, a “map viewer”- client and a “local map simulations software”- client.

The approach is strongly JAVA-based and will be implemented interfacing with an Objectivity-ODBMS and later on with the O2-ODBMS.

Details are outlined in the attached viewgraphs.

11. Integration at and Support from ESTEC (JJM)

JJM explained the plan and schedule for integration of ICC/DPC FINDAS-clients at ESTEC.

OB proposed to add one day to the FINDAS-prototype delivery presentation for having a course given by VEGA about how to integrate a client-application.

12. Discussion (All)

All the clients were accepted as they test different aspects of the system and will implement different subject areas of the Ground Segment. There is no duplication.

SPIRE proposed to integrate its client by the 1st week of July.

JJM pointed out that everyone should contribute to the FINDAS-tutorial with lessons learnt and problems encountered as well as with a complete presentation of their client from conceptual phase to full development phase.

It was noted that not everybody yet has access to DMS.

Action 9: ICCs to consult the Tutorial for FINDAS-prototype client development as it contains a lot of useful information.

Action 10: SPIRE/PACS/HIFI to prepare a list of people in the institutes who must have access to DMS, to be sent to WOM/JJM.

It would be very useful if some studies were performed on the influence of granularity on performance for communication in a 3-tier architecture.

A good test would also be at a later stage to let two clients communicate with each other.

JJM proposed to use the same telemetry packages as Vega to test the RTA-client.

Action 11: JJM/WOM/AHA to ensure that all CWG-members have access to all the relevant DMS-domains.

Action 12: JJM/WOM to make available to all members a list of documents under DMS of great help to client development. This list should include the VEGA-document where the working-environment for client-integration is outlined (directory-structure, configuration management, etc.)

13. FSC-future (post-prototype delivery phase) (PC)

PC presented his plan to organize an OO-ground segment as outlined in the FSC-SIP as well as FINDAS-related activities after prototype delivery. The role of the OO-librarian was stressed and the importance of the Configuration Management Subsystem (CMS) as FINDAS-client to organize configuration management in the Ground Segment. The importance and the definition of three different frameworks was outlined : FINDAS Infrastructure Libraries, Ground Segment Framework Libraries and Interface Class Libraries.

Action 13: PC to change Instrument Class Libraries into Interface Class Libraries (ICL) in the next version of the FSC-SIP.

14. Discussion about OO-model commonality (All)

The CWG realised that apart from some commonality in design approach between FIRST and Planck OO-models, commonality between the OO-models of the different development groups inside the FIRST Ground Segment is highly desireable and needed. It was however not clear whether it would be an activity of this CWG or whether a new CWG must be defined to do the task.

Action 14: Commonality Steering Committee to define whether commonality of the OO-model inside the FIRST Ground Segment should be an activity of this Commonality Working Group or of a new Commonality Working Group.

15. Discussion about other types of commonality (All)

AHA presented the Document Management System (DMS) as an example of a system where commonality has been achieved.

It was agreed that achieving commonality between FIRST and Planck means in the first place achieving commonality in approach, and not so much commonality at a very detailed level.

The CWG came to the conclusion that it is realistic to pursue commonality in the following areas :

- the Configuration Management System(CMS) which can be used by the Planck GS for free
- the Document Management System
- a common approach to the FINDAS Infrastructure Libraries
- the use of “cvs” to achieve configuration control at software level
- the use of the same CASE-tools (e.g. Rational Rose)
- the use of the same utilities to generate documents via “Rose” containing UML-modelling information
- commonality by using the PUS(Packet Utilisation Standard) as the application-level interface between ground and space and as a complement to the Packet Telecommand and Packet Telemetry Standards.
- commonality by the use of SCOS-2000
- commonality in the design approach for an object-oriented framework

Commonality having the same database is not seen as a goal.

16. Plan of Activities for the coming 6 months.

Activity A :

FINDAS-prototype client development and integration.

Activity B :

Assistance to FINDAS-prototype client development and integration and its organization (including organisation of training and practical support for the integration).

Activity C :

Preparation of the FINDAS-prototype Evaluation Report as post prototype-delivery activity.

Activity D :

Investigation and exchange of information about approach to commonality between the FIRST and Planck systems in areas as defined in the terms of reference.

Activity E :

Provision of common FINDAS-Infrastructure Libraries including the URD, SRD, ADD, DDD and ICD.

17. Dates of next two meetings

It was decided that it would be more efficient if the next meeting would be a teleconference. The members proposed the following date and time for this teleconference : the 22nd of March @2.00 pm.

Purpose of the teleconference is to exchange information about FINDAS-prototype client development : status, schedules and problems encountered.

Action 15: PC to organize the teleconference and circulate an agenda/discussion points.

Action 16: A representative per development group to prepare for communicating status, schedule and "problems encountered during development" at the teleconference

Action 17: A representative per group to supply telephone numbers to PC for the 22/03/1999 telecon by 12.00 hours on 19 March 1999.

The members proposed the following date and time for a next meeting: the 18th of May @9.00 am.

Purpose of the meeting is to exchange/present information about FINDAS-prototype client development : status and problems encountered as well as to discuss/merge/agree upon the draft arequirements of each group on FINDAS Infrastructure Libraries.

Action 18: Each functional group to draft User requirements on FINDAS Infrastructure Libraries (FIL)

Action 19: PC to organize the meeting and circulate an agenda.

18. AOB

As there was no any other business the chairman thanked everyone and closed the meeting.

List of Actions:

CWG6_1-A1: DPCs and ICCs to prepare a list of people who will be present at the prototype delivery meeting and send this list to PE. **Actionee:** DPCs, ICCs. **Deadline:** 10/02/1999.

CWG6_1-A2: To suggest how the VEGA final presentation at prototype delivery should be structured (main themes) and what items could be added and send this information to PE. **Actionee:** All CWG members. **Deadline:** 10/02/1999.

CWG6_1-A3: Schedule and manpower for client development and integration and send it to PC, PE, JJM. **Actionee:** ICCs, DPCs. **Deadline:** 31/03/1999.

CWG6_1-A4: Discuss with VEGA the conditions for a training course on client-integration and a possible splitting of the warranty period. **Actionee:** PE. **Deadline:** 12/02/1999.

CWG6_1-A5: To draft a list of items which are wanted to be included in a course to be organised by VEGA about client-integration and send this list to PE. **Actionee:** BV/OB. **Deadline:** 10/02/1999.

CWG6_1-A6: Request to Ardent and circulate to ALL the next date of O2-courses. **Actionee:** JJM. **Deadline:** 04/02/1999.

CWG6_1-A7: Request via Serge Valera a demo on the MOC's system SCOS2000. **Actionee:** PE. **Deadline:** 05/02/99.

CWG6_1-A8: To write down an official statement/description by HIFI where its contribution/responsabilities for FINDAS-prototype client development are. **Actionee:** PR. **Deadline:** 28/02/1999.

CWG6_1-A9: To consult the Tutorial for FINDAS-prototype client development as it contains a lot of useful information. **Actionee:** ICCs. **Deadline:** as soon as development starts.

CWG6_1-A10: List of people in the institutes who must have access to DMS, to be sent to WOM/JJM. **Actionee:** HIFI/PACS/SPIRE. **Deadline:** overdue.

CWG6_1-A11: To ensure that all CWG-members have access to the relevant DMS-domains. **Actionee:** JJM/AHA/WOM. **Deadline:** 05/02/1999.

CWG6_1-A12: Make available to all members a list of documents under DMS of great help to client development. This list should include the VEGA-document where the working-environment for client-integration is outlined (directory-structure, configuration management, etc.) **Actionee:** JJM/WOM. **Deadline:** 15/02/1999.

CWG6_1-A13: To change "Instrument Class Libraries" in "Interface Class Libraries" in the next version of the FSC-SIP. **Actionee:** PC. **Deadline:** 28/02/1999.

CWG6_1-A14: To decide in which WG (this one or a new one) FIRST Ground Segment internal commonality of OO-model will be defined/explored and produce terms of reference for this group. **Actionee:** steering committee. **Deadline:** 16/03/1999.

CWG6_1-A15: To organise a telecon with the CWG-members on the 22th of March 1999 at 14.00 hours and to circulate an agenda/discussion items. **Actionee:** PC. **Deadline:** 19/03/1999.

CWG6_1-A16: A representive per development group to prepare for the teleconference by communicating status, schedule and problems encountered during development/integration of clients. **Actionee:** ICCs, DPCs, FSC, TOS. **Deadline:** 22/03/1999.

CWG6_1-A17: A representative per group to supply telephone numbers to PC for the 22/03/1999 telecon by 12.00 hours on 19 March 1999. **Actionee:** All ICCs, DPCs. **Deadline:** 12.00 hours on 19/03/1999.

CWG6_1-A18: each functional group of the CWG-meeting to draft requirements on FINDAS Infrastructure Libraries (FIL). **Actionee:** ICCs, FSC, TOS-EMS, ESTEC/SA, DPCs. **Deadline:** 12/05/1999.

CWG6_1-A19: PC to organize the next meeting and circulate an agenda. **Actionee:** PC. **Deadline:** 12/05/1999.

ASTROPHYSICS

FIRST

FINDAS-IDIS Commonality WG meeting no. 1

Introduction, agenda and purpose of the meeting

ESTEC, 2 Feb 1999

Peter Claes

ESA Astrophysics Division, Space Science Department

1. Agenda

PART A : FINDAS-PROTOTYPE ACTIVITIES

1.Introduction (10 min) (PC) (9.05 - 9.15 am)
2.Status of FINDAS-prototype (10-15 min) (PE) (9.15 - 9.30 am)
3.Development goals, strategies and phases for FINDAS prototype clients (20 minutes + 10 min discussion) (PC) (9.30 - 10.00 am)

4.Presentation of the ESTEC-client (15 min + 15 min discussion) (JJM) (10.15 - 10.45 am)
5.Presentation of the potential FSC-client (15 min + 15 min discussion) (PC) (10.45 - 11.15 am)
6.Presentation of the potential SPIRE client(s) (15 min + 15 min discussion) (ICC) (11.15 - 11.45 am)
7.Presentation of the potential PACS client(s) (15 min + 15 min discussion) (ICC) (11.45 - 12.15 am)
8.Presentation of the potential HIFI client(s) (15 min + 15 min discussion) (ICC) (12.15 - 12.45 am)
9.Presentation of the potential HFI/LFI client(s) (15 min + 30 min discussion) (DPC or ESA/SA) (2.00 - 2.45 pm)

10.Integration at and Support from ESTEC (+ schedule)(20 min) (JJM)(2.45 - 3.05 pm)
11.Discussion and Selection of clients to be developed (ALL) (20 min) (3.15 - 3.35 pm)

1. Agenda (cont'd)

PART B : FINDAS-IDIS commonality

12. FSC-preparations for the development of the Ground Segment/ FINDAS (+ schedule)(20min)(PC) (3.35 - 3.55 pm)

13. Commonality of OO-business model (including interfaces level 1 (telemetry, telecommanding) and level 4 (Pipeline))(PC+WOL) + discussion (ALL)(45 min) (4.00 - 4.45 pm)

14. Potential of other types of commonality of FINDAS/IDIS and FIRST/Planck GS (networks, ODBMSs, software infrastructure, CMS, procedures, management and approach) (PC+A Hazell) + discussion (ALL) (30 min) (4.45 - 5.15 pm)

15. Actions and next meeting-dates (20 min) (5.15 - 5.35 pm)

16. AOB (5 min) (5.35 - 5.40 pm)

2. Purpose of the 1st comm. WG meeting

- to establish goals for the prototype testing : what must we learn from the prototype to have confidence that the full system (i) is a good idea, (ii) can be developed without undue cost and risk
- strategies and phases for client-development
- learn from the experience of the 1st ESTEC-client-integration with the O2-database(JJM)
- motivate other groups to implement clients as well
- get a good view about the subject area and development methodology of the various clients of the prototype and discuss the proposals
- presentation of integration and support from ESTEC
- proposal for FSC-preparations for the Development of the Ground Segment/FINDAS (SIP-related)
- presentation of opportunities for commonality of the OO-business model between FIRST and Planck
- discussion of potential for other types of commonality between the two missions

