

PRECISION RADIAL VELOCITY SPECTROMETER

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CHANGE RECORD

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1.0	14 th September	All	Re-draft of document to be in-line with the UK ATC Programme Delivery and Engineering Procedures

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List of Abbreviations

ARR	Acceptance Readiness Review
BEN	BOM Explosion Number
BOM	Bill of Materials
CC	Configuration Control
CDI	Change Data Index
CFE	Customer Furnished Items
CI	Configuration Item
CIB	Configuration Implementation Board
CM	Configuration Management
CMP	Configuration Management Plan
CMS	Configuration Management System
CRB	Configuration Review Board
CSA	Configuration Status Accounting
CO	Configuration Officer
CoDR	Concept Design Review
CSCI	Computer Software Configuration Item
CU	Calibration Unit
DA	Design Authority
DDI	Document Data Index
DID	Data Item Description
DPS	Data Pipeline System
DRR	Design Release Review
ECN	Engineering Change Notice
ECR	Engineering Change Request
EPROM	Erasable Programmable Read-only Memory
FAR	Final Acceptance Review
FCA	Functional Configuration Audit
FDAS	Fibre Deployment and Acquisition System
FDR	Final Design Review
FFO	Fibre-Fore Optics
FPRD	Functional Performance Requirements Document
FRACAS	Failure Rate and Criticality Analysis System
HWCI	Hardware Configuration Item
ICD	Interface Control Document

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ICS	Instrument Control System
IfA	Institute for Astronomy, University of Hawaii
INF	Infrastructure
LRU	Line-replaceable Unit
MRI	Master Record Index
MRR	Make Release Review
OCDD	Operational Concepts Definition Document
PCA	Physical Configuration Audit
PDR	Preliminary Design Review
PM	Project Manager
PO	Project Office
PRVS	Precision Radial Velocity Spectrometer
PS	Project Scientist
QAR	Quality Assurance Representative
RR	Requirements Review
SE	Systems Engineer
SWE	Software Engineer
SOW	Statement of Work
SPEC	Spectrograph
TBA	To be Announced
TBC	To be Confirmed
TBD	To be Defined
WPM	Work Package Manager
UK ATC	United Kingdom Astronomy Technology Centre

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Definition of Terms

Bill of Materials	The Bill of Materials is a multi-level list of parts and components required for a product assembly.
Change Data Index	The Change Data Index is a list of the documentation associated with an Engineering Change Request (ECR) and shows the status, (Work in Progress, under Review or Released) of each document listed in the ECR.
Concession	A specific written authorization to accept an item or product which, during or after manufacture or build, having been submitted for acceptance, is found to depart from particular performance or design requirement as represented by an established and approved configuration baseline, but that nevertheless is considered suitable for use "as is" or after rework by an approved method.
Configuration Audits	<p>Verification involves a continuous comparison of the product against its approved configuration, and the discovery and correction of discrepancies. This is applicable to both the development and manufacturing processes.</p> <p>The complete development and build history shall be properly documented, and all approved deviations and concessions shall be recorded. All material and processes used shall be recorded. Inspection and calibration records shall be compiled and maintained.</p> <p>Audits are concerned with the why, where, when and who of product development and manufacture.</p> <ul style="list-style-type: none">• Functional - what the Configuration Item (CI) must do in accordance with specifications (function).• Physical - what the CI must look like in accordance with specifications and standards (form and fit for purpose).
Configuration Baseline	A baseline of a product is a set of approved functional and physical characteristics as documented in a data pack, which consolidates the results from the preceding phase, which is authenticated by an appointed person, and which forms the point of departure for the succeeding phase.
Configuration Control	The systematic proposal, justification, evaluation, co-ordination, approval or disapproval of proposed changes and the implementation of all approved changes, in the configuration of an item or product after the formal establishment of its configuration baseline.
Configuration Implementation Board	The Configuration Implementation Board is a standing committee responsible to oversee that changes are implemented correctly and that all stakeholders are notified of the changes.
Configuration Item	A configuration item is an aggregation of hardware, software, firmware, processed materials, services, or any of its discrete portions that satisfies an end user function, designated for management and treated as a single entity in the process.

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Configuration Management

This discipline applies technical and administrative direction and surveillance for the following:

- Identifying and documenting the characteristics of a configuration item (hardware configuration item (HWCI) or computer software configuration item (CSCI)).
- Controlling changes to the characteristics of the HWCI and CSCI.
- Recording and reporting change processing and implementation status.

To achieve the above-mentioned objectives, the discipline of Configuration Management is divided into five functional areas, namely:

- Configuration Planning.
- Configuration Identification.
- Configuration Control (CC).
- Configuration Status Accounting (CSA).
- Configuration Verification.

These areas are defined in specific sections of this plan.

Configuration Review Board

A group of people composed of technical and project management representatives who recommend approval or disapproval of proposed engineering changes, to an item or product current approved configuration

Configuration Status Accounting

Configuration status accounting is the recording and reporting of the approved configuration identifications, the status of proposed changes to the CIs and the implementation status of approved changes.

The recording and reporting requirements of configuration status accounting are met by the preparation and issuing of an approved MRI for the product, as well as periodic status reports.

Deviation

A specific written authorization, which is granted prior to the manufacture or build of an item or product, to depart from a particular performance or design requirement as represented by an established and approved configuration baseline, to produce for a specific number of units for a specified period of time.

(A deviation is used to request and document a departure when permanent changes are not acceptable)

Document Data Index

The Document Data Index is a list of miscellaneous documentation not directly associated with a product part number.

Engineering Change Request

A request consists of a proposed permanent engineering change described by means of an Engineering Change Request form supplemented with supporting documentation further describing the proposed change (if required). Refer to UK ATC Procedures Manual for the engineering change proposal classification definition.

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Modification

Modifications are defined as changes made to (or planned for deployed) as-built controlled items or product configurations.

Note:

Modification can only be associated with serialized items.

Modification data form part of the underwriting product maintenance and modification history data.

Modifications do not affect the approved product baseline.

Master Record Index

The Product Master Record Index (MRI) is a list of documentation associated directly with an assembly and its lower level item part numbers, indicating material numbers, titles and issue status of all the configuration identification documentation, which is required to reflect the configuration identification of that item at any point in its life cycle.

The MRI is identified directly with the Bill of Material (BOM) and its revision level.

UK ATC Configuration Management Principles

Baselines

Product baselines will be managed by:

- Part number.
- Valid from date (BOM Explosion Number (BEN)).

Document baselines (Milestones, etc.) will be managed by:

- Document Data Item (DDI) document part.

Change

A change is the completion of all the actions required by an ECR.

Implementation

Until the change is complete, both current and proposed product configuration or report status will be available.

Product

Every change to the product (assembly) configuration, whether hardware (component), software (computer program) or documentation, that does not result in a new product part number will result in a revision change to that product (assembly) BOM.

Valid on Date

The 'Valid from' function will be used to indicate the point of embodiment or affectivity of both documents and hardware

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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

This document describes the organization, responsibilities and requirements for implementing Configuration Management (CM) in accordance with the UK ATC processes by the PRVS consortium under the leadership of the UK ATC for the development, build and commissioning of a Precision Radial Velocity Spectrometer (PRVS) for Gemini.

1.2 PRODUCT DESCRIPTION

PRVS is a high resolution spectrometer operating in the near infra-red which shall be developed for use on either of the Gemini 8 meter telescopes. Gemini North, located at Mauna Kea or Gemini South, located at Cerro Pachon. The instrument shall primarily be used to measure the radial velocity of M class stars and the instrument shall be compatible with either location. By measuring the radial velocity of M class stars very accurately the science community hope to detect the presence of orbiting planets. In the science case it is recommended that a larger number targets can be surveyed with Gemini North and that the location will have slightly improved atmospheric conditions.

PRVS shall consist of the following major sub-systems:

- a. Fibre Deployment and Acquisition System
- b. Calibration Unit
- c. Fibre Fore-Optics
- d. Infrastructure
- e. Instrument Control Electronics
- f. Spectrograph
- g. Data Pipeline

Refer to the PRVS Functional and Performance Requirements Document (FPRD) for a detailed description and definition of the instrument.

1.3 PRODUCT IDENTIFICATION

The instrument covered by this documentation plan shall be identified as the Precision Radial Velocity Spectrometer (PRVS) and the configuration identification number is 89-ATC-8001-3000.

1.4 CONFIGURATION MANAGEMENT PRINCIPLES

Configuration Management (CM) is the process of managing products, facilities and processes by managing the information about them, including changes, and also ensuring that the products, facilities and processes and the information are clear, concise and valid. The UK ATC's configuration management system (CMS) is based on the principles of Configuration Management II (CMII). It is proposed that the UK ATC CMS is used for the design, development, build, implementation and commissioning of PRVS.

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Traditional configuration management consists of the following elements:

- a. Configuration Planning.
- b. Configuration Identification.
- c. Configuration Change Control.
- d. Configuration Status Accounting.
- e. Design reviews and configuration audits.

Configuration Management II (CMII) is a redefined and improved version of traditional CM. In addition to the elements (a) through (e) above, CMII seeks to give continuous improvement by including the need to:

- f. accommodate change,
- g. optimise the reuse of standards and best practices,
- h. ensure that all requirements (all released information) remain clear, concise and valid,
- i. communicate (f), (g) and (h) to each user promptly and precisely and
- j. ensure that results conform to the requirements in each case.

The processes to deal with the traditional elements of configuration management for the development of the instrument are described in:

- a. Configuration Planning in Section 3.
- b. Configuration Identification in Section 4.
- c. Configuration Change Control in Section 5.
- d. Configuration Status Accounting in Section 6.
- e. Design Reviews and Configuration Audits in Section 7.

1.5 APPLICABILITY OF PLAN

The configuration requirements described in this plan will be applicable to the design, development, manufacturing, integration, verification and commissioning of the instrument as described in the “PRVS Management Plan”, Document Number PRVS-PLA-00003-0001.

1.6 UK ATC PROGRAMME DELIVERY AND ENGINEERING PROCEDURES

The UK ATC Programme Delivery and Engineering Procedures, Document Number ATC-TBD, September 2006, describes the UK ATC’s development process, procedures and policies for the development, build and commissioning of telescopes and astronomical instruments. The document contains the standard Configuration Management Plan for UK ATC projects.

The UK ATC Programme Delivery and Engineering Procedures are currently under consideration for approval and in future, UK ATC lead projects shall call up the relevant procedures for project configuration management, product assurance, quality assurance and safety, thus this document will become obsolete. The project management plan shall reference the Product Breakdown Structure (PBS) in Appendix A and the Documentation Schedule (in Appendix B).

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1.7 DOCUMENT LAYOUT

In this section we define the purpose and scope of this document and describe and identify the instrument. The principles of Configuration Management II (CMII) are summarised together with a description of the relationship of this document with reference to the UK ATC Procedures referenced in Section 2. The applicable and referenced documents are listed in Section 2.

Section 3 describes the PRVS project configuration planning. In the remainder of the document (Sections 4, 5, 6 and 7) the rest of the configuration management elements are defined.

Finally the concept design Product Breakdown Structure and Documentation Schedule are defined in Appendix A and B respectively.

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2 REFERENCE DOCUMENTS

Where there is a conflict between the information in the applicable documents and that contained in this document, this document takes precedence.

2.1 UK ATC PROCESS DOCUMENTS

The following documentation should be read in conjunction with this document for supplementary information:

Reference	Document Title	Document Number	Issue & Date
AD01	UK ATC Programme Delivery and Engineering Procedures	TBD	1, September 2006

2.2 PROJECT DOCUMENTS

Reference	Document Title	Document Number	Issue & Date
AD02	Design Study for PRVS : Exhibit A, Work Scope	Contract No.0084699-GEM01056	6 th January 2006
AD03	PRVS Management Plan	PRVS-PLA-00003-0001	September 2006

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3 PRVS PROJECT CONFIGURATION MANAGEMENT PLANNING

To ensure an adequate CM programme, the organisational relationship required within the UK ATC lead consortium, the consortium and Gemini, and between the consortium members and their respective sub-contractors are described in Section 3.1 and 3.2.

