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Title : REVIEW OF FINDAS USER REQUIREMENTS

Abstract : This document is a review of the FINDAS User Requirements provided in the Statement of Work. The original requirements have been interpreted and expanded, and a number of missing requirements have been identified.

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AMENDMENT POLICY

This document shall be amended by releasing a new edition of the document in its entirety. The Amendment Record Sheet below records the history and issue status of this document.

AMENDMENT RECORD SHEET

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1. INTRODUCTION

1.1. Purpose and Scope

This report is a review of the FINDAS User Requirements provided in the Statement of Work (RD.1). The original requirements have been interpreted and expanded, and a number of missing requirements have been identified. Further work on User Requirements is anticipated for future project phases.

1.2. Overview

Section 2.1 lists the original requirements together with our comments, *which are indented relative to the original*. Section 2.2 lists requirements that were perceived as *missing* from RD.1.

1.3. Referenced Documents

The following is a list of documents with a direct bearing on the content of this report. Where referenced in the text, these are identified as RD.n, where "n" is the number in the list below.

1. Implementation of a Prototype Integrated Data Archive System for the FIRST Ground Segment – Statement of Work, PT-S/W-04373, Issue 1, 4/6/97.

2. REQUIREMENTS

2.1. Original Requirements (Annotated)

1. FINDAS shall be able to capture and store online all significant FIRST mission data (initial estimate 2 Terabytes).

FINDAS shall not be required to store any processed products other than the final outputs from calibrations and tests (TBC).

2. FINDAS shall be able to capture and store PLANCK science and housekeeping data (initial estimate .5 Terabytes). The design shall include, as for FIRST, storage of additional data (software, documents, ancillary data, etc.). PLANCK data shall be stored in such a way that it is immediately and unambiguously distinguishable from FIRST data.

The storage of PLANCK data shall not require any additional capability relative to the system design developed for FIRST (TBC).

3. FINDAS shall be operational for at least 20 years (7 years pre-launch, 5 years operations, 8 years post-operations and archive). Adaptability to change is therefore essential.

4. FINDAS shall support expert and novice users.

All FINDAS users will be classified as either novice or expert. A novice user shall be allowed access to the database only through novice-level client software. An expert user shall be to use expert-level client software. All expert users will be internal (see 7).

The archive manager may be responsible for promoting the status of a user from novice to expert, as this confers greater access rights to the database.

5. FINDAS shall support different views of the data it contains.

The aim of a view is to provide a client with an interface to the database at an appropriate level of abstraction. A view shall group together a set of objects and offer them to a client in the simplest possible manner consistent with the client's needs. A view need not be defined in the database itself. A view will insulate a client from changes that may occur in the structure of the database.

6. FINDAS shall support local and remote users.

7. FINDAS shall support internal users (the FIRST/PLANCK Project users resident at the MOC, ICCs, DPCs, or FSC) and external users (the FIRST/PLANCK scientific community).

Internal users shall have priority of access over external users. An internal user shall have read-only access to a shadow database even if a communication link to the FSC is down (TBC).

8. FINDAS shall provide a mechanism (e.g. limitation of the number of users simultaneously connected, lock-out facility, etc.) to prevent system crash/freeze in the case of temporary overload conditions.

Many commercial databases are licensed according number of users simultaneously connected. This could provide a convenient method for limiting system workload.

9. FINDAS shall support decentralised operations using network facilities

- The MOC, ICCs, DPCs, and FSC are geographically separated entities connected via dedicated communication links operating at up to 128 Kbps (TBC)

- The communications between the centre shall be secure (e.g. no incomplete deliveries, misrouted deliveries, lack of feed-back in case of data loss, etc.)

- The communications between the centres shall be efficient. This means both fast and easy.

In the event of a link outage the system shall automatically resynchronise when the link is restored.

10. FINDAS shall provide queries on selected data in the archive to internal as well as to external users (see 7).

Internal users shall expect a rapid online response to simple queries, subject to system workload. Where the work of a remote internal user necessitates communication with the FSC this shall take place via the dedicated communications links.

External users shall expect an online response to a query resulting in less than 50 Mb of data. The results of a query resulting in 50-100Mb of data will be made available via FTP. Queries resulting in more than 100Mb will be dispatched by post on a CD ROM. These limits may be varied as improved technology becomes available.

All queries shall be subject to appropriate access control (see 12 & 13).

11. FINDAS shall support logging of all transactions.

The classes of transaction actually logged shall be configurable. All transactions that result in a change to the database or which access proprietary material shall be logged. All transactions that are refused owing to insufficient access permission shall be logged. All logging data shall be maintained in the database (TBC).

12. Access to FINDAS data shall be controlled via access rights, allocated to various user categories by the archive manager. The archive manager shall be able to change access rights when required.