ASTROPHYSICS

FIRST

FINDAS-IDIS Commonality WG meeting no. 1

Development Goals, Strategies and Phases for Client Development

ESTEC, 2 Feb 1999

Peter Claes

ESA Astrophysics Division, Space Science Department

1. FINDAS prototype-client development goals

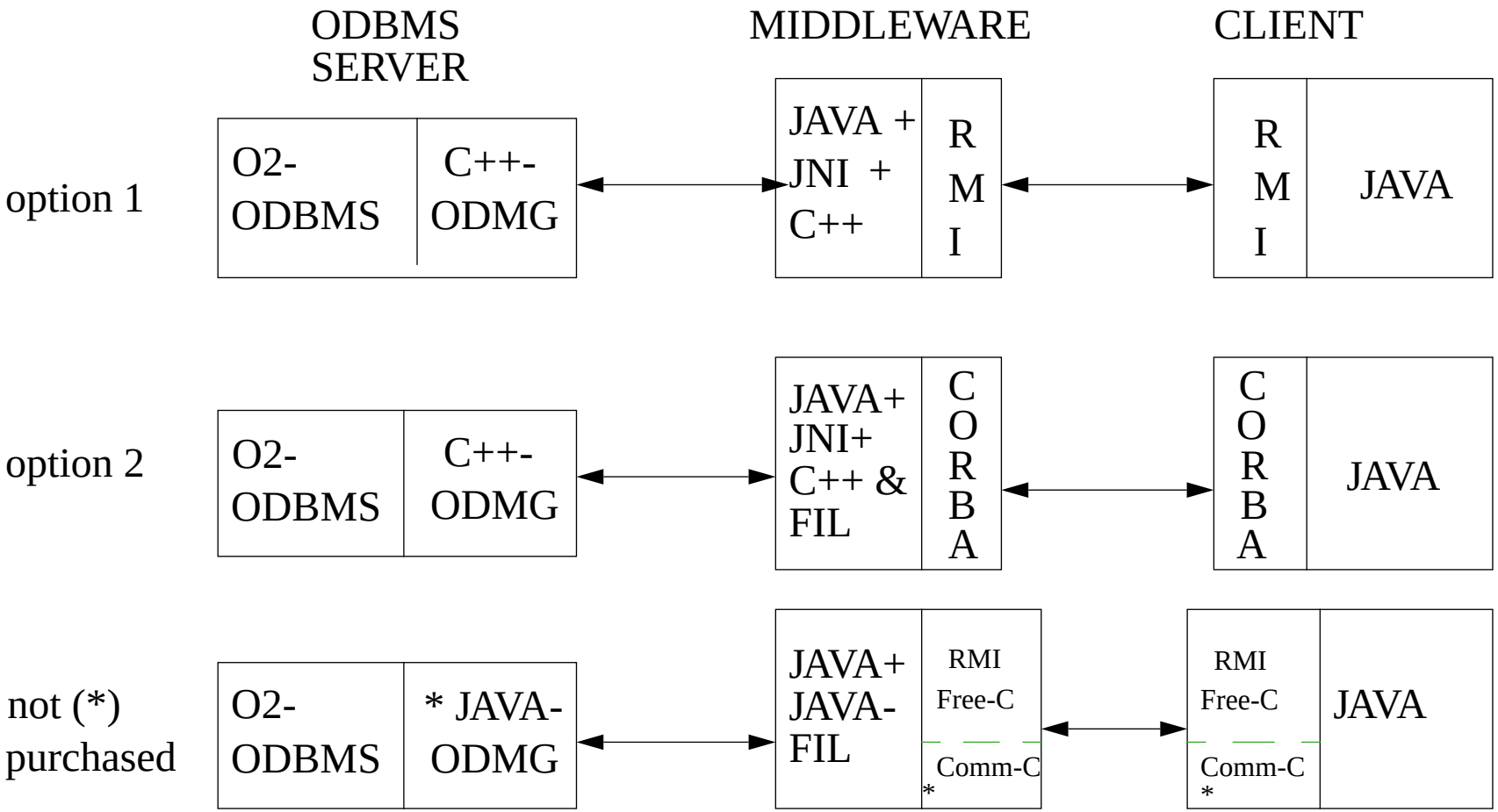
- evaluate/assess the FINDAS-concept as far as possible : is it a good idea ?, can the full system be realised without undue cost and/or risk ?
- gain experience in communicating with the ODBMS and in three-tier programming
- gain experience with specific O2-tools
- demonstrate/assess O2-ODBMS and/or Objectivity as usable databases
- test “Remote Method Invocation” (RMI) as alternative technology (to CORBA) and test the usefullness of the “Java Native Interface” (JNI) for FINDAS-applications development
- compare this with a CORBA-implementation
- test the usability of the FINDAS Infrastructure Class Libraries developped by VEGA
- motivate other groups to implement clients as well and learn from each other experience
- etc.

2. Development Strategies (Architectures) of the prototype

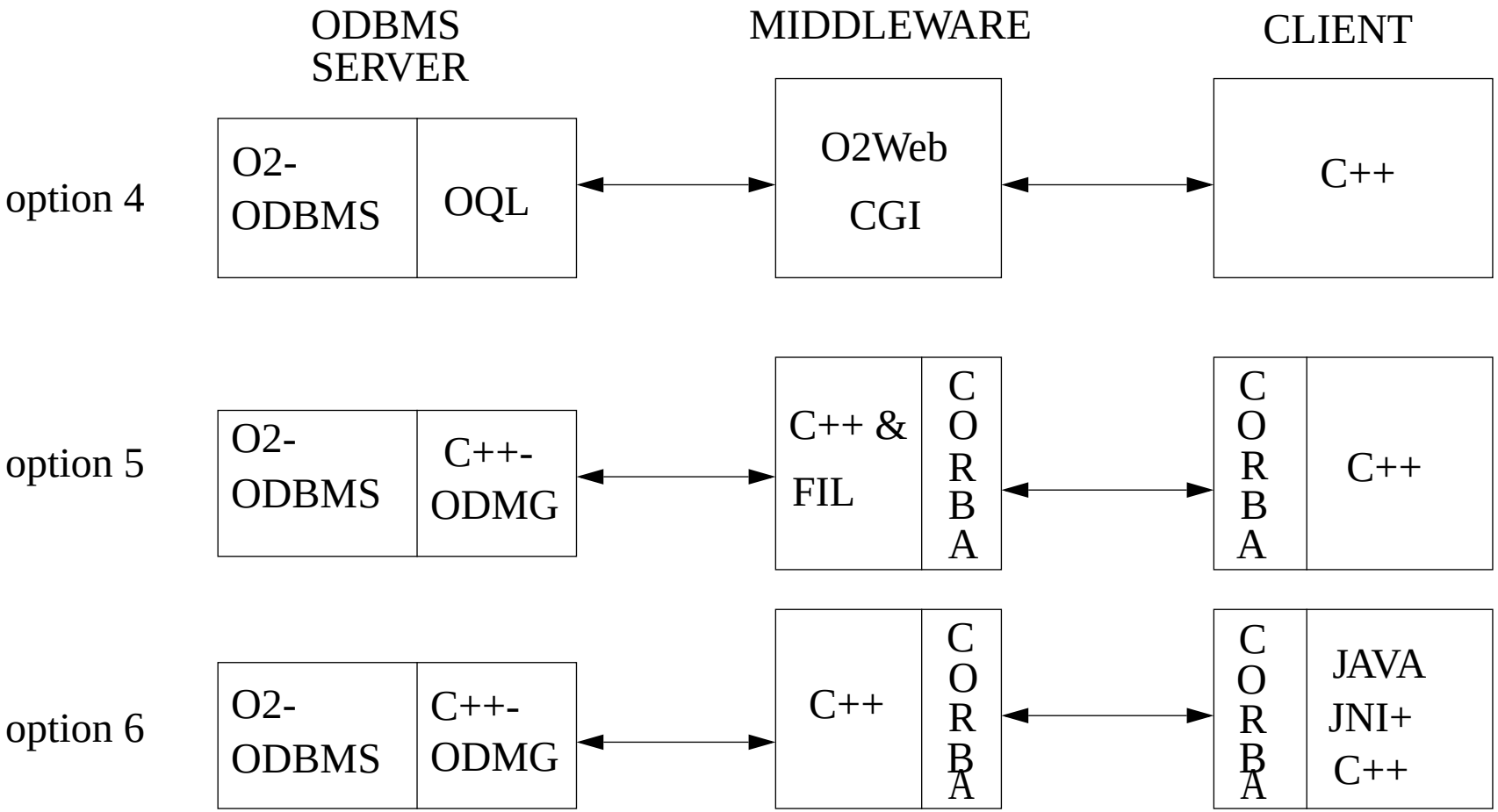
Decisions/choices

- JAVA versus C++
- CORBA versus RMI
- free CORBA versus commercial CORBA
- JAVA + JNI together with C++
- “fat-client” or “thin-client”
- use of O2-tools or not (such as O2Web)
- O2 or Objectivity
- use of FINDAS Infrastructure Libraries or not
- use of OQL(O2) or SQL(Objectivity)
- ...

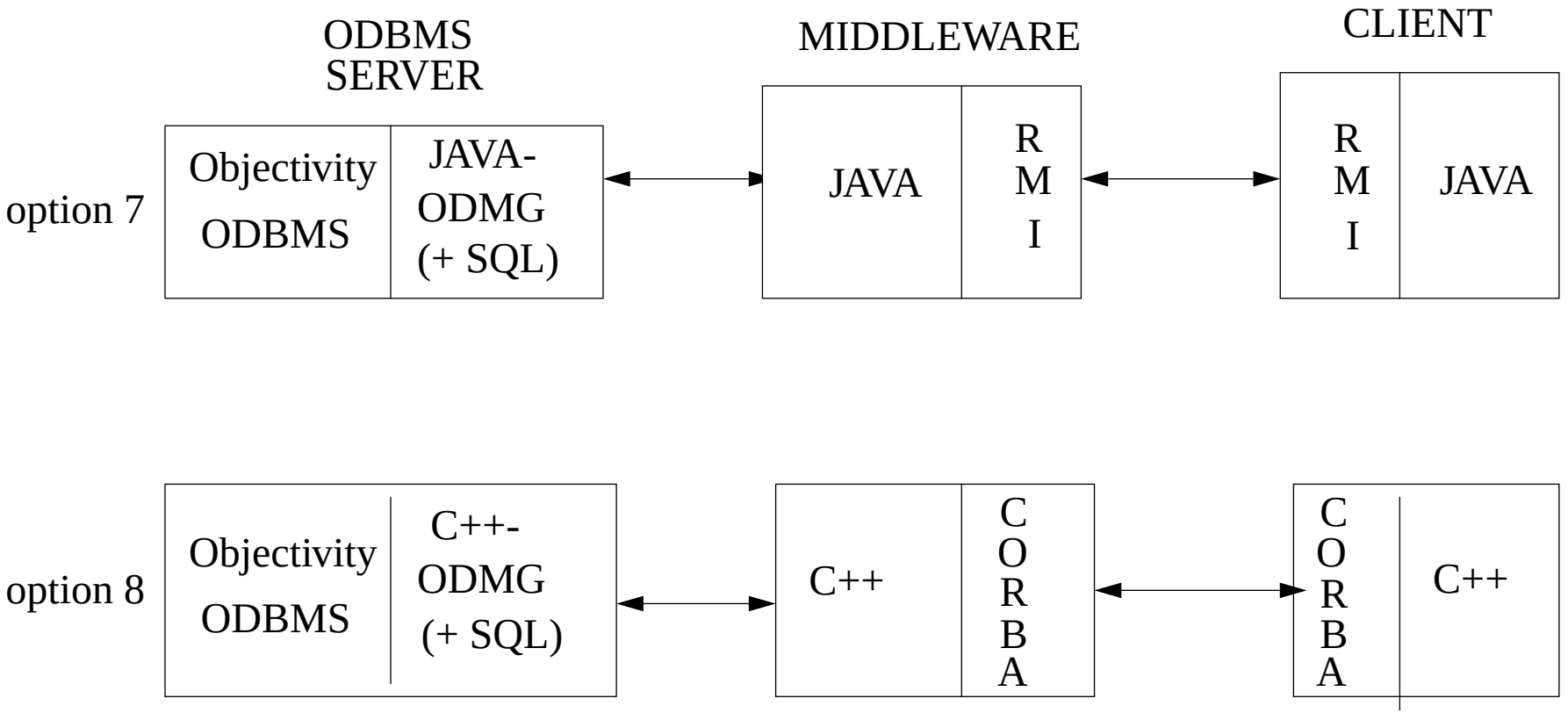
2. choice of strategy of three-tier Architecture for the FINDAS-subsystem:



2. choice of strategy of three-tier Architecture for the FINDAS-subsystem:

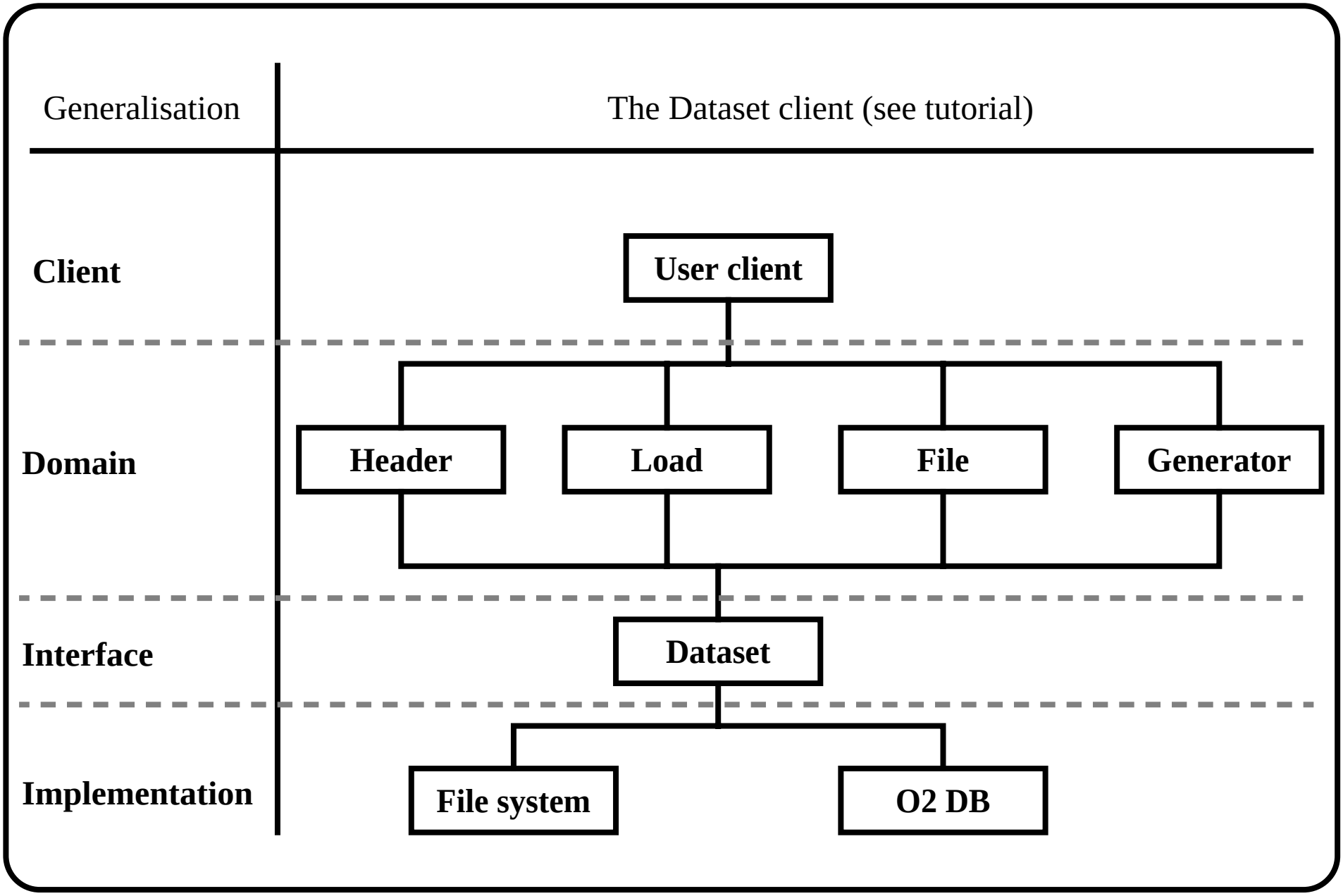


2. choice of strategy of three-tier Architecture for the FINDAS-subsystem:



3. Phases of client development

1. Purpose and User Requirements.
2. UML-modelling (analysis and design).
3. Stand-alone prototype (JAVA recommended).
4. Choose your development strategy/architecture (3-tier architecture).
5. Build a CORBA-IDL or RMI-Interface.
6. Split application in client-server part.
7. Implement Interface with/without FINDAS Infrastructure Libraries.
8. Integrate server-part of application with the database, using optionally ODBMS-tools.
9. Debug with the help of staff with experience, Tutorial, ODBMS-support and COTS-tools support.
10. Document your operational application.
11. Document problems encountered and lessons learnt


Generalisation
The Dataset client (see tutorial)
Client
Domain
Interface
Implementation
User client
Header
Load
File
Generator
Dataset
File system
O2 DB

Lessons learnt in this instance

- Single minded classes: split server in “Directory look up” and “Dataset” servers.
- Class purpose: change data access from of single x-y pairs to set of pairs.
- Separation between interface and implementation class: introduce a “Storage” class between dataset and implementation on file system or database.

Open items

- Organization for development and exchange of information (what information needs to be exchanged and how is this information made visible to all).
- Complete end-to-end module development (from Rose design to completed documentation).
- CORBA usage and use of freeware CORBA and Java RMI.
- Where does the web fits in.

Lessons learnt to date

- Clean architecture is essential.
- Separate interface (immutable) and implementation.
- Class design driven by clear requirements.

- Robustness achieved with defensive programming.
- Consistent naming (foster “reuse”).

- Be aware of the difference between commercial CORBA and free-ware CORBA (the latter provide the API, but there is a long way from this to a fully usable system).

ASTROPHYSICS

FIRST

FINDAS-IDIS Commonality WG meeting no. 1

FSC Proposal Handling Client Presentation

ESTEC, 2 Feb 1999

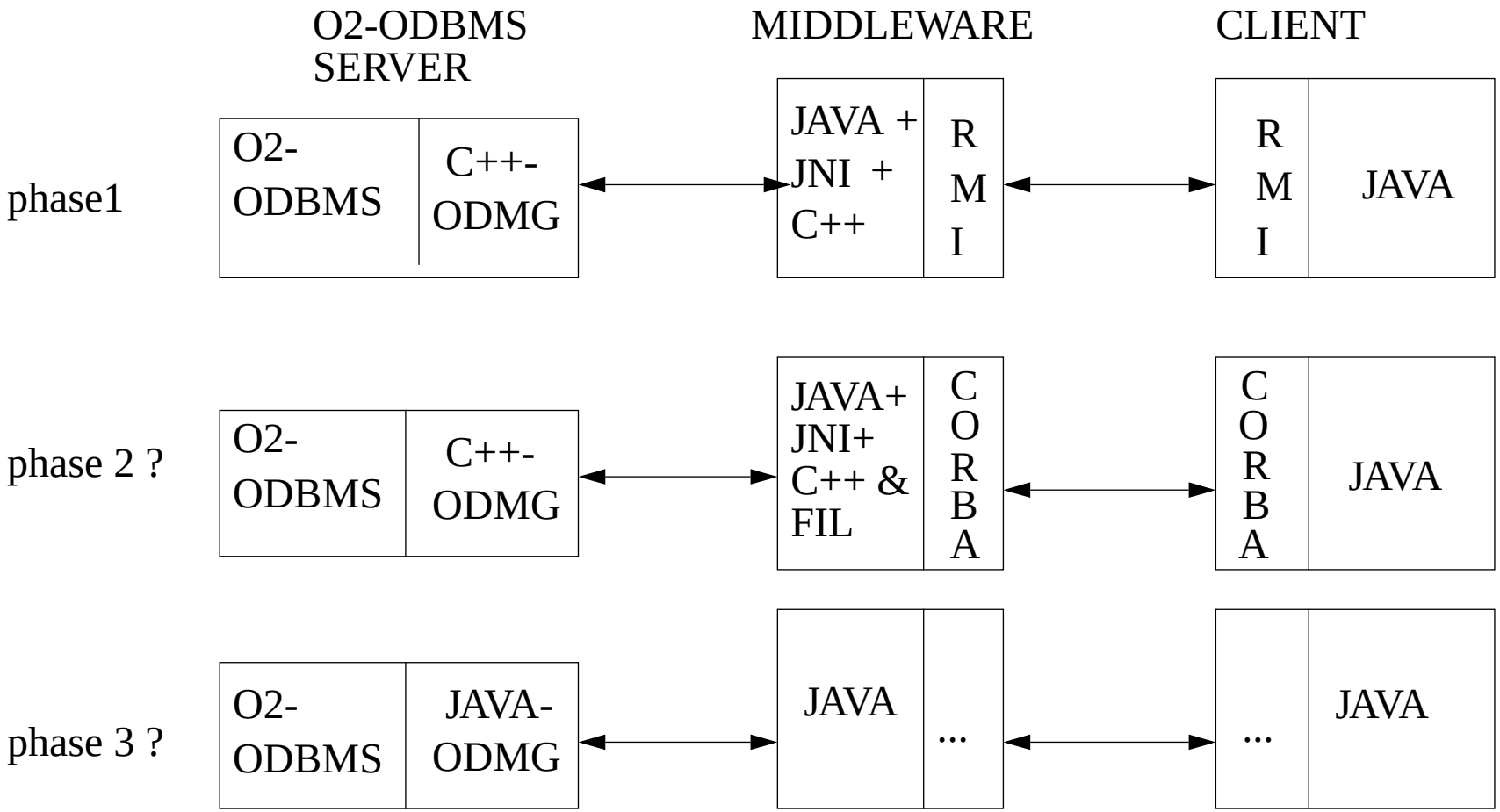
Peter Claes

ESA Astrophysics Division, Space Science Department

1. FSC prototype FINDAS-client implementation goals

- gain experience in communicating with the O2-ODBMS and in three-tier programming
- gain experience with specific O2-tools
- demonstrate/assess O2-ODBMS as a usable database
- demonstrate/assess JAVA as the preferred technology for client-implementation
- test “Remote Method Invocation” (RMI) as alternative technology (to CORBA) and test the usefullness of the “Java Native Interface” (JNI) for FINDAS-applications development
- compare this in a later stage with a CORBA-implementation
- test in a later stage schema evolution and object manipulation functionality
- test in a later stage the usability of the FINDAS Infrastructure Class Libraries
- motivate other groups to implement clients as well and learn from each other experience

2. three-tier Architecture for the client :



3. RMI versus CORBA

RMI (pos/neutral)

- JAVA-native(transparent) access to remote objects (good) using “proxy” design pattern.
- object model of RMI is the feature-rich distributed object model of JAVA.
  (no extra object model) (good)
- has automatic garbage collection. (good) <-> CORBA
- pass an object by its actual type rather than declared type, OMG alligned its object-by-value specification so that it is fully compatible with RMI. (good)
- RMI is not difficult to learn and use. (good)
- RMI uses its own proprietary protocol.
- RMI provides call-by-value mechanism for JAVA objects.
- RMI supports CORBA’s Internet protocol, IIOP. (good)
- hides the use and creation of OMG IDL from the programmer.

3. RMI versus CORBA (cont'd)

RMI (to be unknown/neg)

- RMI is a JAVA-only solution, (good/bad)(neg ?) but integration with C and C++ possible via other JAVA-packages/tools.
- how will RMI support IDL ? ==> RMI-based components integration into other CORBA-based applications is unclear.
- performance ???

3. RMI versus CORBA (cont'd)

CORBA (pos)

- language independent (JAVA, C++, C), access to objects implemented in other programming languages. (good)
- interfaces defined independently of implementations. (good)
- industry standard (good)
- application that uses the IDL compiler can connect to any object server that complies with the CORBA standards, access to objects regardless of their location (location transparency) (good)
- automatic object activation (good)
- automatic code generation to deal with remote invocations (good)
- access to standard CORBA services and facilities (good)

3. RMI versus CORBA (cont'd)

CORBA (to be examined/doubt/neg)

- performance ?
- design and programming is not so easy.
- no automatic garbage collection.
- has its own object model.

4. User Requirements

R1. The application shall support two types of user : a PHSOperator user with special priviledges and a normal user.

R2. The PHSOperator user is allowed to edit (change) existing proposer and proposal information.

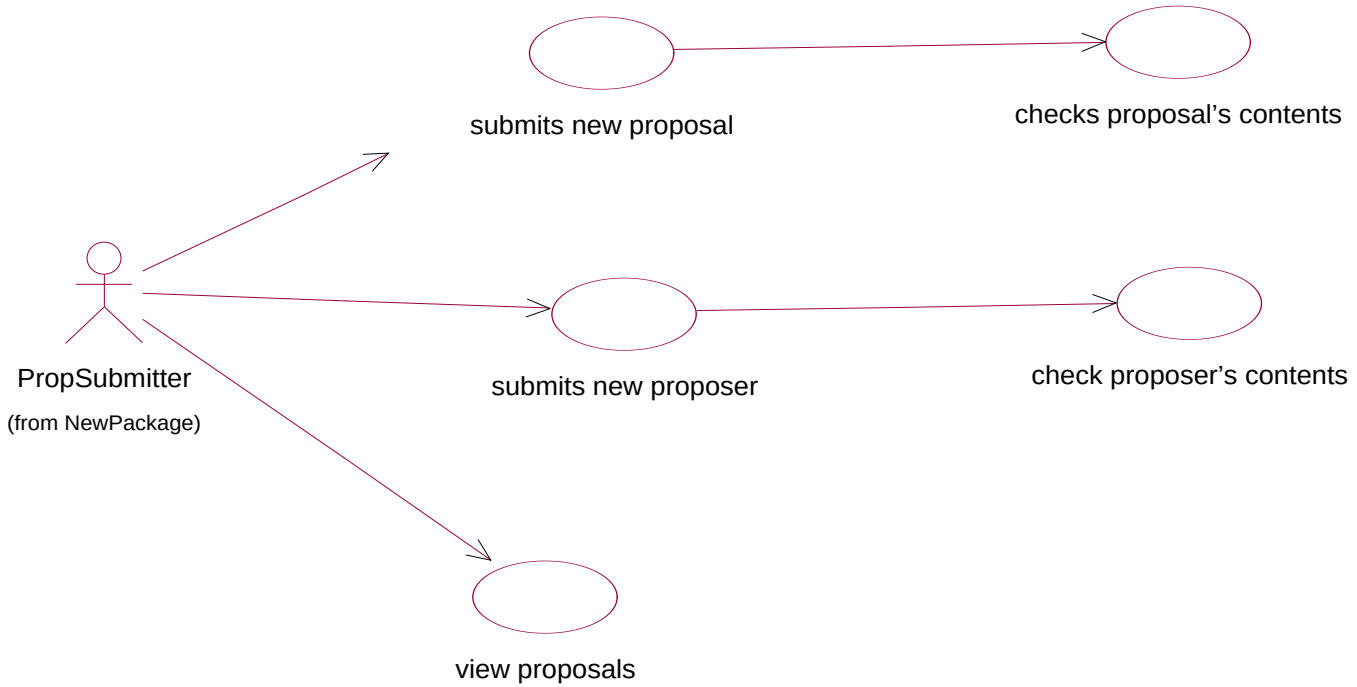
R3 : The PHSOperator user can change the database structure of the Proposal and Proposer classes.