3.1 CONFIGURATION MANAGEMENT ACTIVITIES RESPONSIBILITIES

The responsibilities are defined in below Table 1.

Table 1 PRVS Roles and Responsibility Allocation

Ref	Description	PM	CM	SE	WPM	DE	PO	PA
1	CONFIGURATION ORGANIZATION							
A	System and Standards	-	P	-	-	-	-	-
B	CM Policy		P		-	-	-	-
C	Generation of UK ATC Standard CMP		P		-	-	-	-
D	Liaison with Project Team	P	-	P	P	S	S	S
E	Subcontracting Agreements	P	-	S	P	-	S	-
2	CONFIGURATION IDENTIFICATION		-					
A	Identification Numbering and Naming	-	-	P	-	-	-	
B	Baseline Identification	S	-	P	S	-	-	S
C	Input to Contractual Documents	P	S	S	P	-	-	-
D	Product Item Identification	-	-	P	-	-	-	S
E	Item Naming as Applied at CI Level	S	-	P	S	-	-	S
F	Preparation and Updating of Documentation Schedule	S	-	P	S	-	-	S
G	Change Identification to Drawings and Documents	-	-	P	S	S	S	S
H	Project Engineering Management Documents Requirements	S	-	P	S	-	-	-
I	System, Project and Document Family Trees	-		P	S	-	-	S
3	CONFIGURATION CONTROL							
A	Programme Phasing	P	S	S	P	S	S	S
B	Product Breakdown Structures	S		P	S			
C	Engineering Change Request Initiation	S		P	P	P	P	S
D	ECR Evaluation	P	-	P	P	P	P	
E	ECR Processing	S	-	S	S	S	S	P
F	ECR Approval (Internal Changes)	S	-	P	S	S	S	S
G	Composition of CCB	S	P	S	-	-	-	-
H	Convening of CCB	S	-	S	S			P
I	Interface Control	S	-	P	S	S	-	-

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Table 1 PRVS Roles and Responsibility Allocation

Ref	Description	PM	CM	SE	WPM	DE	PO	PA
J	Minutes and Actions Arising from CCB	S		S	S	S	S	P
K	Submission of Class 1 ECR to Buyer	P		S	S	-	-	S
L	Updates to Drawings and Documents	S		P	S	S	S	S
M	Updates to Other Documents	S		S	S	P	P	S
N	Storage and Retrieval of Documents and Drawings	P	P	P	P	P	P	P
O	Release Documents and Drawings	P	-	-	-	-	-	S
P	Document Reproduction and Archiving	-	-		-	-	-	P
4	STATUS ACCOUNTING							
A	Generation of, and Updates to MRI, DDI and Records	S	-	S	-	-	-	P
B	Functional Audits	S	P	S	S	S	-	-
C	Physical Audits	S	P	S	S	P	-	-
D	Preparation of Reports	S	P	S	S	P	-	-
E	Distribution of Reports	S	-	S	S	-		P
F	Traceability of Documentation and Products	S	-	S	S	S	-	P
G	Build History Dossiers and Records	S	-	S	S	S	-	P
Keys:	DE Design Engineer PM Project manager CM Configuration Management PO Project Office MPC Material Procurement and Control S Secondary Responsibility P Prime Responsibility SE Systems Engineer PA Project Assistant							

3.2 SYSTEM AUTHORITY AND RESPONSIBILITIES

The configuration management responsibilities are defined below.

3.2.1 Project Manager

The project manager shall be responsible for all the project activities related to cost, schedule and priority and shall also be the CCB chairperson.

3.2.2 System Engineer

- The System Engineer shall be responsible for the technical performance of the product and shall therefore also be responsible for the evaluation of all CCB change requests.
- The Systems Engineer is responsible for the CCB and distribution of all the project interface control documents, and for issuing all changes.
- The Systems Engineer will ensure that the necessary interface documentation is generated and that all changes proposed for an ECR are approved in consultation with the various parties affected by a change.
- The Systems Engineer is also responsible for reviewing all changes as part of the Configuration Review Board (CRB) and verifying the correct implementation of approved changes as part of the Configuration Implementation Board (CIB).

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3.2.3 Configuration Management

At the UK ATC configuration management is the responsibility of the Head of Systems Engineering and reports on the following:

- a. Existence of all CM activities in-house and at contractor level.
- b. Determining the general requirements for project CM.
- c. Establishment and maintenance of the UK ATC CM procedures.
- d. Ensuring that the requirements for CM are included in all proposals and Statement of Works (SOWs).
- e. Assessment and auditing of subcontractors' CM systems, activities and capabilities.

3.2.4 Subcontractors

- a. Subcontractors are responsible for identifying, defining and documenting CI interfaces designed within their own agency.
- b. Subcontractors are responsible for the identification, definition and documentation of CI interfaces rolled down to their subcontractors.

3.2.5 Quality Assurance Representative

Quality Assurance Representatives shall be responsible for validating and releasing of the product and to verify that the product conforms to the agreed baselines.

3.2.6 Standing Committees

All standing committees referred to in this document are UK ATC specific. The descriptions in this document are specifically applied to all change requests originated by the UK ATC lead consortium.

3.2.6.1 Configuration Review Board

This Configuration Review Board (CRB) is a permanent committee initiated by the Project Manager. It is the final authority within the Project environment on proposed major Class 1 and complex Class 2 changes.

The CRB is not a voting board; its members are there to advise the chairperson as to:

- a. whether the change is necessary;
- b. whether the method of implementation is feasible;
- c. whether the change meets the technical performance;
- d. whether the schedule and cost requirements can be met;
- e. what the implications are for existing inventory.

After assessing this information, the CRB shall decide either to approve or reject the change proposal and the CRB chair person shall sign-off the engineering change request note.

For change proposals affecting hardware and associated documents, the CRB shall consist of the following core members:

- a. Project Manager (chairperson).
- b. Systems Engineer.
- c. Safety Officer.
- d. Quality Assurance Representative.

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- e. Procurement.
- f. ECR initiator.

Additional members may be appointed as and when required.

The CRB meeting will be held when required.

For change requests not affecting hardware or associated documents, the CRB would typically consist of the individual whom proposed the change, system engineer, project manager and the project assistant.

3.2.6.2 Configuration Implementation Board

This Configuration Implementation Board (CIB) is a permanent committee initiated by the Project Manager. It is the final authority within the Project environment for verifying that approved major Class 1 and complex Class 2 changes have been implemented correctly and that the Engineering Change Notice (ECN) can be issued to notify the project team and stakeholders of the change in the product status.

For approved engineering change requests the CIB shall consist of the following core members:

- a. Systems Engineer.
- b. Quality Assurance Representative.
- c. Design engineer or work package manager.

The CIB meeting will be held as and when required.

3.2.7 Interface Control Management

3.2.7.1 Method of Interface Control

All interfaces shall be specified in the various Interface Control Documents (ICDs) and in interface drawings.

3.2.7.2 Interface Drawings

The interface control drawing shall carry the approval signatures of the CI owners.

3.2.7.3 Engineering Change Requests

An Engineering Change Request (ECR) for every change affecting the customer's or subcontractor's hardware interfaces will be sent to the customer (Class 1). All interfaces are included, in other words interfaces between major items (Class 2).

3.3 CM PHASING AND MILESTONES

This section defines the baselines required from development through to the production cycle.

3.3.1 As-Planned and As-Released Baseline

Development is a three tier process consisting of a high level plan, detailed design and execution of the plan. A high-level plan (or design basis) is created and released before proceeding with a detailed design. The design basis is extended into a physical item hierarchy (called a Product Breakdown Structure). Associated with each physical item is a set of documents required to either buy or make the item. Document owners shall work in order to achieve the planned release dates to ensure the timely integration of the instrument as defined in the PRVS Management Plan and in accordance with the baseline schedule defined in Section 3.3.2.

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3.3.2 Baselines

This project has been identified as consisting of the phases, defined in Figure 1 below.

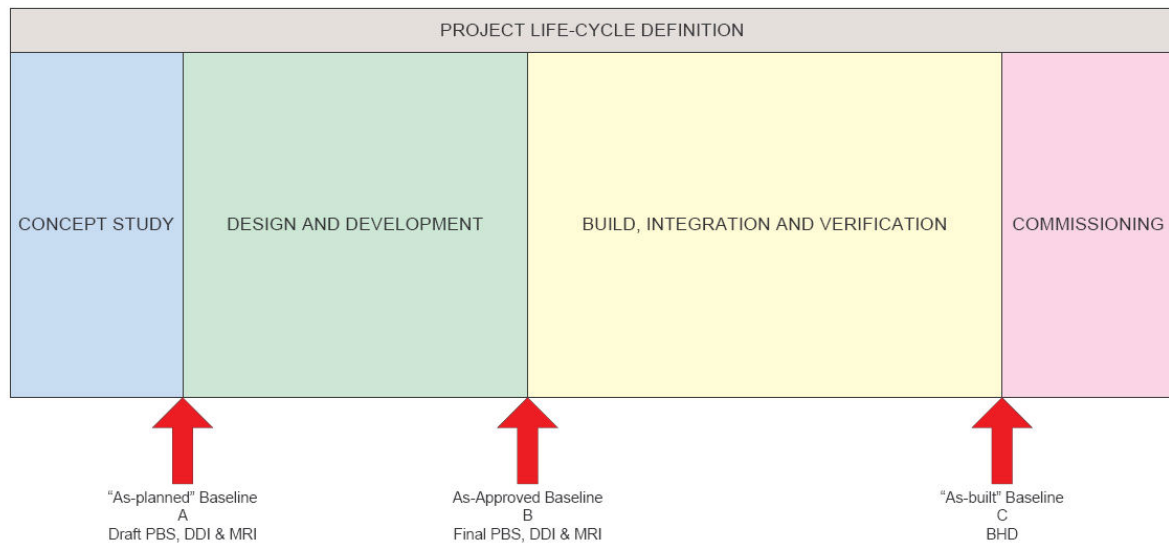


Figure 1 PRVS Baseline Definition

3.3.3 Baseline Management

- For the manufacturing baseline, all MRIs shall be approved and the baseline frozen.
- The product baseline contains all "built to", "operate to", "and maintain to" information for each item of the system.

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4 CONFIGURATION IDENTIFICATION

4.1 SCOPE

This section of the CMP shall address the identification requirements for documentation, software, hardware and baseline definitions.

4.2 PRODUCT IDENTIFICATION

- a. The identification of CIs is a progressive activity and shall be carried out by means of the expanding product breakdown structure. System level identification shall consist of a unique number allocated by the SE.
- b. A MRI and product breakdown structure shall exist for each CI.
- c. Further number allocations for the data pack will be allocated by the drawing owners and the SE, and registered in a register allocated to the project.

4.2.1 Interconnections

- a. Loom - When the wiring of a product is done during the manufacturing process and cannot be removed from the product without destruction of the wiring then this wiring is a 'Loom'.
A loom does not have a part number but has items of wiring on a higher-level BOM.
- b. Harness - when the wiring of a product is made separate from the product and then installed in the product and can be removed from the product when required as an item then this wiring is a 'Harness'.
A harness will have a part number and its own BOM.
- c. Cable - when it is necessary to connect two or more products or connections on a single product and this wiring is made separate from the product then this wiring is a 'Cable'.
A cable will have a part number and its own BOM.

4.2.2 Software Configuration Identifications

Software configuration identification shall be done by the responsible software engineers in cooperation with the Systems Engineer.