Every object in the database will have an associated access rights list, which consists of a set of role / access right pairs. A role will consist of a group of users denoted by a user category. The set of user categories could include: archive

manager, general management, instrument calibrator, scheduler, real-time operator and external user. The set of access rights could include: remove/promote, update/lock, create, and read.

The promote operation shall designate the default object for a class (see 16).

The lock operation shall render an object read-only for all users except the one holding the lock and endures until an unlock operation is performed. A user with lock access rights for an object shall be able to obtain the contact details of any user holding a lock on the object. The archive manager shall be able to remove any lock.

13. FINDAS shall support allocation of access rights to various levels of granularity, e.g. access rights such as read or update can be set at high level (i.e. object) or at field level (for instance the grade field of a proposal).

Access control at a level lower than that of the object may be handled by the methods of the object concerned. In the previous example, the access right necessary to change the grade of a proposal would be enforced by the "set grade" method.

14. Note that this section has been changed relative to the SOW.

FINDAS shall allow the following type of access to external users:

- notification of events by e-mail
- browsing of selected data
- downloading (e.g. FTP, HTTP, etc.)
- update

E-mail notification shall be provided automatically following specific events. For example, proposal holders shall be notified when their proposals are scheduled and when the products become available.

Browsing and downloading shall be available via client software.

Updating of the database shall be permitted only by a very limited set of client software (e.g. PGA).

Internal users shall have potential access to a much greater range of client software than external users, providing more scope to update the database.

Remote log-in to a FINDAS host system shall be available for the archive manager only, who shall be strictly an internal user.

All FINDAS access will make use of standard protocols compatible with possible firewall deployment.

15. FINDAS shall provide the necessary facilities to support automatic messaging between system components, users and/or processes.

Automatic messaging shall be triggered by changes to specific objects in the database.

16. FINDAS shall provide a secure fully integrated configuration control system (audit trail, version control, history, etc.)

Every object, where appropriate, shall possess a version number. Version numbering shall be unique within a class. Each time an object is updated its version shall be updated. It shall be possible to group related objects and apply version control to the group. The configuration control system shall be capable of dealing with version branches. For versioned collection a single version may be designated as default (see 12). The default version will be used by all client software not specifying an explicit version. Only a single object from a class may be default.

Every object shall possess the following attributes: creation date, user responsible for creation, and documentation (TBC). The documentation attribute may not be empty: if an object is created automatically then the process identity shall be given as well as any other relevant information.

17. FINDAS shall provide a mechanism which allows to mark a set of related data as "proprietary" (based on user-id). A mechanism shall be provided to remove the proprietary feature upon occurrence of specific event (specific date, expiration of a grace period, etc.)

Every object shall have an owner, which shall be a single user.

The proprietary nature of an object shall be enforced by setting its access rights such that only its owner has access. An object may be made public by giving read access to all users (TBC).

18. FINDAS shall provide a mechanism to allow the "automatic binding" into a unique set of several data items which are inter-related. For example an observation data set for one user could be bound with the corresponding calibration file(s), auxiliary data, and science processing software prior to downloading to the user.

Automatic binding might be implemented using a view (see 5), a versioned collection (see 16), or explicitly through the database schema, depending on the closeness of the relation and the purpose of the binding.

19. FINDAS shall provide a mechanism to support "bulk loading" of the archive e.g. support populating of the archive from data/files originating outside of FINDAS.

Bulk loading from different external formats may be achieved by creating an appropriate view (see 5).

20. FINDAS shall support "batch-type" transactions (e.g. updates).

A batch transaction is a transaction that is not initiated from an interactive client session (TBC).

21. **Note that this section has been changed relative to the SOW.**

TM data (packets) received from the ground station(s) by the MOC (*rate up to 64 Kbs seconds*, TBC) shall be made available via FINDAS to up to three ICCs (geographically separated from the MOC) within an absolute maximum of five minutes of receipt at the FSC, and preferably within one minute of receipt (TBC).

2.2. Missing Requirements

22. The standard user interface for FINDAS client software shall be the HTML browser, although the system shall have the flexibility to support other interfaces as may be required.

Every FINDAS object for which the display operation is meaningful shall be capable of being displayed in a HTML browser.

23. The database shall have a backup facility which shall be capable of operating without interruption to normal operations. It is accepted that limited outage of service may be required in order to restore the database from backups.

24. The database shall have a facility for uploading telemetry from secondary storage media.

This mechanism shall automatically synchronise with the network based distribution of data (see 9) to ensure that no transactions are missed out or repeated.

25. FINDAS shall be available 24 hours per day, with a maximum of 15 minutes allowed for unscheduled maintenance. The total downtime shall be not more than 3 days for any period of two years (TBC).

26. FINDAS shall provide APIs to support client software but the client software itself is not part of FINDAS.