R4 : The normal user (observer) can only introduce either a new Proposer or a new Proposal (associated with a Proposer) and he gets feedback on its acceptance in the database. The normal user must be able to view the details of his own proposals.

R5 : The PHSOperator user can view lists of existing Proposals and Proposers and also request the detailled information of one such Proposer or Proposal.

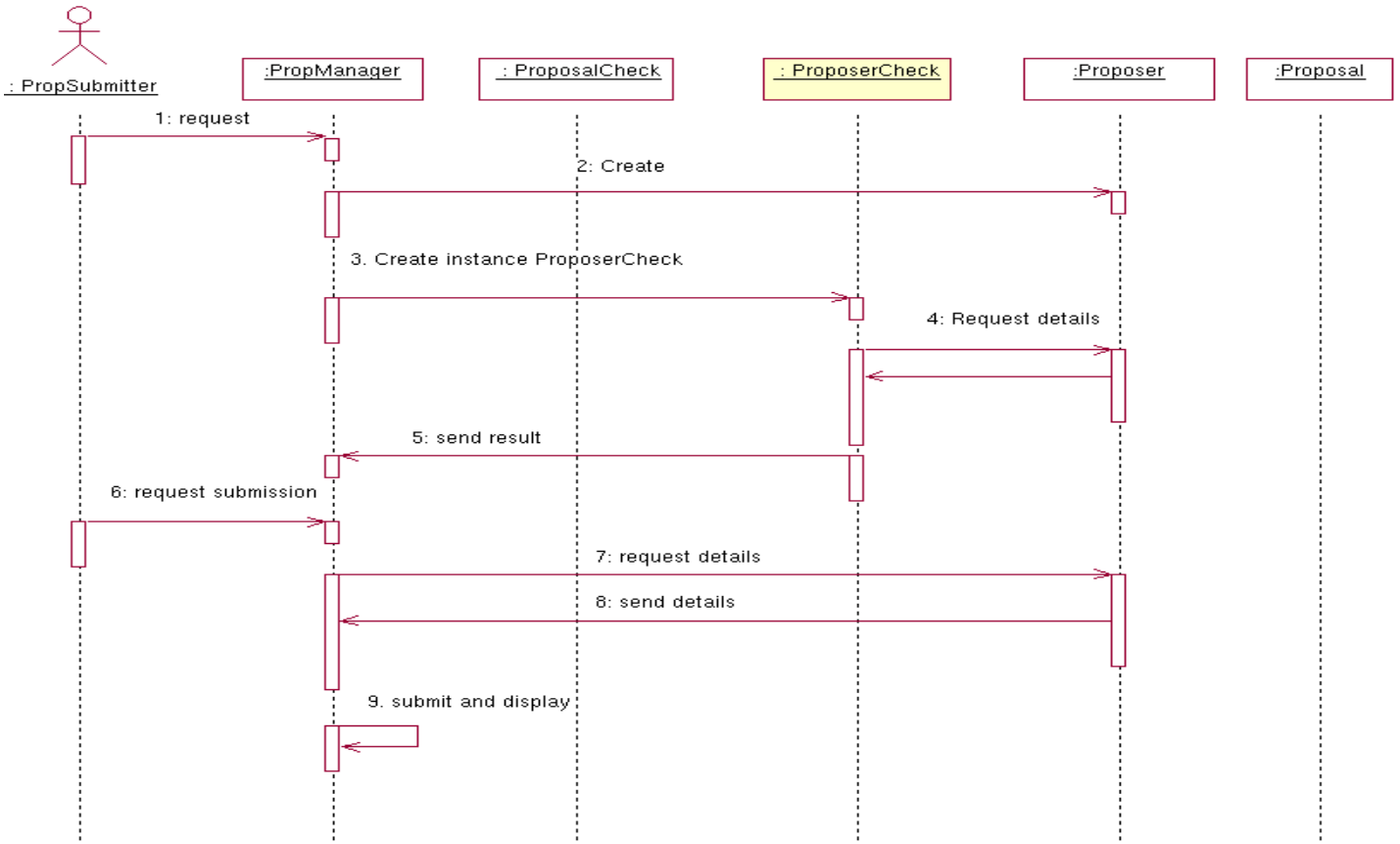
R6 : The GUI has HelpScreen-information where appropiate.

5. UML-Diagrams(draft)

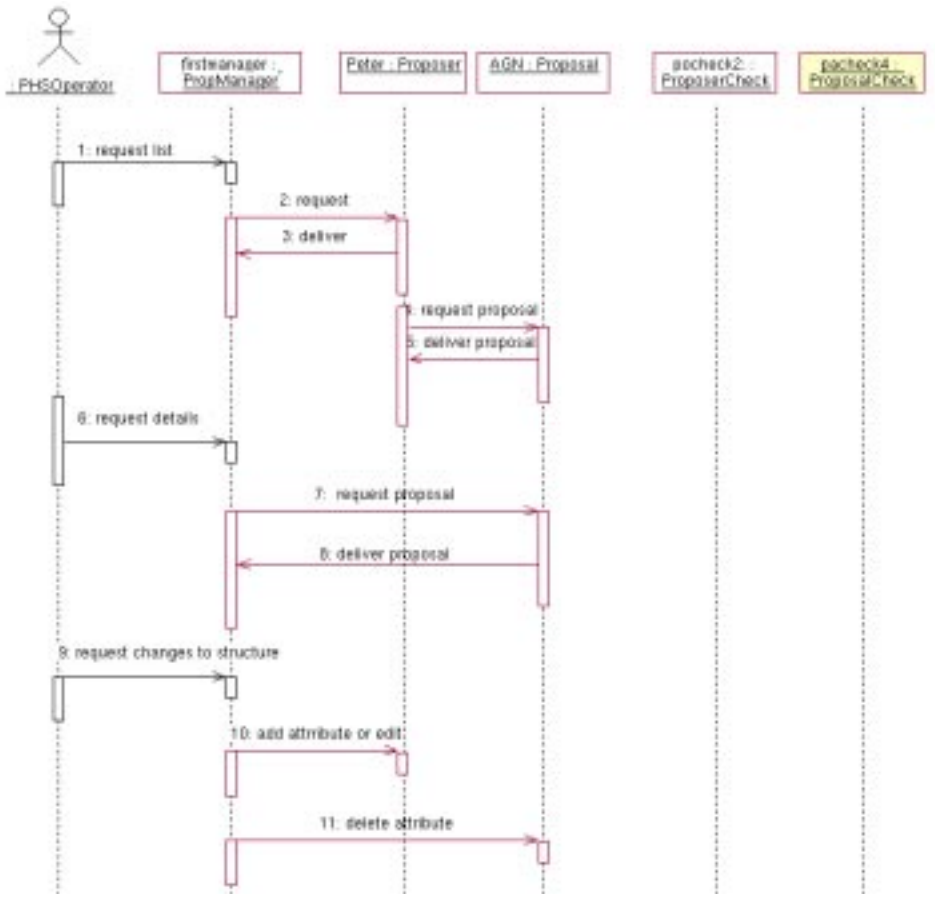


5. UML-Diagrams (draft)(cont'd)

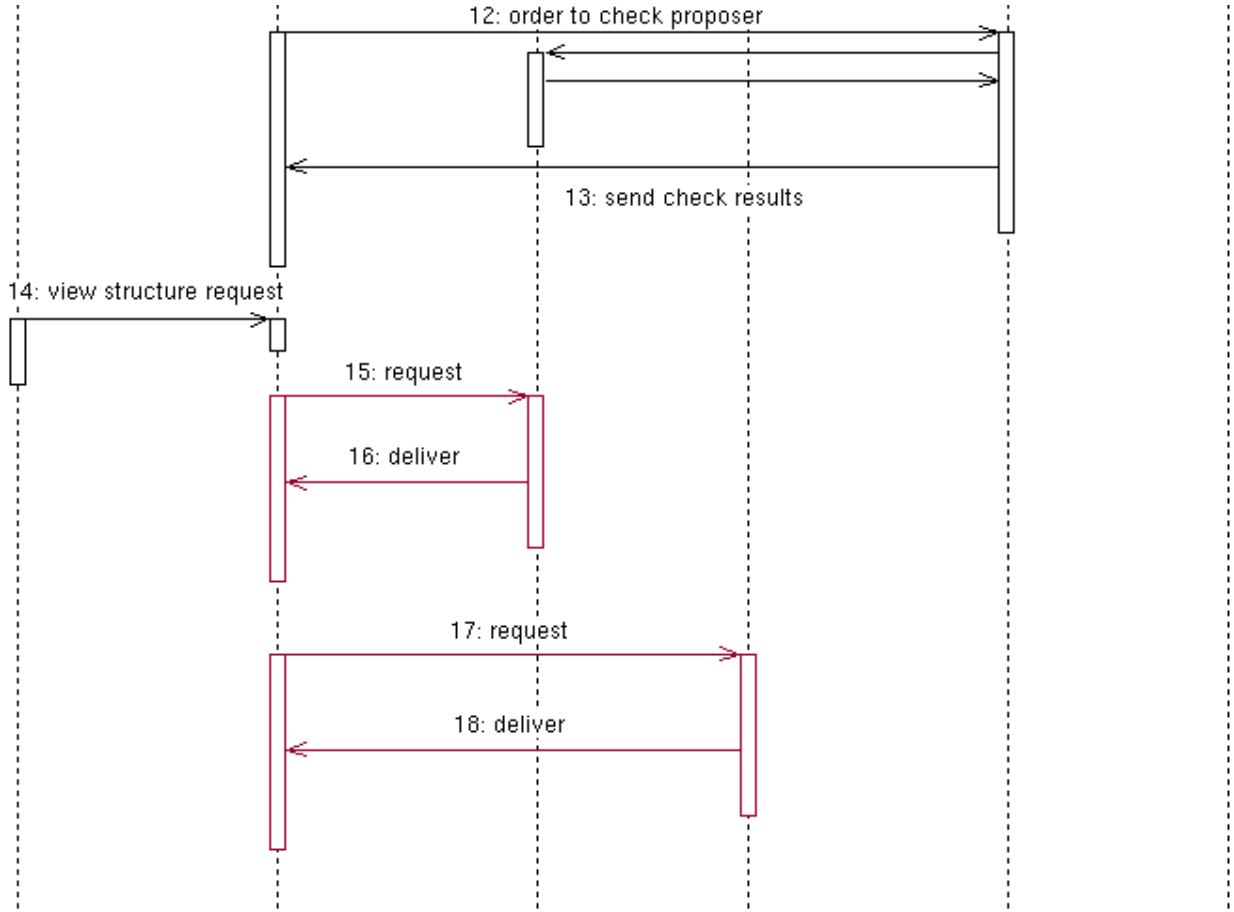
5. UML-Diagrams (draft)(cont'd)



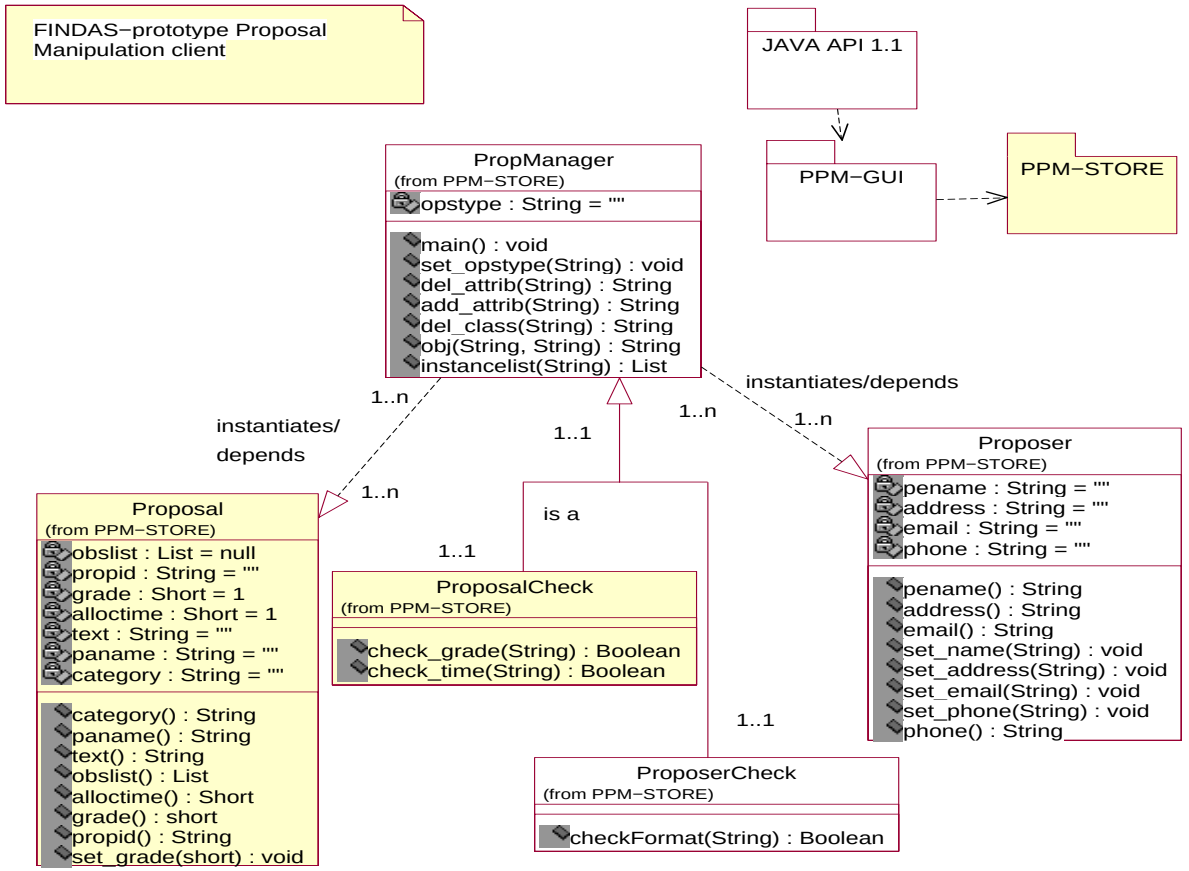
5. UML-Diagrams (draft)(cont'd)