4.2.3 Customer-Furnished Equipment

- a. All items supplied by the customer for incorporation into the product either prior to delivery of thereafter, will be identified by an outline drawing or specification on the applicable Master Record Index (MRI). The title will include the word CFE.
- b. These items will be indicated on the applicable higher-level product BOM. The item master description will include the word CFE.
- c. Rework of these items will result in them being re-identified as UK ATC items and labelled accordingly. Traceability to the original CFE part number shall be maintained.

4.2.4 Purchased Items

4.2.4.1 Identification of Bought-out CIs

Purchased items will be incorporated into the system MRI and DDI by means of UK ATC number. An outline drawing shall be generated for each bought-out unit of hardware.

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4.2.4.2 Equipment User Manuals/Documentation

All documentation supplied with bought-out equipment and items shall be placed under CM control, for example user manuals, and leaflets and brochures supplied.

- The person or initiator responsible for buying the bought-out item shall ensure that all documentation received with the item is placed under CM control.
- This type of bought-out documentation can be reissued to the user, after it has been registered at CM.
- Bought-out documentation shall also include all support documentation received with bought-out software.

4.3 PRODUCT BREAKDOWN STRUCTURE

The first order conceptual design instrument level product breakdown structure is defined in Appendix A of this document.

During the next phase of the project the PBS will be contained in a formally release numbered drawing.

4.3.1 Product and Software Numbering System

A block of Gemini product numbers has been reserved for PRVS, starting at 89-ATC-8001-3000 and ending at 89-ATC-8001-3999.

Gemini product numbers have been allocated as listed in Table 2.

Table 2 PRVS Instrument Configuration Items

Sub-Systems	Part Number	Responsible DA
Fibre Deployment and Acquisition System	FDAS	89-ATC-8001-3050
Calibration Unit	CU	89-ATC-8001-3150
Fibre Fore-Optics	FFO	89-ATC-8001-3300
Infrastructure	INF	89-ATC-8001-3500
Spectrograph	SPEC	89-ATC-8001-3750
Instrument Control system	ICS	89-ATC-8001-3900
Data Pipeline System	DRS	89-ATC-8001-3950

4.4 DOCUMENTATION PLAN

The “as-planned” documentation list is given in Appendix B of this document. Currently the documentation list only identifies the level 1 and level 2 documentation requirements. This list will evolve and be updated to include the documents required for the manufacturing and procurement of all parts and components required to build the instrument.

4.4.1 External Documents

Externally originated documents will be taken up as secondary masters into the CM system by the external numbering system. In the case where documentation is received with no identification number, a project-related UK ATC number shall be allocated to the document and placed under CM control.

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4.4.2 Work Packages

The UK ATC standard numbering system for documents shall be allocated to all data items produced as part of a work package.

4.4.3 Drawings

- a. All mechanical CAD design work shall conform to the UK ATC procedures.
- b. All printed circuit board (PCB) cad design work shall conform to the UK ATC procedures.
- c. The applicable design engineer responsible for the equipment in question shall approve all drawings.

4.4.4 Document Approval Responsibility

The Project Manager and System Engineer shall approve all specifications. Other documents shall be approved as per the UK ATC Procedures (AD01).

4.4.5 Naming Convention

4.4.5.1 Product naming

The following general rules apply to product naming:

- a. State what the product is, not what it does. This should be a single noun or short noun phrase.
- b. The noun or noun phrase may be followed by a descriptive word or phrase, only where necessary to differentiate between like products.
- c. Commas will always separate the above words or phrases.
- d. The descriptive word will never precede the noun word.
- e. Remember that a part number also identifies the product.
- f. Titles allocated to hardware (system and equipment) shall be in accordance with the product description.
- g. The use of system and subsystem level designation shall be as shown in the Product Breakdown Structure.
- h. Hardware titles (system and equipment) shall determine the titles allocated to written documentation.

4.4.5.2 Document naming

Documents shall be named after the product followed by the document type description.

4.4.6 Numbering

4.4.6.1 Product-Defining Drawings

- a. The part numbering system includes the main issue level of the applicable product-defining drawing. Changes that do not result in a new part number will be identified with an alpha issue-raise to that drawing.
- b. All definition drawings (i.e. those defining a material master) will have the item part number as the drawing number. These drawings will then receive alpha version raises only.
- c. The requirement for a new part will result in a new drawing number.

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- d. The data media type will be disassociated from the drawing and part number.
- e. All rules applicable to part number interchangeability are still to be applied.

4.4.6.2 Document Numbering

- a. The standard UK ATC document numbers shall be the “data base number” number which is automatically generated by the UK ATC Enterprise Content Management System (ECM), together with the alphanumeric project name. For PRVS the document number will have the format: “PRVS-XXXXX”, where “XXXXX” is the five-digit ECM “data base number”.
- b. The UK ATC configuration management system is embedded in Livelink, the UK ATC’s ECM.
- c. Livelink is a web-based system that the UK ATC uses for collaboration and knowledge management – to gather, store, share, distribute and control the information generated.
- d. If the customer requires a specific document numbering scheme, the UK ATC will endeavour to accommodate the proposed numbering scheme.

4.4.6.2.1 Consortium Members Numbering System

Consortium members will be issued with Livelink accounts and shall use the same ECM as the UK ATC and as such all documents shall be numbered and controlled as specified in Section 4.4.6.2.

4.4.6.2.2 Subcontractors Numbering System

Subcontractors may use their own numbering system if it fulfils the following requirements:

- a. Items shall be uniquely and uniformly identified throughout their lifespan.
- b. Allocation of identification numbers shall be controlled by the person responsible for configuration management as per this plan.
- c. Identification of items and their related documents should correspond.
- d. The identification number and an issue indication are the only unique identifiers of an item.
- e. The contractor’s numbering system shall be subject to approval by the person responsible for the project’s configuration management, typically the Systems Engineer.

4.5 MARKING/IDENTIFICATION LABELS

4.5.1 Products and Containers

The Labels used on products will always include the part number and version status as well as the modification status indicator.

4.5.2 Serial Numbers

Products built to a configuration baseline MRI and DDI shall be identified with a serial number to facilitate traceability. A group of serial numbers shall be allocated to a specific group of products, all of which are built to the same configuration baseline. This group of serial numbers shall be listed on the configuration baseline MRI and DDIs cover page.

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4.6 MRI AND DDI SYSTEM DESCRIPTION

4.6.1 Types of MRI and DDIs

- a. The MRI and DDI shall contain all documents and lower-level MRI and DDIs directly related to the specification, design, build or control of the product, be it a development model or production model.
- b. This MRI and DDI shall be uniquely identified by its issue number, which shall start at Configuration 1 for the functional baseline and shall continue numerically. This MRI and DDI can be made up of separate MRI and DDIs as required.

4.6.2 System MRI and DDI Breakdown

- a. The PRVS MRI and DDI will consist of a combination of the different hardware and software available.
- b. The specific combination of hardware and software will be identified by a unique part number.
- c. The MRI and DDI shall also list all the other applicable and associated MRI and DDIs, for example:
 - i. Test equipment MRI and DDI.
 - ii. Jigs, tools and fixtures MRI and DDI.
 - iii. Software MRI and DDI.
 - iv. General project-related documentation MRI and DDI.
- d. A front page shall be created. It will include the following:
 - i. Title.
 - ii. Date.
 - iii. Serial Numbers.
 - iv. System Engineer.
 - v. Project Manager.
 - vi. Quality Representative.
 - vii. Configuration Manager.

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4.7 DEVELOPMENT PROCESS DOCUMENTATION

A typical manufacturing data set for an assembled component in the 'production' environment would comprise the following document types:

- a. Science Requirement.
- b. Functional and Performance Requirements Specification.
- c. Assembly Drawing.
- d. Detail Drawing.
- e. Parts List (complete).
- f. Exploded View.
- g. Assembly Instruction.
- h. Acceptance Specification.
- i. Acceptance Procedure.
- j. Acceptance Test Log.
- k. Build History Document or Master Record Index (MRI).

4.7.1 Build History Documents

- a. A Build History document shall be compiled for the instrument.
- b. The Build History document shall be placed under CM control and is not a deliverable.
- c. Refer to UK ATC Programme Delivery and Engineering Procedures for the Compilation of a Build History Dossier.
- d. A Schedule of Build History Requirements will be generated (which will specify a list of all the documents required to make up a build history document).

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5 CONFIGURATION CHANGE CONTROL

5.1 INTRODUCTION

The management and control of new documents and changes to existing documents shall take place in accordance with the processes described in the UK ATC Programme Delivery and Engineering Procedures (AD01) and summarised in this Section.

5.1.1 Consortium Members Configuration Change Control

Consortium members shall adhere to the configuration control procedures as defined in this Configuration Management Plan.

5.1.2 Subcontractors Configuration Change Control

5.1.2.1 Subcontractors Change Control Procedures

The procedures shall be identified in a separate CMP, if required, and the persons responsible for their execution (CM, CRB, etc.) shall be appointed. Where reference is made to in-house procedures, the client or his/her representative shall have access to the procedures.

5.1.2.2 Interface between UK ATC consortium and subcontractors

Subcontractors shall refer any change normally classed as Class 1 to the project CM for approval before implementation. This procedure shall be defined in the relevant subsystem CMP.

5.1.2.3 Requirement for subcontractors

As a minimum, suppliers shall be required to meet at least the following requirements:

- a. Ensure traceability of all CIs with respect to documentation and parts lists.
- b. Ensure that CIs “as built” data packs are consistent.
- c. Ensure that all changes to CIs are appropriately reviewed, approved and implemented.
- d. Ensure that all deviations and waivers are approved and the conditions of approval adhered to.

5.2 CHANGE CONTROL

5.2.1 Identification of Changes

- a. All changes instigated by the Gemini shall be defined as a Class 1 change.
- b. Post delivery of the instrument a modification instruction shall be generated to retrofit the instrument with approved changes.
- c. Any changes to the established configuration baselines shall be initiated by means of the formal change procedure. The change shall be identified by the change in issue status of the document MRI and DDI and a reference to the ECR initiating the change.
- d. A proposal will only be considered if accompanied by sufficient supporting documentation to enable the CCB to make sound recommendations and to indicate that the products performance and functionality are not adversely affected.

5.2.2 Corrective Action Process

The corrective action process is described in detail in the UK ATC Programme Delivery and Engineering Procedures (AD01).