5. UML-Diagrams (draft)(cont'd)



5. UML-Diagrams (draft)(cont'd)



6. Schedule

- end of Feb 1999 : stand-alone application ready, including the GUI
- 7th of March : application split in client-server part using RMI
- 3rd week of March : middleware-code split into C++ and JAVA-part using JNI as the glue
- middle of April : documentation of client added to the Tutorial and new issue of the Tutorial
- 21st of April : start integration with the database till done
- end of May : phase 2 ? ready
- end of July : phase 3 ? ready
- September : client-experience integrated into FINDAS-prototype evaluation report

FINDAS PROTOTYPE ACTIVITIES

SPIRE Presentation

STAFF:

- **UK STAFF LEVELS & PROFILES ARE FAIRLY WELL ESTABLISHED FOR THE ICC DEVELOPMENT PHASE**
- **SOME MINOR ADJUSTMENTS MAY NEED TO BE MADE WITHIN THE SPIRE CONSORTIUM**
- **AS A CONSEQUENCE, THE PARTITIONING OF TASKS WITHIN THE SPIRE CONSORTIUM IS NOT YET FINALISED**
- **SKILL LEVELS, THEREFORE, NEED TO BE RE-ASSESSED & APPROPRIATE TRAINING TAKEN UP (ALREADY STARTED IN UK)**

FINDAS PROTOTYPE ACTIVITIES

CLIENTS:

- **SPIRE WOULD LIKE TO SEE AN EARLY IMPLEMENTATION OF AN INTERFACE BETWEEN THE TELEMETRY STREAM AND IDL. THIS COULD:**
  - **BE USED TO SUPPORT AN RTA/QLA DEVELOPMENT PROGRAM**
  - **BECOME THE INTERFACE BETWEEN ALL SCIENCE DATA PROCESSING SOFTWARE & THE TELEMETRY DATA**
- **SPIRE HAS NOT, SO FAR, IDENTIFIED ANY OTHER FINDAS CLIENTS TO BE WRITTEN BUT IS INTERESTED IN THE EARLY USE OF THE DOCUMENT MANAGEMENT & CONFIGURATION CONTROL CLIENTS**
- **WE INTEND TO REVIEW THE OTHER SUGGESTIONS FOR FINDAS CLIENTS PUT FORWARD AT THIS INITIAL MEETING WITH THE AIM OF ASSESSING IF & HOW SPIRE CAN PARTICIPATE IN THEIR DEVELOPMENT**

2 General Description

2.1 General Capabilities

2.2 General Constraints

2.3 User characteristics

2.3.1 Instrument expert

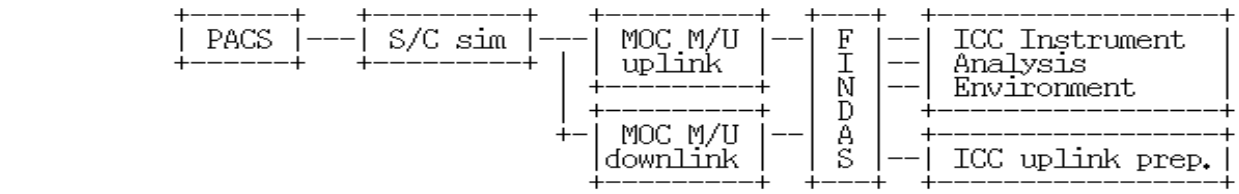
2.3.2 Software expert

2.3.3 Observer

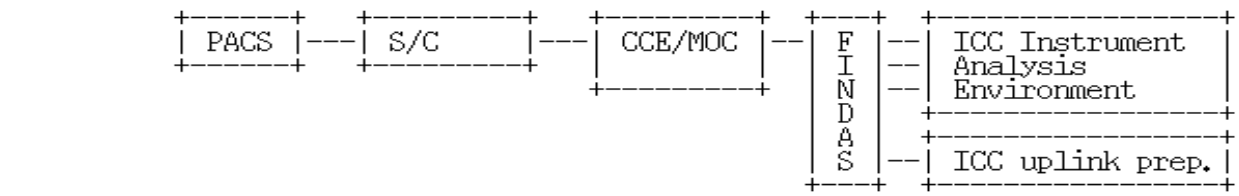
2.3.4 Operator

2.4 Operational environment

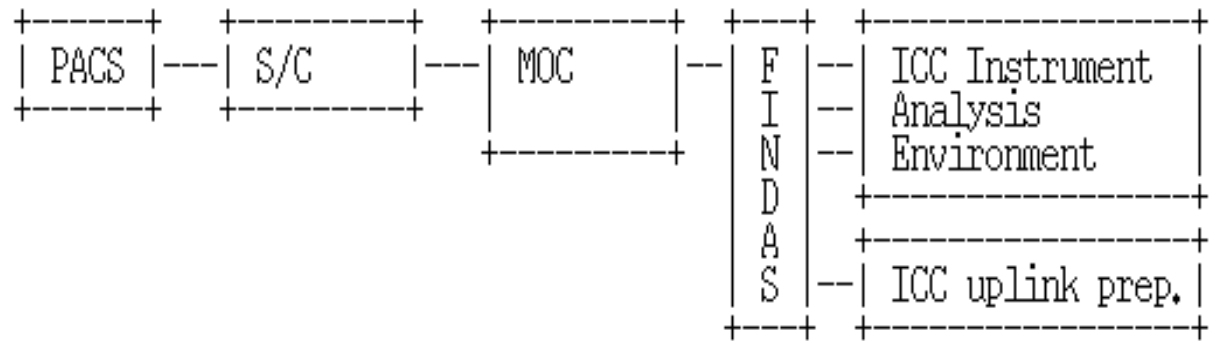
2.4.1 Operational environment during ILT phase



2.4.2 Operational environment during Integrated System tests



2.4.3 Operational environment during operational phase=20



PACS ICC SOFTWARE

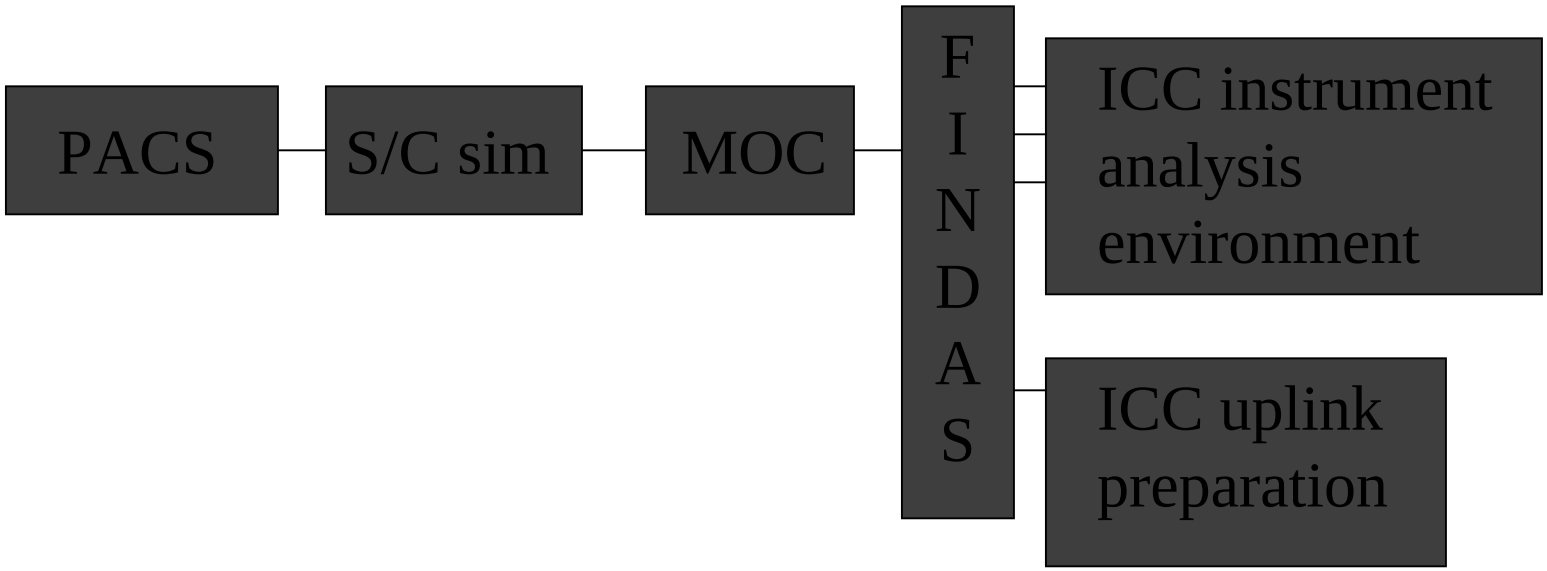
Development and planning
related to FINDAS

LEUVEN

STATUS

- ICC definition meeting (18-19 Jan 1999)
- URD being drafted
- FINDAS prototype test client identified
  - RTA client
- Milestone
  - March 2001 first ILT phase

ICC environment



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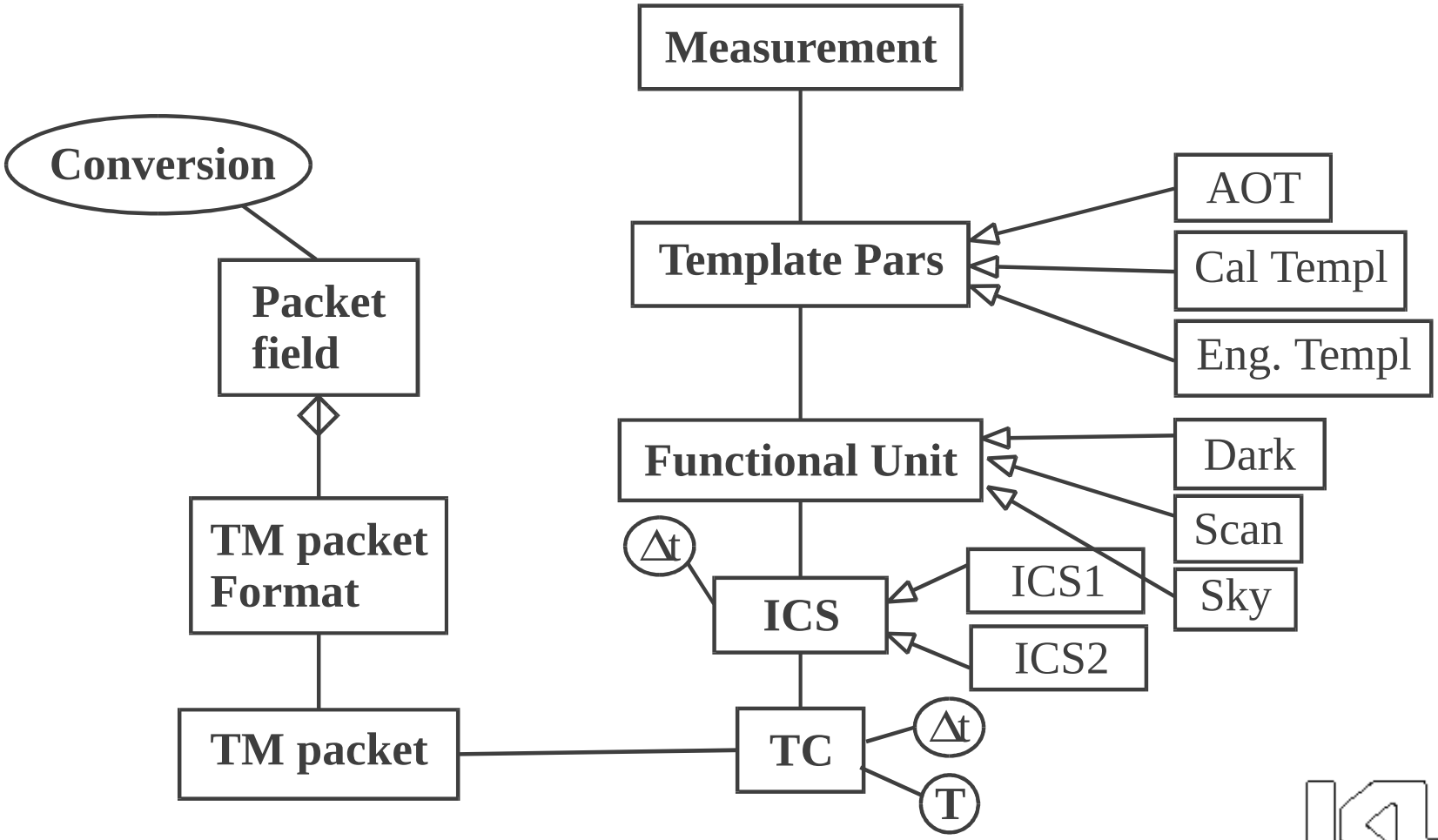
Sample Class Diagram



LEUVEN

Main Concerns

- Common class design
- Common object servers
- Mobile OODB server for lab tests outside home ICC

Interfaces approach to data management

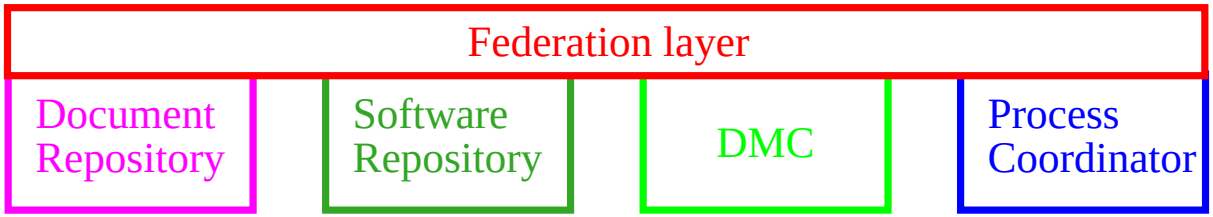
FINDAS-IDIS Commonality Working Group

William O'Mullane

General IDIS Approach

General approach and mapping to PSS-05-0 in “IDIS System Design and Workpackage Breakdown Approach”

- Main components identified (task orientated)
  - Document Management
  - Software Management
  - Data Management (DMC)
  - Process Coordination/Management (pipeline)
  - Federation
- Define requirements and find COTS for all of the above (with programming interfaces)

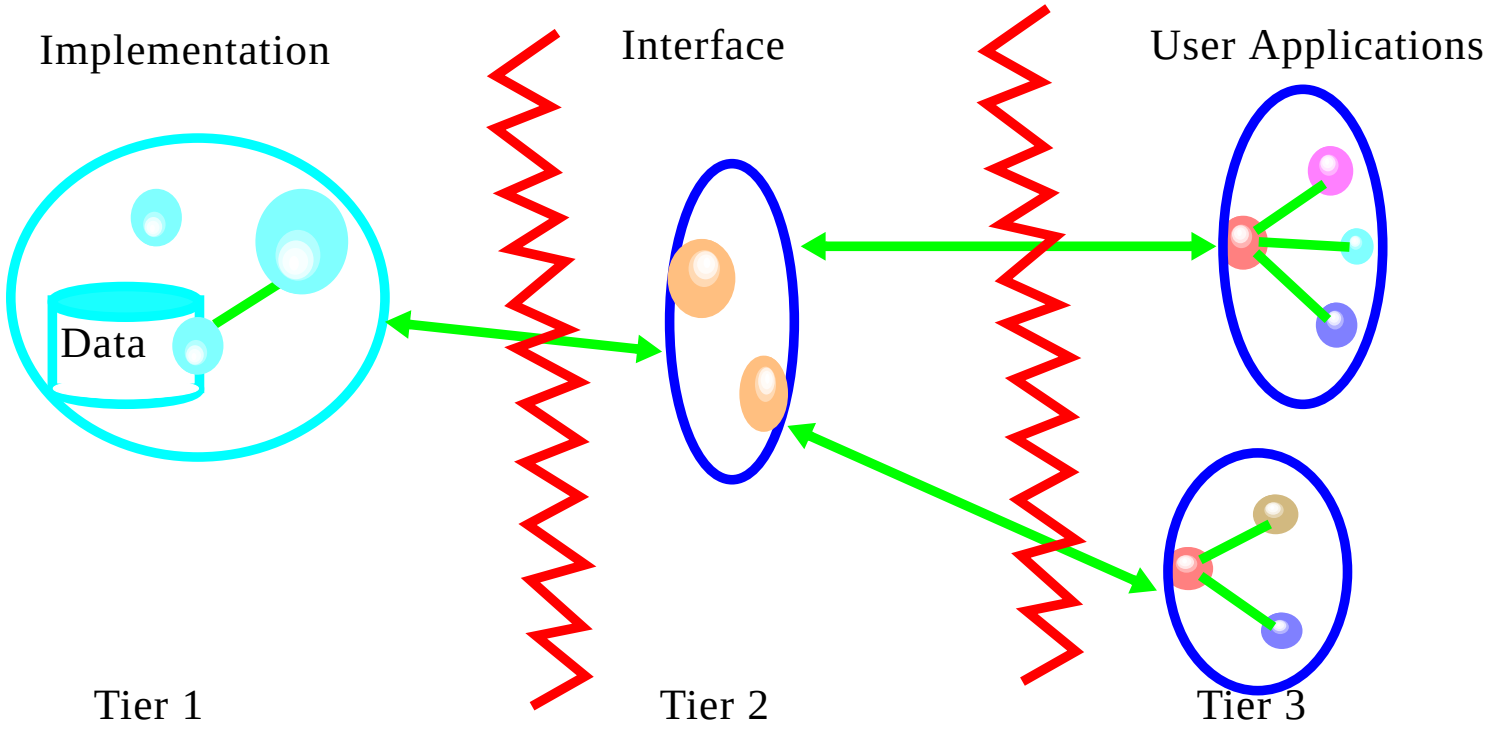


Approach

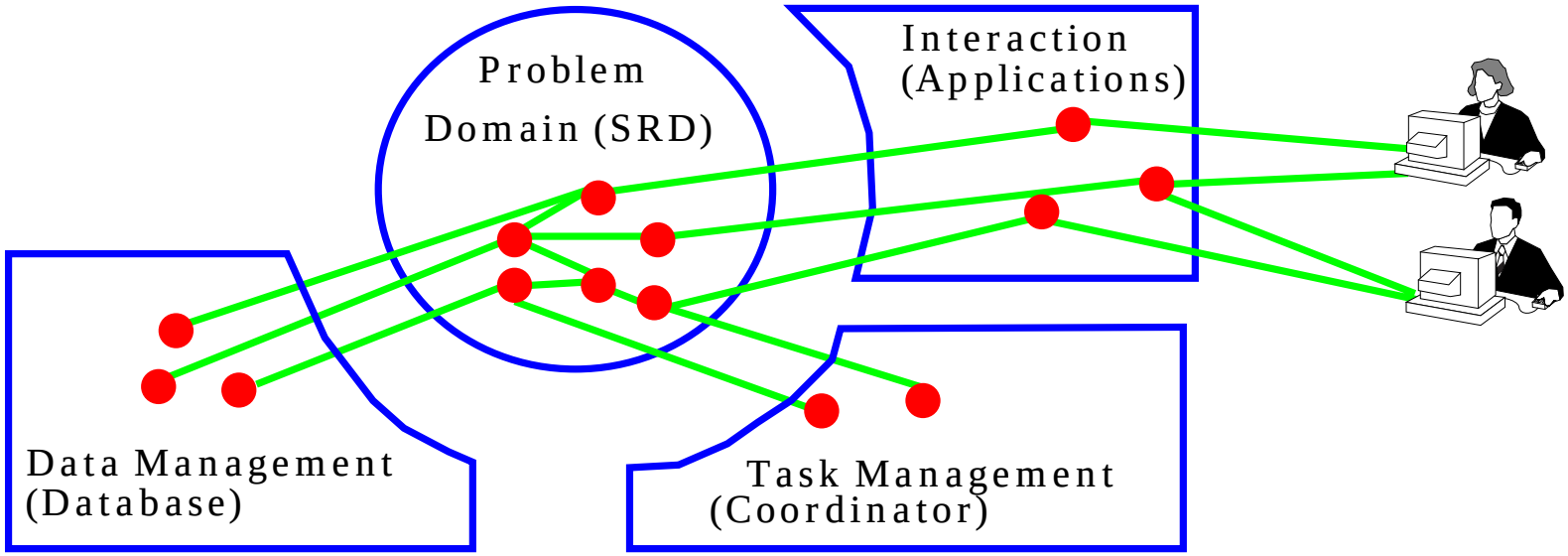
Similar to 3-tier architecture and draws upon Coad/Yourdon design principles. Described in “Data Management Component Design Approach”

- What should the system do (URD)
- How should the software look (SRD)
  - Set of “Interfaces” and perhaps a few classes.
  - Define relationships
  - Group in to packages
  - produce actual code for the interfaces
- Clients should interact only with these interfaces
- The software implementation (AD/DD)
  - Use any Database
  - or don’t use any Database
  - compile in interfaces from SRD to ensure compliance with client expectations.