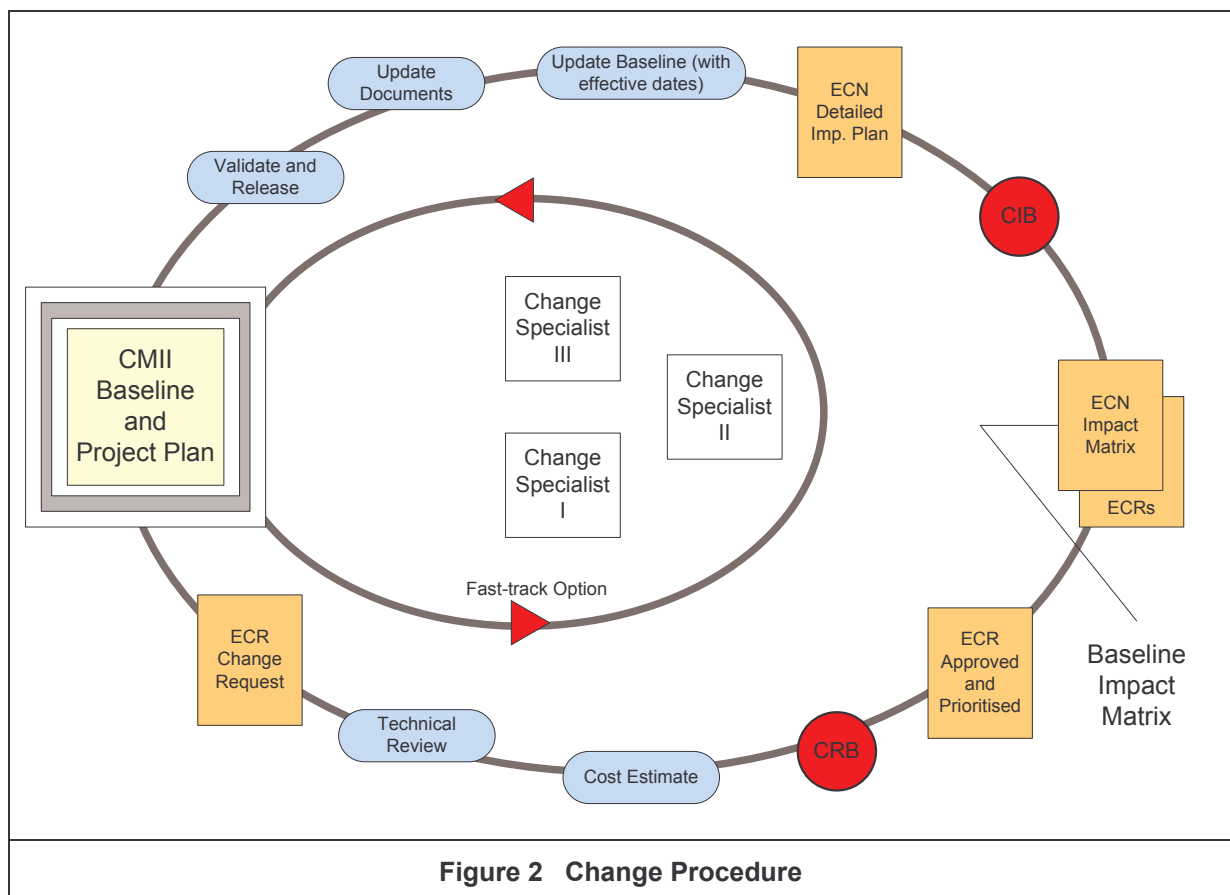
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5.2.3 Closed-looped Fast-tracked Change Control

The change process is defined in Figure 2 and the process is described below:

- The process is managed by three change administration functions namely, Change Specialists, Configuration Review Board (CRB) and the Configuration Implementation Board (CIB)
- Technical reviews are coordinated by the responsible design engineer or creator of impacted documents.
- Minor changes shall be processed using the fast-track change control process as indicated in Figure 2 during project development. The change specialists typically are the systems engineer, the design engineer and an engineering specialist.
- High-risk changes are evaluated and approved or disapproved by a Configuration Review Board (CRB) and low-risk changes by the responsible design engineer or creator who did the technical review as depicted in Figure 2.
- Forms and records are used to manage the change control. These are embedded in the UK ATC Enterprise Content Management System and as such end-item traceability is achieved without breaking the rules of interchangeability.



5.2.4 Data Item Creation and Change Process

All activities are requirements-driven and work will be controlled by means of a work flow. Work shall be authorised and positively controlled with Livelink on-line forms.

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The UK ATC data item creation and approval process is defined in Figure 3, the same process is used for both the creation of a data item creation and to change an item. Both processes are initiated by an Engineering Change Request (ECR) form.

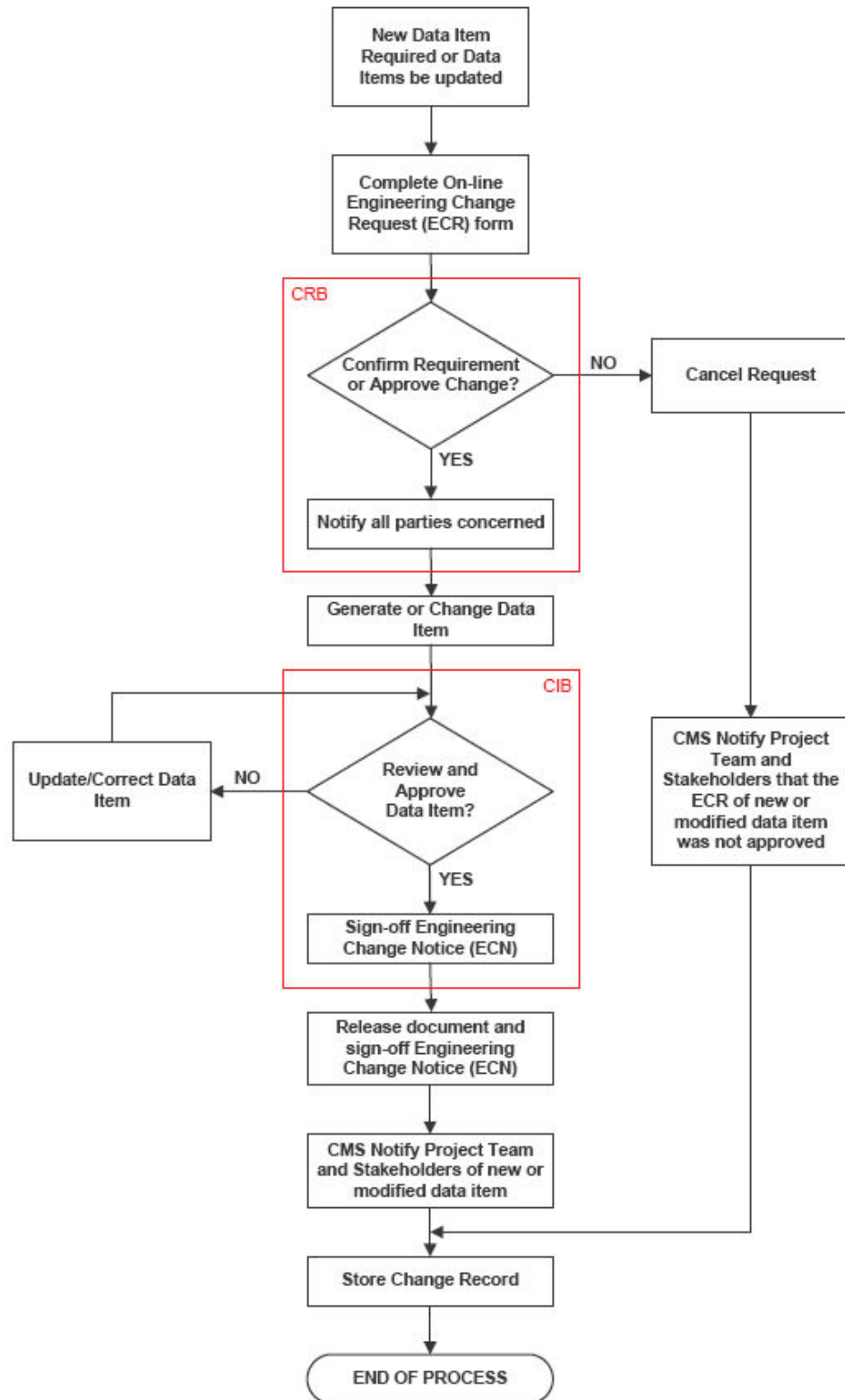


Figure 3 UK ATC data item creation and change process

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5.2.5 Engineering Change Request System Principles

The following principles apply to the ECR system:

- a. An Engineering Change Request (ECR) is initiated when a new document or drawing is required or when a problem is identified and needs to be resolved.
- b. The investigation of the impact of the change proposal is a team effort involving all affected disciplines.
- c. A proposed change shall be fully tested for suitability before final approval by the product Configuration Implementation Board (CIB).
- d. The CRB has the sole responsibility for the approval of Class II ECRs.
- e. Class I ECRs are submitted to the customer for approval after CRB approval.
- f. A full set of completely marked-up prints of all affected documents (or a set of completed documents) will accompany the ECR when submitted for CRB approval.
- g. The change proposal is managed by the CIB while the Project Assistant (PA) will serve as expeditor to the processing of the documentation.
- h. The point of embodiment for the change proposal is of cardinal importance.
- i. Only changes relevant to one CI are allowed per ECR.
- j. The ECR is a document in its own right and subject to configuration management control.
- k. The ECR form is structured around the product breakdown structure.
- l. The UK ATC CMS (Livelink) retains copies of completed ECRs.

5.2.5.1 ECR documentation requirements

5.2.5.1.1 Existing data items

- a. A fully documented change proposal submitted for the amendment of an existing product configuration baseline shall normally comprise the following:
 - i. Marked-up set of drawings (as applicable);
 - ii. Marked-up set of textual documents or documentation schedule (as applicable);
 - iii. Changed computer software (as applicable);
 - iv. Completed ECR form.
- b. Each and every marked up document described above shall contain all the information required to describe the change in its entirety including other published documents affected by the proposed change. The type of individual documents involved in a change is determined by the product and the change proposed to it.
- c. It is recommended that marked-up product data items be certified for accuracy by the applicable design engineer.
- d. The above documents will contain sufficient information to allow the finalization of the documents by the respective draughtsmen, writer or editors.

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5.2.5.1.2 New data items

For new data items, the on-line “create new data item” work flow process shall be initiated by the author. As part of the work flow initiation process the author will be requested to complete the on-line ECP form. Once the ECP has been approved, the work flow initiator will be notified and the data item template (if it is a document) will be available in the ECM project workspace or else the appropriate data item number will be forwarded to the work flow initiator if the data item is an engineering item such as a drawing, simulation model or analysis.

5.2.5.2 Approval of Changes

5.2.5.2.1 Development and build

- a. During development all Class 2 changes should be reviewed and approved using the fast-track change procedure, while during the instrument build, all Class 2 changes shall be approved within the CRB.
- b. All Class 1 changes shall be approved within the CRB.
- c. Refer to the ECR Change Control System, as defined in the UK ATC Procedures (AD01) for the definitions and descriptions of Class 1 and 2 changes.

5.2.5.2.2 Customer

- a. All consortium proposed changes to Gemini shall be handled as Class 1 changes.
- b. Gemini shall state its position within a maximum of 3 weeks after submission of a change request by the consortium.
- c. Prior to a formal request for change, either party (i.e. Gemini and the consortium) may provide the other party with an advanced preliminary assessment, using an ECR form, whereby the other party shall respond within 10 working days whether or not the demanding party should proceed with a formal submittal of a change.

5.2.5.3 Concessions and Deviations

See the PRVS Management Plan on the process to follow for Deviations and Concessions.

5.2.6 Software Configuration Change Control

- a. The software engineers assisted by the systems engineer shall be responsible for the software configuration management.
- b. The lead software engineer shall be responsible for all formal releases of the software.
- c. The software engineer shall ensure that all the software that make up the product are documented as an integral part of that product documentation.
- d. All software, source codes, executable codes and associated documentation shall be placed under CC as soon as a developmental baseline or milestone is reached. All the code shall be under CC before system integration or system testing is done.

5.3 DOCUMENTATION DISTRIBUTION CONTROL

5.3.1 Distribution

The external distribution of documents will be kept to a minimum. Should a copy of a data item such as a document, drawing or source code be required, it can be obtained on request from the PA.

PM might provide guest access to non-team members.

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5.3.2 Secondary Masters

It is essential that all consortium members, subcontractors and Gemini direct secondary masters to the project assistant (PA) and NOT to individual members of the project team.

5.3.3 Storage, Handling and Formal Release of Project Media

All project data items shall be stored in the UK ATC Enterprise Content Management System and team members are strongly advised to use the system as their preferred project repository even for work in progress. Daily back-ups of the UK ATC ECM system are always available.

Prior to the distribution of data items for project milestones and reviews, the PA shall ensure that the latest approved data items are released by marking these item as a generation.

The UK ATC ECM system has implemented the important CMII principles in a very formal, while keeping it simple and easy for project teams to use, and as such there is no special information handling procedures required.

Only the Project Manager shall release data items to Gemini. The preferred transfer document format and method to transfer information to Gemini is PDF and electronically via the internet respectively.

5.3.4 Approval of Documents

After formal approval of the following documents by Gemini, they will be subject to Class 1 change control.

- a. Science Requirements Document.
- b. Functional and Performance Requirements Document (only the instrument level requirements).
- c. External Interface Control Documents.
- d. Contract.

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6 CONFIGURATION STATUS ACCOUNTING (CSA)

6.1 REQUIREMENTS

6.1.1 Master Record Index

Each product configuration shall have a baseline by means of a Master Record Index (MRI) in a manner that will allow the CM and QAR to identify and control the product configuration.

6.1.2 Document Data Index

Each documentation activity (e.g. contract baselines, document milestones, reports, etc) shall have a baseline by means of a DDI in a manner that will allow the Configuration Manager to identify the status and availability of documentation.

6.1.3 Baseline Management

The baseline management system should make provision for at least the following aspects:

- a. Freezing and retention of previous baselines.
- b. Management of baselines in parallel.
- c. Hierarchical recording of baselines.
- d. Establishment of new baselines based on a previous baseline.
- e. Approval and formal control of established baselines.

6.1.4 ECR Current Status Report

A list of all ECRs in process shall be available.

6.2 SOFTWARE CONFIGURATION STATUS ACCOUNTING

Configuration status accounts and the MRI and DDI on all software products and media shall be kept. The accounts shall specify the versions in use, the status of all ECRs, the status of all formal releases and the status of all applicable documentation.

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7 DESIGN REVIEWS AND CONFIGURATION AUDITS

7.1 DESIGN REVIEWS

The following design reviews and audits shall be scheduled:

Table 3 PRVS Phase review summary			
PHASE	REVIEW	REVIEW BASELINE	OWNER
Project Definition & Planning (this phase)			
Concept Design	Concept Design Review (CoDR)	<ul style="list-style-type: none"> Science Requirements Document Functional and Performance Requirements Document (FPRD) Operational Concept Design Document (OCDD) Conceptual layouts Product Breakdown Structure Engineering Requirements Documentation Schedule Trade-off Study Reports Identification of contradictions Initial draft ICDs Costed proposal Project schedule and WBS (Level 2) Risk assessment and mitigation plans 	PS & SE SE PS & SE SE SE SE SE SE SE SE PM PM PM
Preliminary Design	Preliminary Design Review (PDR)	<ul style="list-style-type: none"> Science Requirements Documents FPRD Product Breakdown Structure OCDD Preliminary drawings. First Draft Bill of Materials (BOM) Design analysis reports Initial draft test requirements Software architecture definition Safety plans (preliminary) Draft ICDs Costs to complete Project schedule Risk assessment and mitigation plan Long lead-time items procurement plan 	PS SE SE PS & SE DE DE DE DE SWE PM SE & DE PM PM PM PM
Detail Design	Final Design Review (FDR)	<ul style="list-style-type: none"> Science Requirements Document FPRD OCDD Detailed Product Breakdown Structure Sub-System Development Specifications Bill of Materials (BOM) Detailed drawings 	PS SE PS & SE SE WPM & DE DE DE
	Make Release Review (MRR)	<ul style="list-style-type: none"> ICDs Software integration and test plans Design analysis reports and development test reports Safety plans Draft acceptance test plan procedures Special tooling and support equipment definitions Identification of special facility requirements Costs to complete Project schedule Risk assessment and mitigation plan. Vendor data (critical items). Addressing outstanding CDR issues Release reviews of manufacturing data 	DE SWE DE SW SE SE & DE SE PM & Team PM PM PM Team DE
Build			
Parts Procurement and Manufacturing			
Sub-System Assembly, Integration and test	Acceptance Readiness Review (ARR)	<ul style="list-style-type: none"> Complete set of product drawings and associated lists. Interface drawings and documents. 	DE & PA SE & DE

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Table 3 PRVS Phase review summary

PHASE	REVIEW	REVIEW BASELINE	OWNER
System Integration and Test	Acceptance Test Review	<ul style="list-style-type: none"> Spares list. Test and analysis reports. Acceptance test plans. Commissioning plans. Special tools and test equipment documentation. Preliminary operation and maintenance documentation. Maintenance manual. Safety documentation and procedures. Acceptance Test Results. 	SE SE & DE SE SE & PS DE SE SE & DE SE SE
Commissioning		<ul style="list-style-type: none"> Commissioning Plan. 	PS & SE
Support			
Post-Commissioning Support		<ul style="list-style-type: none"> On-site support. 	SE
Post-Acceptance Support		<ul style="list-style-type: none"> As requested. 	
Maintenance, Spares, Upgrades		<ul style="list-style-type: none"> Spares. 	
	Project Close Out Review	<ul style="list-style-type: none"> Customer Interface User Interface PPARC Interface ATC Support Risk identification Quality (science and engineering) Schedule (accuracy & adherence) Cost estimates (accuracy & adherence) Effort estimates (accuracy & adherence) Documentation Adequate team skills and knowledge (Identify training needs or new hire requirements) 	PM PM PM PM PM PS & SE PM PM PM SE PM
UK ATC SCHEDULED REVIEWS AND REPORTS			
Monthly	Project Managers Meeting	Project Resourcing (people and facilities) Project SOFT analyses and Timescale issues Outturn forecasts Project Risk Levels	PM
Quarterly	Review Meetings	Critical path assessment Detailed review of project plans Progress against objectives Customer issues Risk status Costing levels	PM
Six Monthly	Reports	Realistic Out-turns	PM

7.2 INTERNAL CONFIGURATION AUDITS

7.2.1 Physical and Functional Configuration Audits

- Physical Configuration Audits (PCAs) shall be conducted by comparing the verified-as-manufactured condition of the product (Build History file) against the approved product baseline (MRI and DDI) and the results will be published in a report.
- The objective of the Functional Configuration Audit (FCA) is to verify that the actual performance of the CI complies with its hardware development or software requirements and interface requirement specification.

7.2.2 Responsibilities

The Configuration Manager in conjunction with the QAR shall be responsible for carrying out the verification process.

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7.2.3 Audit schedule

Audits are to be scheduled in accordance with the project schedule.

7.2.4 Software Configuration Audits

Formal audits shall be done prior to the release of any software to the project team for system integration or flight tests. The audits shall be done by the software Quality Assurance officer in conjunction with the Configuration Manager.

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8 APPENDIX A PRODUCT BREAKDOWN STRUCTURE

The concept design product breakdown structure is depicted in Figure 4 and the “as-planned” documentation schedule is given in Table A1 respectively.

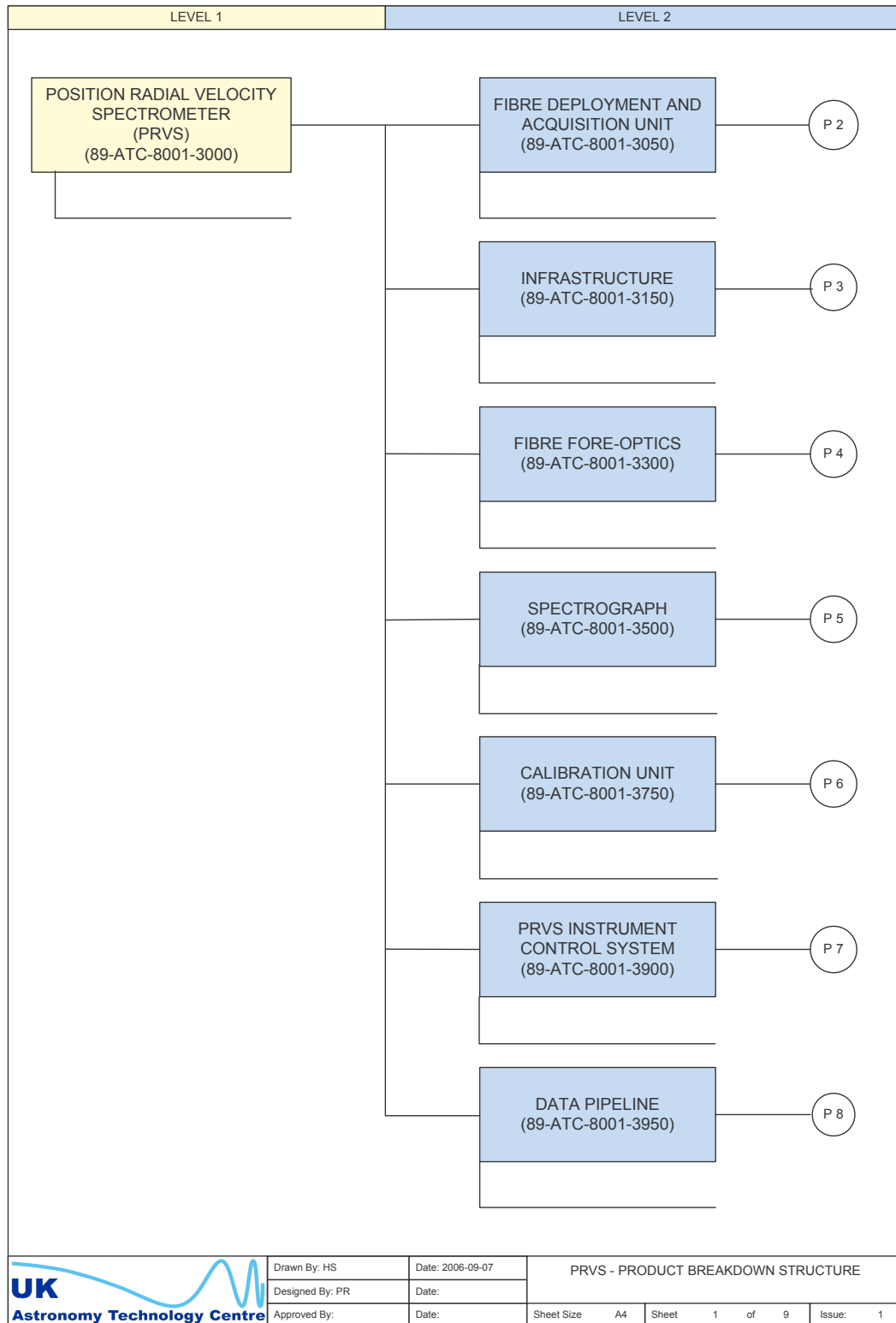


Figure 4 Instrument level product breakdown structure - page 1

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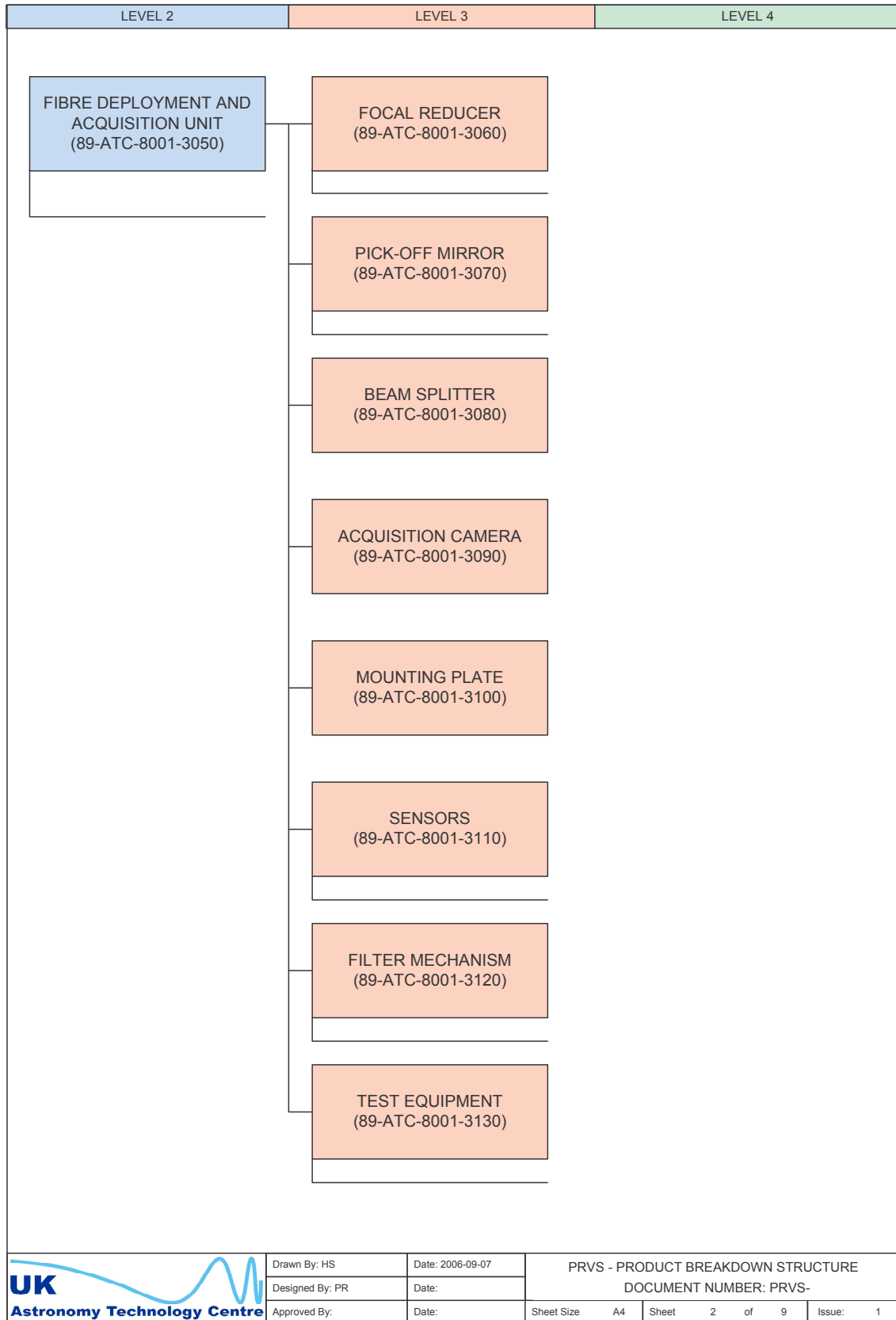