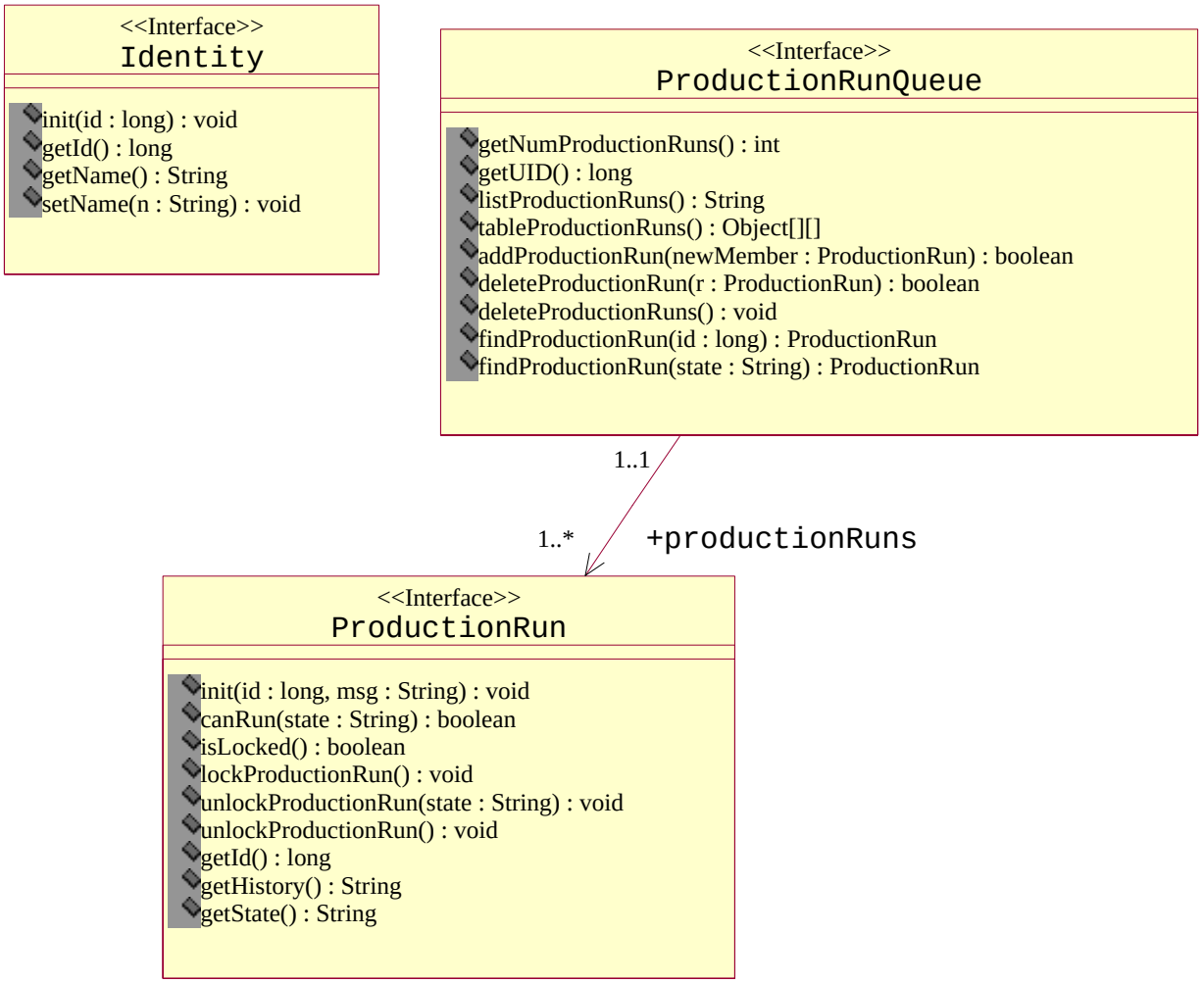
3-Tier Client Architecture



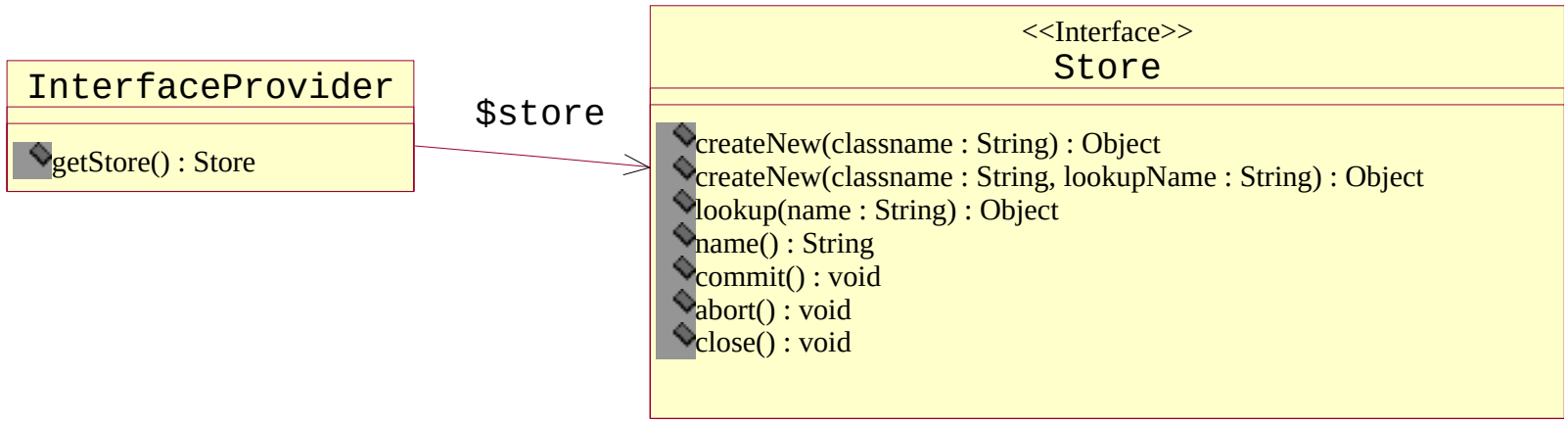
Coad & Yourdons Domains



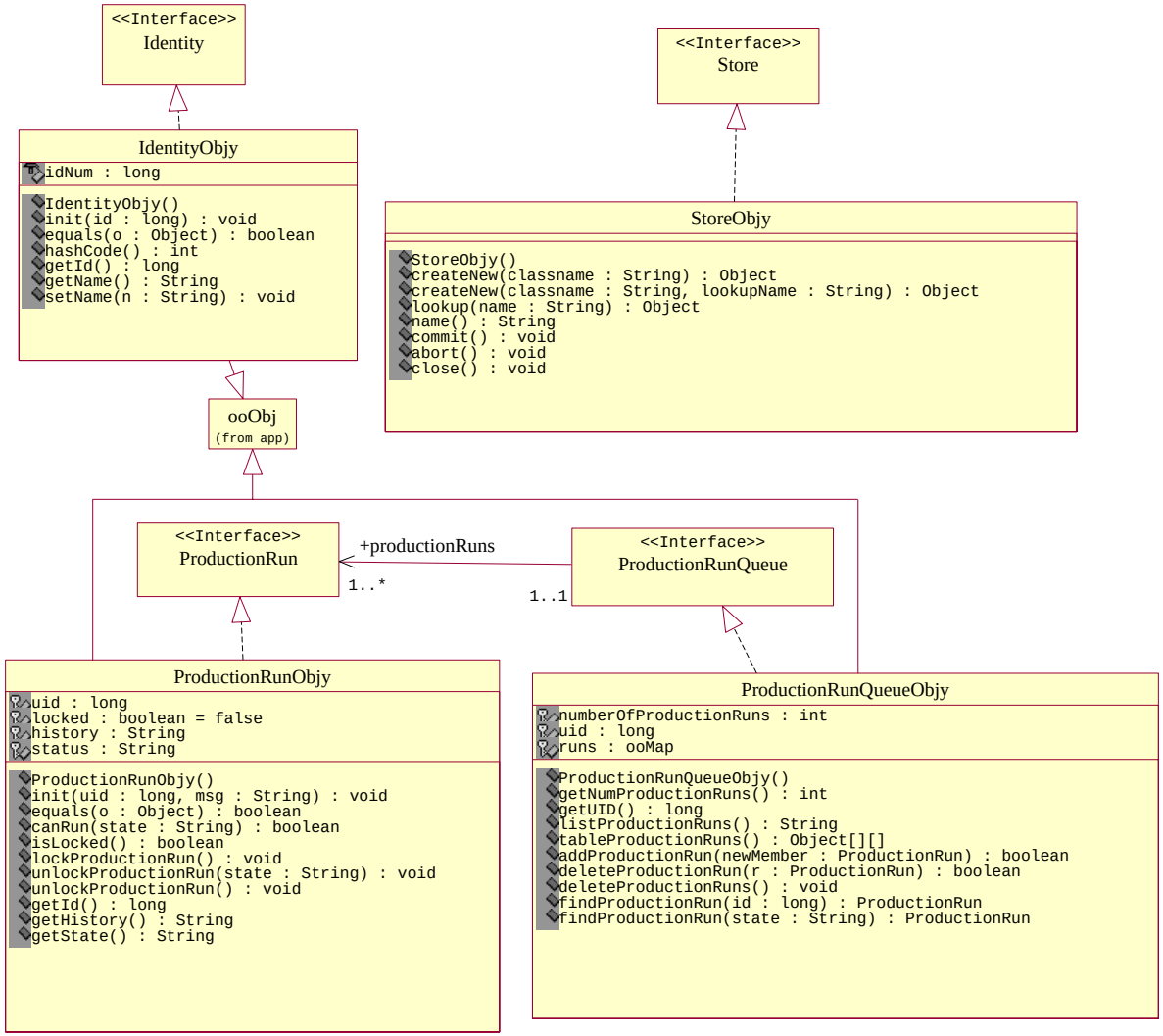
Interfaces (Pipeline Information)



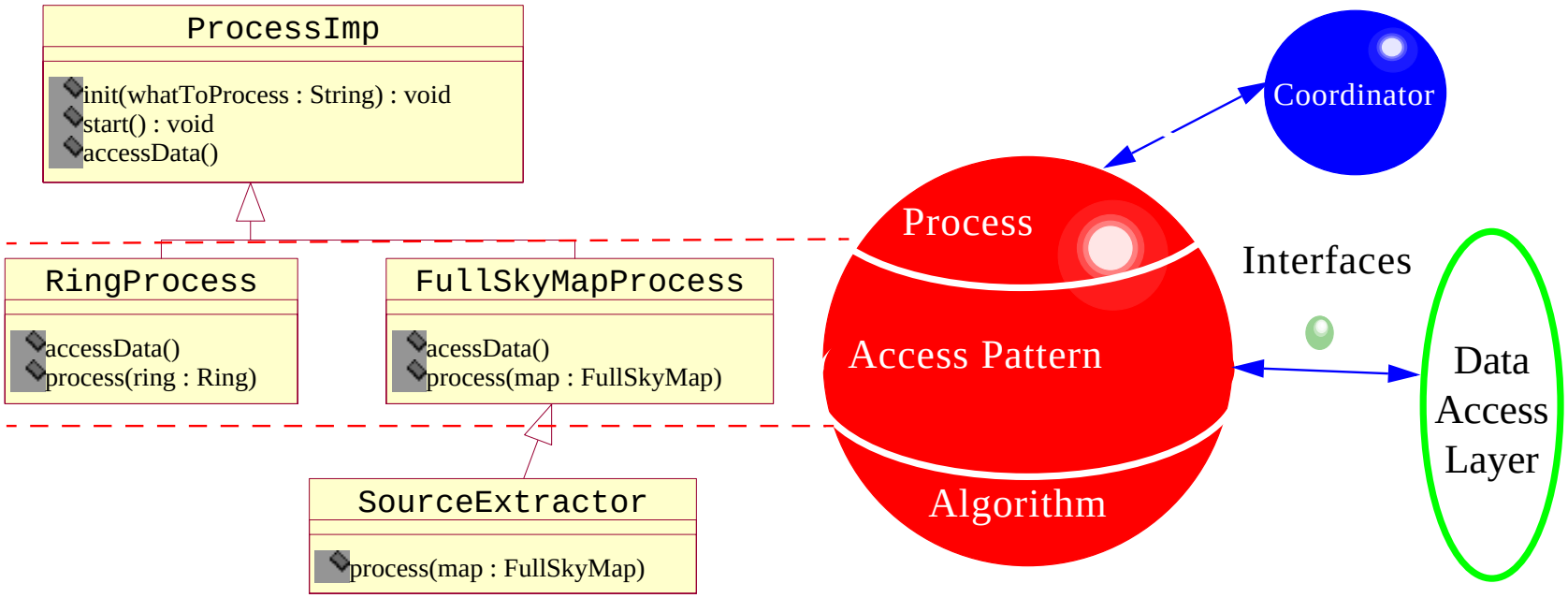
Interface provider /Store



Implementation



3-Part Process



Prototype pipeline has only two parts - the process part has not yet been generalised.

1st FINDAS-IDIS Commonality Working Group Meeting

IDIS Clients

IDIS Development Team

IDIS Clients

- Define interfaces for the data model and develop applications against these
- Multiple clients foreseen
  - Clients will be in Java
- Multiple implementations foreseen for bench marking purposes
  - FINDAS
  - Other implementations
    - Objectivity
    - Oracle (v8)
    - Files
    - O2 native
- Java Native Interface (JNI) wrapper needed for FINDAS
- Simultaneous testing of applications from IAS and OAT

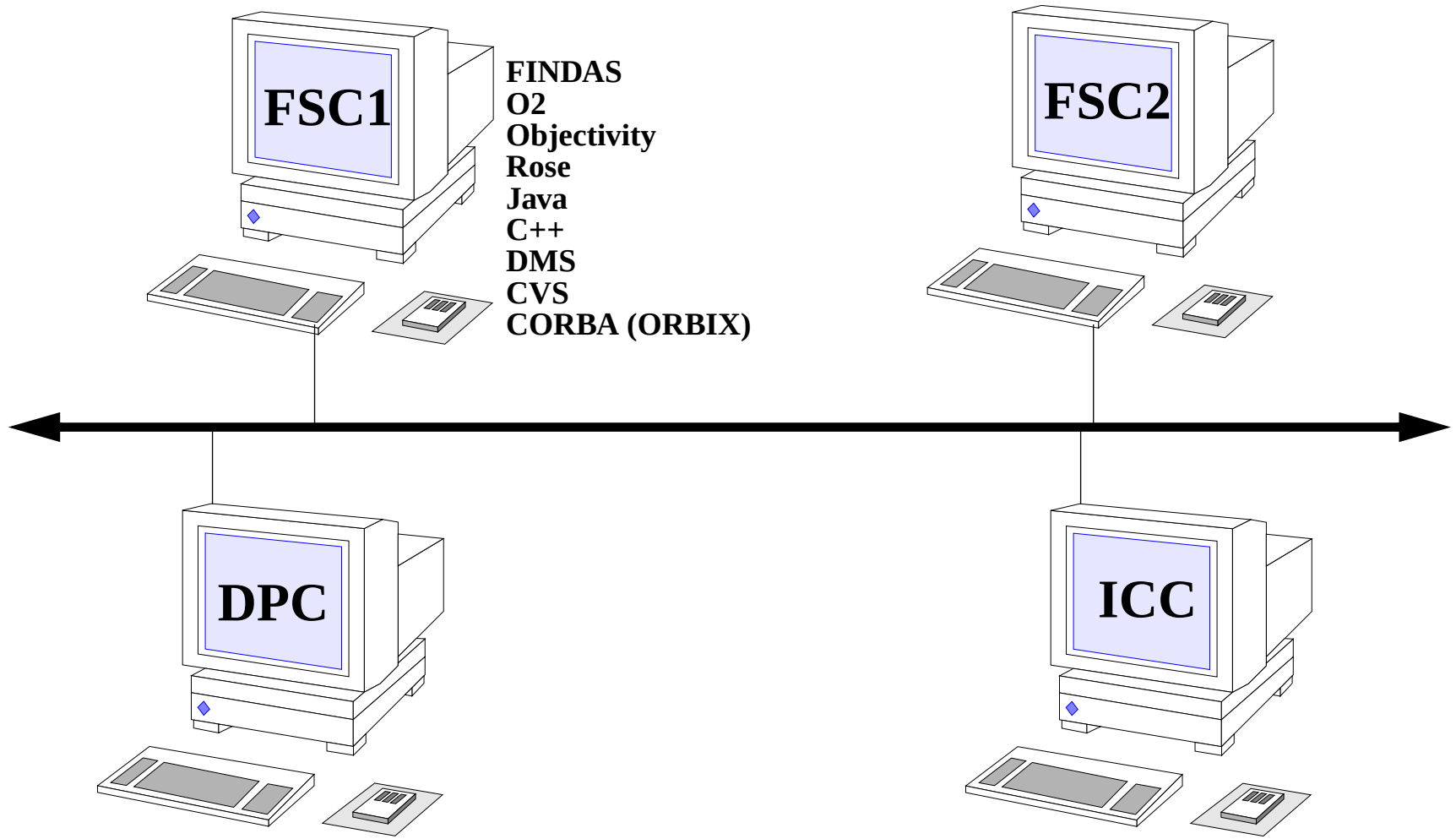
Proposed Clients

- MPA prototype pipeline software
  - Initial data requests and final product storage (via FITS client)
  - Pipeline status monitoring data
- FITS client(s)
  - Convert from database objects to and from FITS
- Simple map viewer client (MPA)
  - Views output of prototype pipeline
- TangoJ
  - IAS local map simulations software

Rough Schedule and Responsibilities

Task	~date	People
Tango J Definition	ASAP	IAS
Map Viewer Definition	ASAP	MPA
TangoJ Applications	April	IAS
Model	mid Feb.	SSD
Model Interface	end Feb.	SSD
Modify Pipeline to use FINDAS Implementation (largely done - already uses interfaces)	April	MPA
Load Maps implies FITS->Model	April/May	MPA
Model->FITS	April/May	MPA
Simple Map viewer	April	MPA
JNI based Interface to FINDAS Model	mid March	SSD
Objectivity Implementation	end March	SSD
02 Implementation	May	SSD
FINDAS Implementation	May	SSD
Oracle8 Implementation	end April	OAT
File implementation	May	IAS

Integration and support for clients



Schedule

April	May	June	July
•Learning prototype use and features. •Integrating FSC client. •Documentation	•Integration ICC client	•Integration ICC client	•Integration ICC client
•Learning prototype use and features. •Integrating IDIS/SSD client. •Documentation	•Integration DPC client	•Integration DPC client	
	•Developing, testing alternatives (in database, speed versus granularity, etc...) •Improving development process. •Documenting recommendations, guidelines, etc...		

Integration support at ESTEC

- FIRST side: Peter Claes & Jean-Jacques Mathieu
- Planck liaison: William O'Mullane & Adam Hazell & Jean-Jacques Mathieu
- Vega "warranty"ends mid-July

Need to have

- Knowledge of CORBA and OO database.
- operational teleworking from centres to ESTEC (possibly facilities such as FTP, remote login and telephone).

ASTROPHYSICS

FIRST

FINDAS-IDIS Commonality WG meeting no. 1

FSC Preparation for the Development of the GS/FINDAS

ESTEC, 2 Feb 1999

Peter Claes

ESA Astrophysics Division, Space Science Department

1. activity A: prototype FINDAS-evaluation

- *FINDAS prototype evaluation report* containing :
  - lessons learnt
  - recommendation for FINDAS-architecture and technologies
  - recommendation for FINDAS-infrastructure libraries
  - recommendation for the database
- *post-prototype Tutorial*

2. activity B : GS OO-framework and FIL

FINDAS Infrastructure Libraries (FIL)

- implement version control, session management, security, access control, transaction logging, etc.
- core FINDAS functionality
- similar to VEGA prototype Infrastructure libraries but more expanded
- **FIL** URD, SSD, DDD, ICD

GS OO-Framework Libraries (GSFL)

- performed early in the development phase by a group of OO- and domain experts, chaired by the OO-librarian
- fundamentals of the ground segment OO-model, to be used by all clients
- definition group examines reuse of previous projects and makes uses of industrial "*design patterns*"
- **GSFL** URD, SSD, DDD, ICD

3. activity C : Interface Class Libraries (ICL)

- ICL is defined by FSC (input from ICCs is sought)
- defines a common set of interface and general classes valid for all Instruments and instrument-related
- design pattern : "*bridge*"
- advantages of this approach :
  - clear interfaces
  - decoupling of FSC and ICC development
  - commonality at high level between instruments
  - less code, easier coding and simpler design of other ground segment subsystems
- ICL (abstract and general) == > ISCL (concrete and specialised)
- ISCL (Instrument Specific Class Libraries) implements the functionality of Astronomical Observation Template (AOT)-logic, Instrument Command Sequences and provides interfaces to every other instrument specific susbsystem (ICC-responsability)
- ISCL will be used later among others by the FINDAS-clients Proposal Handling Subsystem (PHS) and Mission Planning Subsystem (MPS)
- **ICL** URD, SSD, DDD, ICD
- later **ISCL** URD, SSD, DDD, ICD

4. activity D : provision and maint. of hardware and network

- first 2 interconnected machines foreseen for FINDAS already available internally
- O2-DBMS available from the 21st of April onwards
- next built-up of system at fixed dates of purchase (TBD)
- continuous support of O2-DBMS housekeeping, configuration control and hardware maintenance
- dedicated people later onwards for these tasks

5. Role of OO-Librarian

- Chair the Model Management Board (MMB).
- Participation in chairing of relevant commonality working group(s).
- Analyse and approve or disapprove the MCRs.
- Develop and define the GS OO-Framework object-oriented interfaces and libraries together with other experts in the GS.
- Use CMS (FINDAS-client) to make the OO-model visible to all GS-developers via the WWW.
- Chair the workgroups developing GSFL and ICL.
- Develop and define the FINDAS-Infrastructure libraries together with other experts in the GS.
- Define together with instrument specialists the abstract common Instrument Class Libraries (ICL) and their OO-Interfaces
- Maintain the parts of WWW-pages of CMS related to information about OO-technology.
- Interface with system engineers, integrators, ICCs, the Planck team and MOC as required.
- Maintain the update the Database-Schema in the ODBMS.
- Generate and publish the Data Dictionary.

6. activity E : provision of CMS

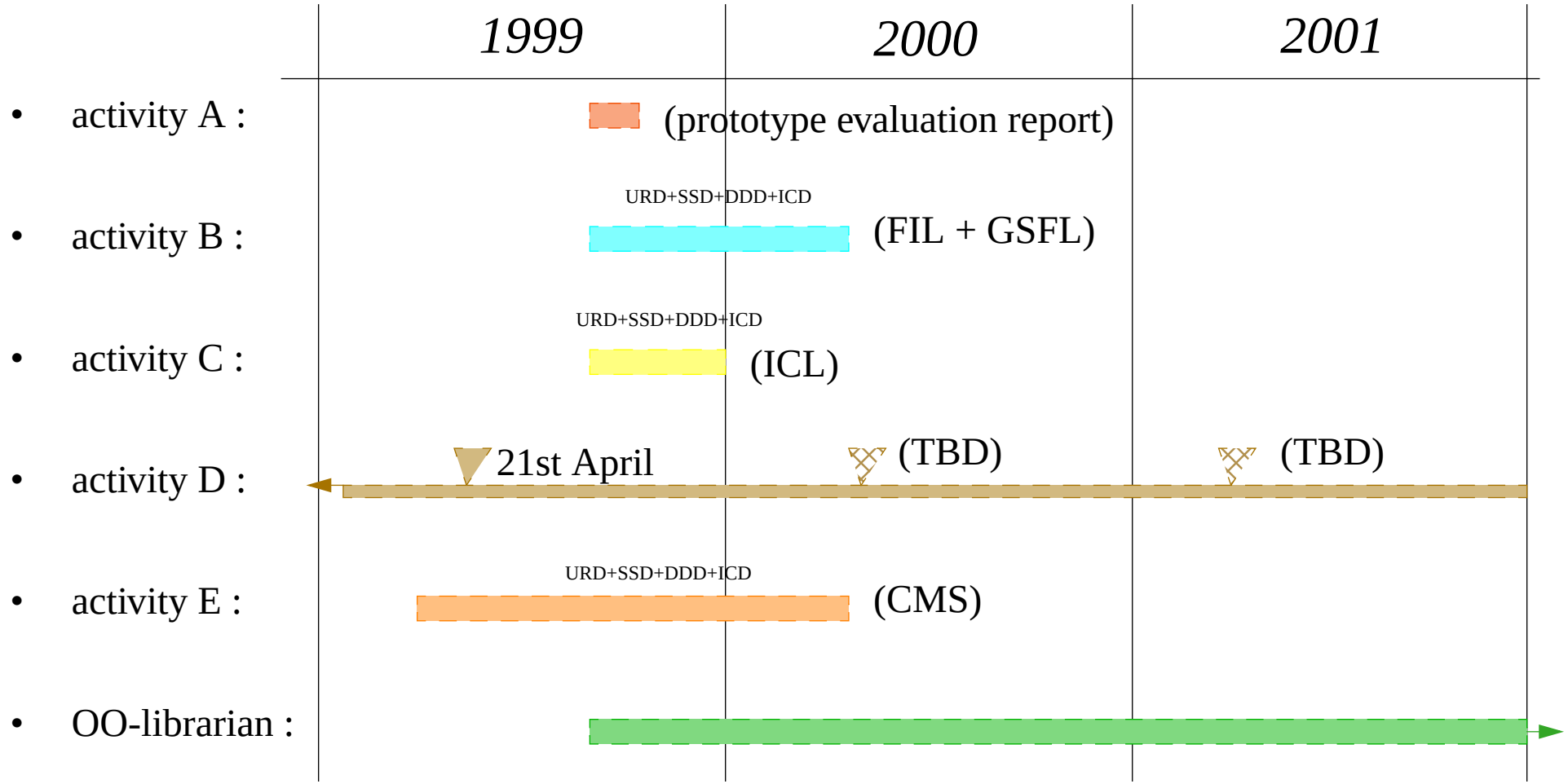
CMS provides the following functions :

- a mechanism for introduction, browsing and tracing of Software Problem Reports (SPRs)
- a mechanism for introduction, browsing and tracing of Software Change Requests (SCRs)
- a mechanism for introduction, browsing and tracing of FIRST OO-Model Change Requests (MCRs)
- a Document Management System (DMS)
- a mechanism for introduction, browsing and tracing of Review Item Discrepancies (RIDs)
- a mechanism for introduction, browsing and tracing of FIRST Infrastructure Change Requests (ICRs)
- visibility to the whole FSC/ICC/MOC-development team of UML OO-Model and Data Dictionary
- visibility to Software Release Notes
- on-line FINDAS-developers tutorial (including architecture and lessons learned) and FAQ
- on line OO-concepts tutorial and FAQ

6. activity E : provision of CMS (cont'd)

- 1 fte during 13 months including URD, SSD, DDD, maintenance afterwards
- implemented in JAVA (OO-logical links with other subsystems at a later stage)
- finish development when GSFL, ICL and FIL are available and before first "operational" FINDAS-subsystem is delivered

7. Schedule


1999
2000
2001
• activity A :
(prototype evaluation report)
URD+SSD+DDD+ICD
• activity B :
(FIL + GSFL)
URD+SSD+DDD+ICD
• activity C :
(ICL)
• activity D :
21st April
(TBD)
(TBD)
URD+SSD+DDD+ICD
• activity E :
(CMS)
• OO-librarian :

ASTROPHYSICS

FIRST

FINDAS-IDIS Commonality WG meeting no. 1

Commonality FINDAS-IDIS and commonality of GS

ESTEC, 2 Feb 1999

Peter Claes

ESA Astrophysics Division, Space Science Department

1. What is our goal ?

Exploit commonality between FINDAS and IDIS, FIRST-GS and Planck-GS whereever and whenever advantageous in terms of effort, cost, reduction of risk, complexity, etc. !

2. How do we achieve the goal ? : Discussion points of focus

- commonality of OO-model ?
- How far should we go ? (Pipeline ?, Telemetry ?, Telecommanding ?, etc.)
- IDIS-FINDAS Infrastructure Libraries shared ?
- must be compliant with SIP
- central role of OO-librarian
- strict configuration control, centralised
- framework should allow independent (in time) development by various partners in the Ground Segment

2. How do we achieve the goal ? : Discussion points of focus (cont'd)

- use of CMS (including DMS) (for free for Planck)
- OO-interfaces which can be used by all developers of the Planck- and FIRST GS
- IDIS-FINDAS same database ? commonality of ODBMS ? (pros and cons)
- commonality of networks ?
- commonality of Management Methodology, approach, Quality Managament ?
- commonality of documents (templates, layout)

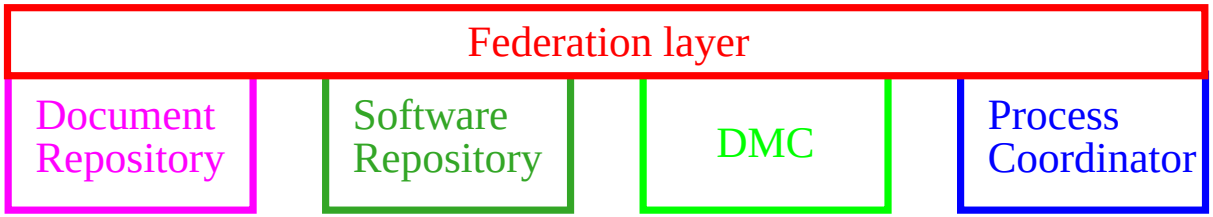
3. Output should be :

- decisions about in which areas commonality is desired and can deliver the highest benefits
- fresh ideas to take home, digest and bring back processed as input for the next meetings
- detailed plan of activities for the coming months
- action items

1st FINDAS-IDIS Commonality Working Group Meeting

Potential Commonality

Adam Hazell



Software Repository

- Developing “Software Repository URD”
- Written “Use of CVS for IDIS” document.
- Currently, common IDIS software being developed through Concurrent Versions System (CVS) centralised repository (at ESTEC) - COTS
  - Remote check-out, update and commit mechanism with conflicts flagged to developers
  - Level of control on each file in the repository can be varied as required
  - Repository structure by module (package) rather than by language
  - Web-based repository viewer
  - Probable long-term solution (e.g. large user base)
- Local “Private” repositories can easily be set up
  - Modules may be imported from one repository to another.
- Distribution repository is a simple FTP site.

Document Management System

- Currently developing the IDIS DMS URD
- Planck and FIRST now using Science Projects Division (SPD) COTS DMS
  - Immediate solution (need to share documents)
  - Helps define user requirements - as outlined in Work Package Break-down Approach
- Other COTS solutions under investigation

CASE Tool

- Planck software development currently using Rational Rose - COTS
  - UML implementation (OO design)
  - Code generation (Java, C++, Ada, Oracle,...)
  - Documentation generation
    - Done using flexible scripting language
    - Other applications possible e.g. FITS header generation
  - “Using Rose in a multi user environment” document written