Figure 5 Instrument level product breakdown structure - page 2

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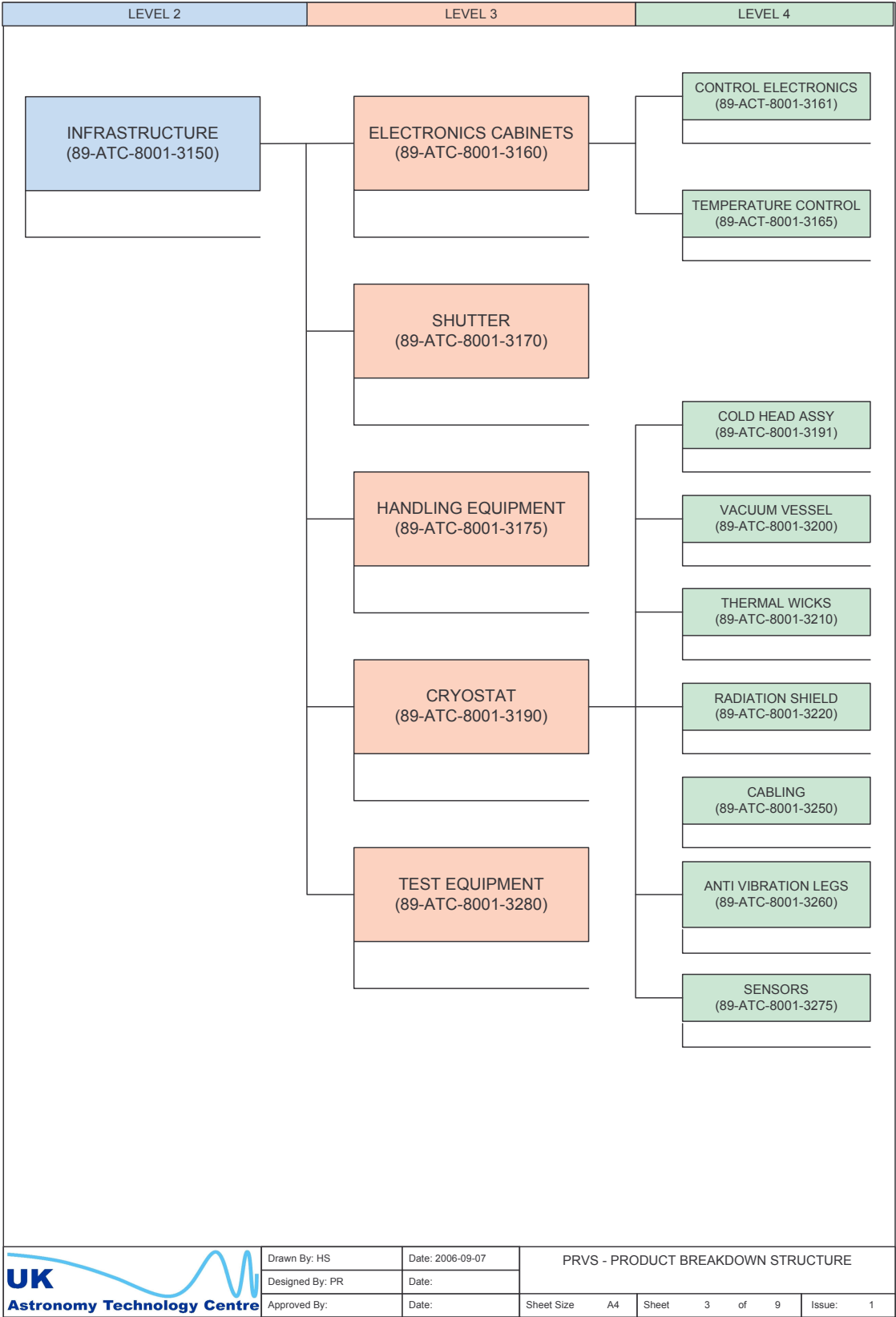


Figure 6 Instrument level product breakdown structure - page 3

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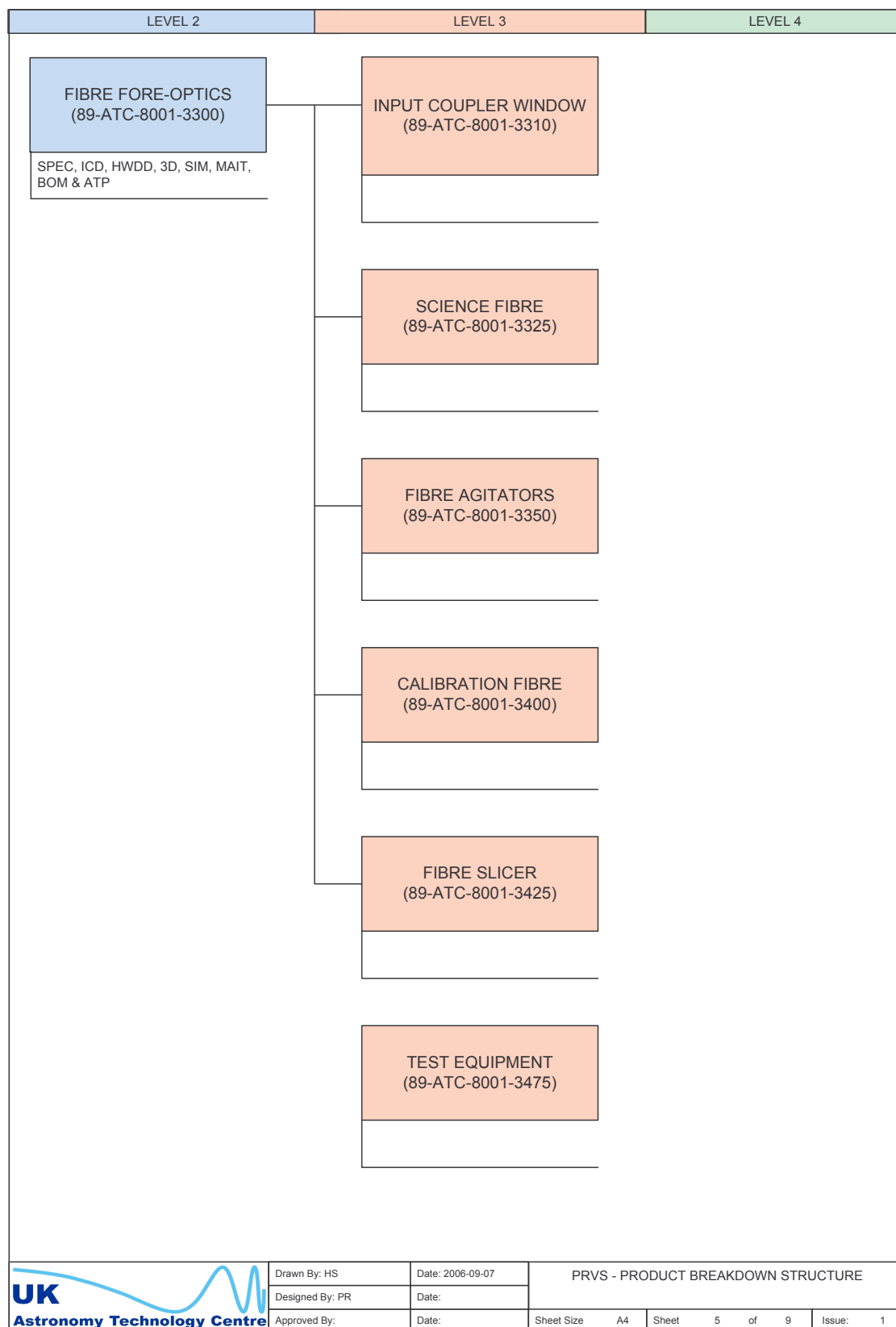


Figure 7 Instrument level product breakdown structure - page 4

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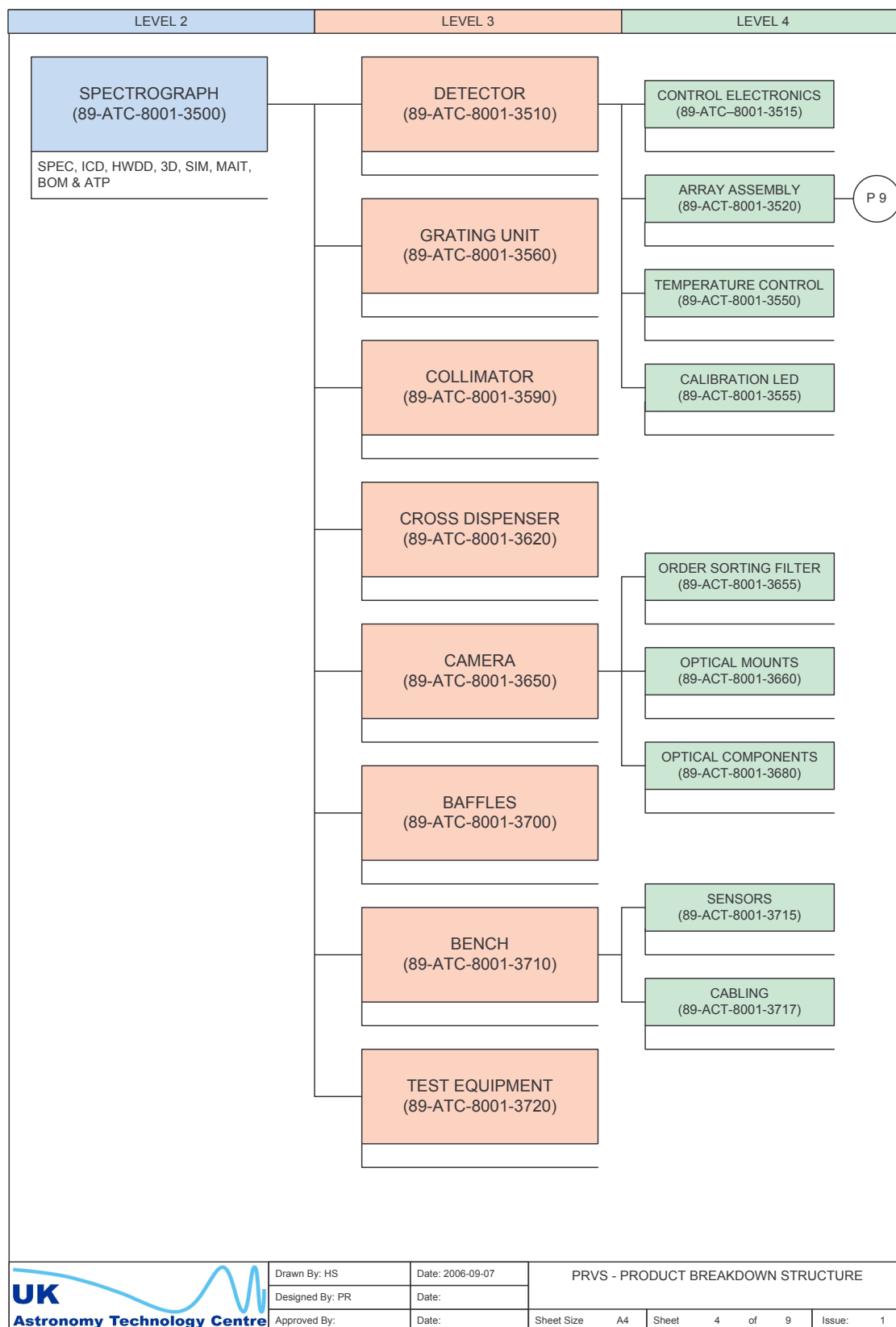


Figure 8 Instrument level product breakdown structure - page 5

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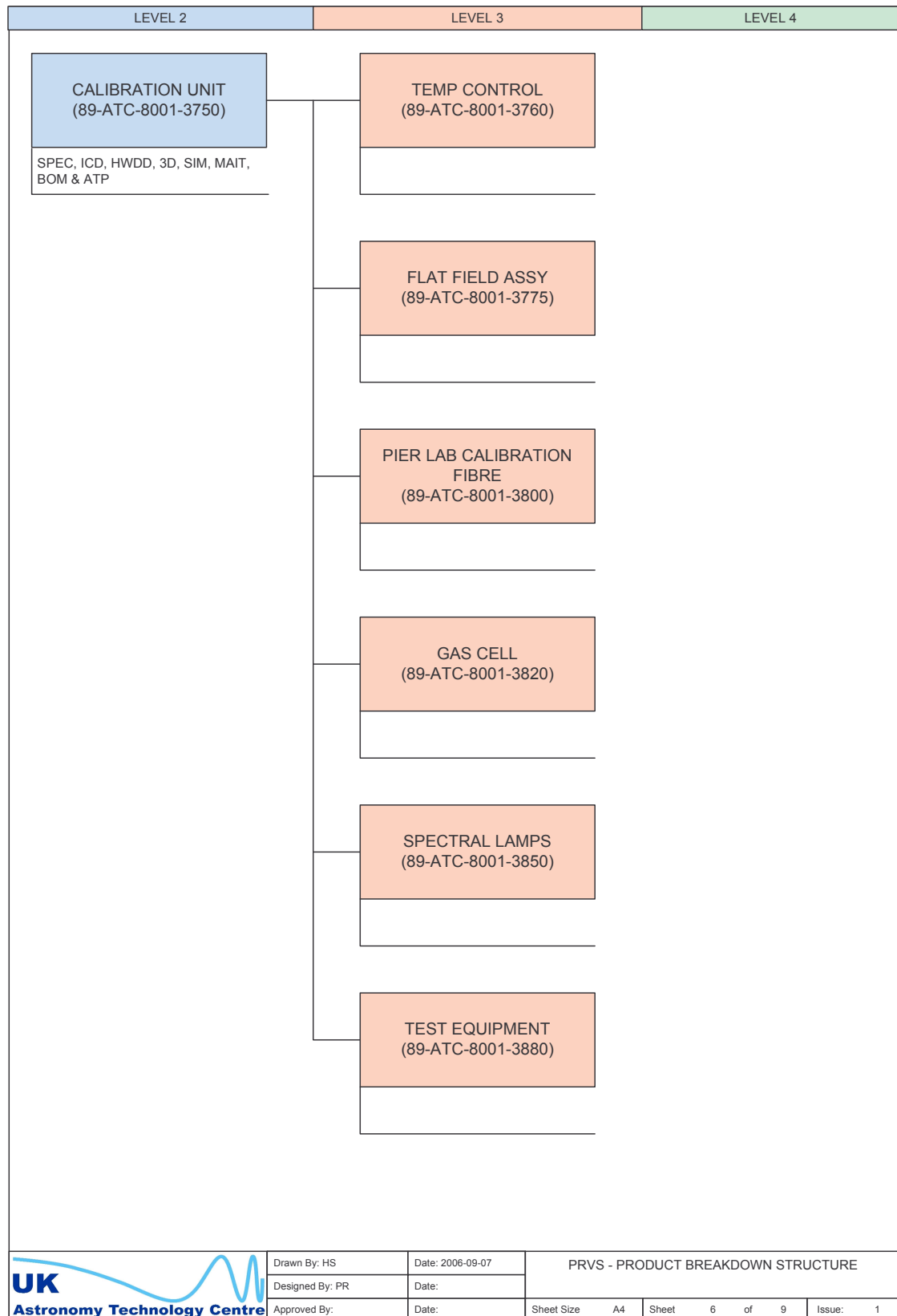


Figure 9 Instrument level product breakdown structure - page 6

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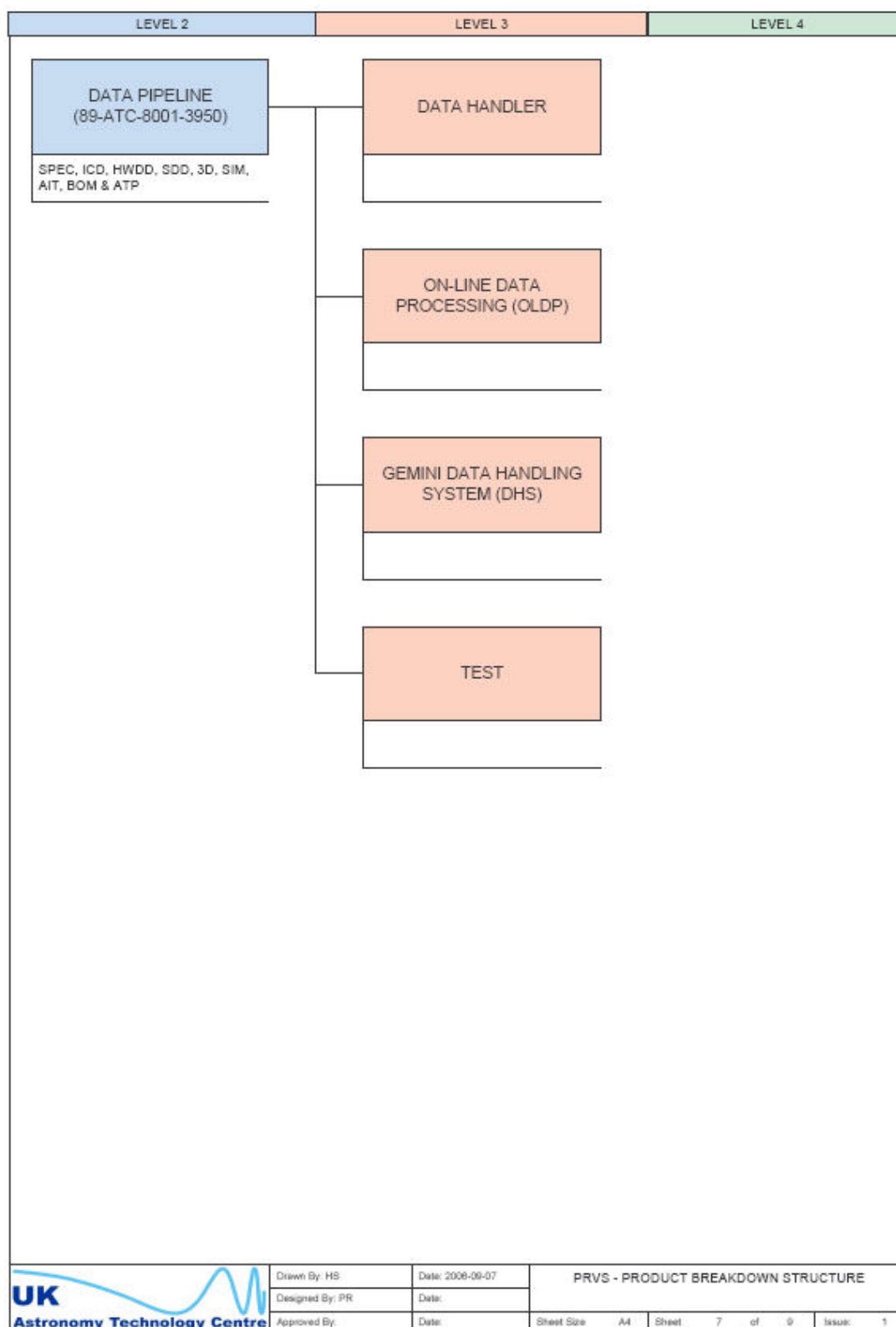


Figure 10 Instrument level product breakdown structure - page 7

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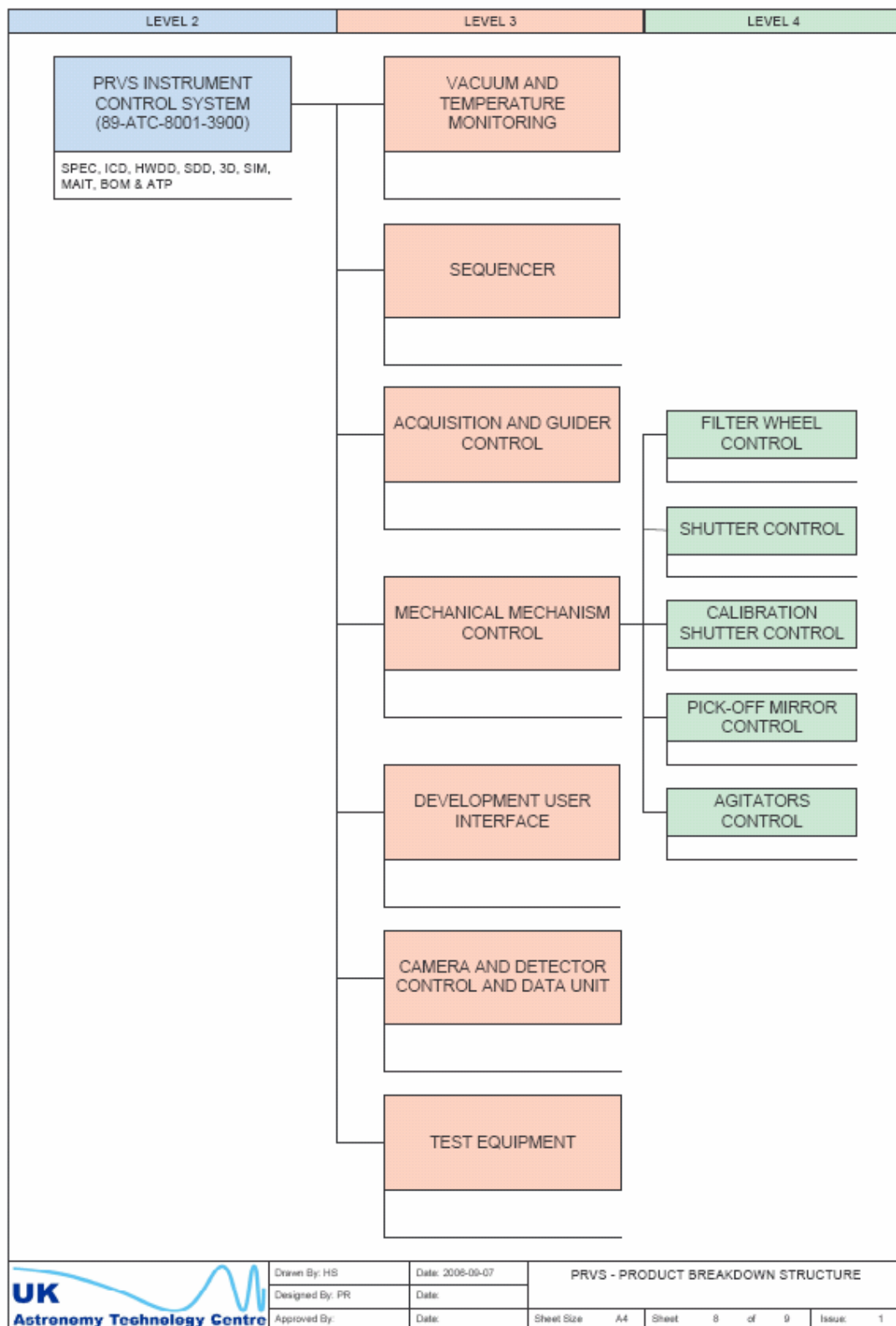


Figure 11 Instrument level product breakdown structure - page 8

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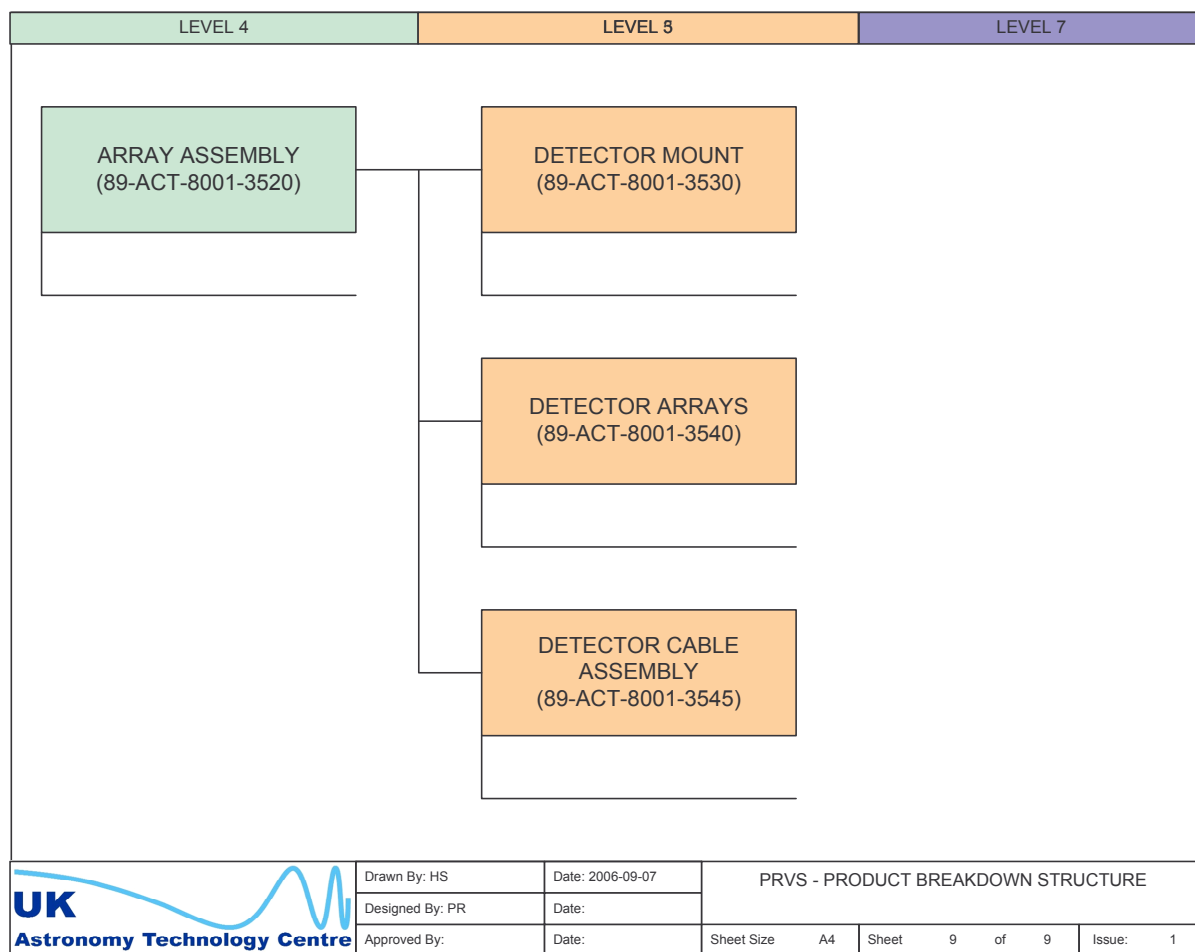


Figure 12 Instrument level product breakdown structure -page 9

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9 APPENDIX B DOCUMENTATION SCHEDULE

The level 1 and 2 “as-planned” documentation schedule is given in Table B1 below.

Table 4 PRVS Document Schedule

Name	Identification Acronym	Number	Level	Responsible Institution	Document Type	Number
Precision Radial Velocity Spectrometer	PRVS	89-ATC-8001-3000	1	UKATC	Project Management Plan	PRVS-PLA-00003-0001
					Risk Management Plan	PRVS-PLA-00008-0001
					Risk Management Register	PRVS-PLA-00009-0001
					Configuration Management System	PRVS-PLA-00002-0001
					Science Case	PRVS-SPEC-00004-0001
					Science Requirements Document	PRVS-SPEC-00005-0001
					Functional and Performance Requirements Document (FPRD)	PRVS-SPEC-00003-0001
					Product Breakdown Structure	
					Documentation Schedule	
					Operational Concept Design Document (OCDD)	PRVS-SPEC-00002-0001
					Instrument Design and Analysis Description Document	PRVS-PLA-00006-0001
					Science Case Simulation Model Description	
					External Interface Control Document (ICD)	
					Internal Interface Control Document (ICD)	
					Master Record Index	
					Bill of Material (BOM)	
Instrument Drawing Set						
Assembly, Integration and Verification Plan						
Instrument Integration Procedure						
Verification Test Procedures						
Instrument Acceptance Test Report						
List of Waivers (if required)						
List of Deviations (if required)						

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Table 4 PRVS Document Schedule

Name	Identification Acronym	Number	Level	Responsible Institution	Document Type	Number
Fibre Deployment and Acquisition Unit	FDAS	89-ATC-8001-3050	2	UKATC/IfA	Non-conformance Reports (if required)	PRVS-TRE-00007-0001
					Instrument Shipment Preparation, Packaging and Shipment Packing List	
					On-site Instrument Integration Procedure	
					Acceptance Test Procedure	
					Acceptance Test Results	
					Operators Manual	
					Maintenance Manual	
					Spare Part List	
					FDAS Development Specification	
					FDAS Product Breakdown Structure	
					FDAS Internal ICD	
					FDAS Design and Analysis Description Document	
					FDAS Simulation Model Description	
					FDAS Master Record Index	
					FDAS Bill of Material	
					FDAS 3-D models	
					FDAS Drawing Set	
					FDAS Assembly, Integration and Verification Plan	
					FDAS Integration Procedure	
					FDAS Verification Test Procedures	
					FDAS Acceptance Test Report	
					FDAS Non-conformance Reports (if required)	
					FDAS Shipment Preparation, Packaging and Shipment	
					FDAS Packing List	
					FDAS On-site Integration Procedure	
					FDAS Final Acceptance Test Procedure and Results	

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Table 4 PRVS Document Schedule

Name	Identification Acronym	Number	Level	Responsible Institution	Document Type	Number
Infrastructure	INF	89-ATC-8001-3150	2	UKATC	Infrastructure Development Specification	PRVS-TRE-00001-0001
					Infrastructure Product Breakdown Structure	
					Infrastructure Internal ICD	
					Infrastructure Design and Analysis Description Document	
					Infrastructure Simulation Model Description	
					Infrastructure Master Record Index	
					Infrastructure Bill of Material	
					Infrastructure 3-D models	
					Infrastructure Drawing Set	
					Infrastructure Assembly, Integration and Verification Plan	
					Infrastructure Integration Procedure	
					Infrastructure Verification Test Procedures	
					Infrastructure Acceptance Test Report	
					Infrastructure Non-conformance Reports (if required)	
Fibre Fore-Optics	FFO	89-ATC-8001-3300	2	PSU	Infrastructure On-site Integration Procedure	PRVS-TRE-00002-0001
					Infrastructure Final Acceptance Test Procedure and Results	
					FFO Development Specification	
					FFO Product Breakdown Structure	
					FFO Internal ICD	
					FFO Design and Analysis Description Document	
					FFO Simulation Model Description	
					FFO Master Record Index	
					FFO Bill of Material	
					FFO 3-D models	
					FFO Drawing Set	
					FFO Assembly, Integration and Verification Plan	
					FFO Integration Procedure	

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Name	Identification Acronym	Number	Level	Responsible Institution	Document Type	Number
Spectrograph	SPEC	89-ATC-8001-3500	2	UKATC	FFO Verification Test Procedures	PRVS-TRE-00003-0001
					FFO Acceptance Test Report	
					FFO Non-conformance Reports (if required)	
					FFO Shipment Preparation, Packaging and Shipment	
					FFO Packing List	
					FFO On-site Integration Procedure	
					FFO Final Acceptance Test Procedure and Results	
					Development Specification	
					Product Breakdown Structure	
					Internal ICD	
Calibration Unit	CU	89-ATC-8001-3750	2	UK ATC	Design and Analysis Description Document	PRVS-TRE-00003-0001
					Simulation Model Description	
					Thermal Model	
					Master Record Index	
					Bill of Material	
					3-D models	
					Drawing Set	
					Assembly, Integration and Verification Plan	
					Integration Procedure	
					Verification Test Procedures	
					Acceptance Test Report	
					Non-conformance Reports (if required)	
					On-site Integration Procedure	
					Final Acceptance Test Procedure and Results	
					CU Development Specification	
					CU Product Breakdown Structure	
					CU Internal ICD	

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Table 4 PRVS Document Schedule

Name	Identification Acronym	Number	Level	Responsible Institution	Document Type	Number
Instrument Control System	ICS	89-ATC-8001-3900	2		CU Design and Analysis Description Document	PRVS-TRE-00004-0001
					CU Simulation Model Description	
					CU Master Record Index	
					CU Bill of Material	
					CU 3-D models	
					CU Drawing Set	
					CU Assembly, Integration and Verification Plan	
					CU Integration Procedure	
					CU Verification Test Procedures	
					CU Acceptance Test Report	
					CU List of Waivers (if required)	
					CU List of Deviations (if required)	
					CU Packing List	
					CU On-site Integration Procedure	
					CU Final Acceptance Test Procedure and Results	
Instrument Control System	ICS	89-ATC-8001-3900	2		ICS Software Requirements Specification	PRVS-TRE-00006-0001
					ICS Workstation Requirements Specification	
					ICS Product Breakdown Structure	
					ICS ICD	
					ICS Software Design Document	
					ICS Master Record Index	
					Software deliverables (source code, executable files, installation procedures etc.)	
					ICS Integration and Verification Plan	
					ICS Integration and Verification Test Procedure	
					ICS Test Report	
					ICS Non-conformance Reports (if required)	
					ICS Final Acceptance Test Procedure and Results	

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Table 4 PRVS Document Schedule

Name	Identification Acronym	Number	Level	Responsible Institution	Document Type	Number
Data Pipeline System	DPS	89-ATC-8001-3950	2		DPS Software Requirements Specification ICS Workstation Requirements Specification DPS Product Breakdown Structure DPS ICD DPS Software Design Document DPS Master Record Index Software Deliverables (source code, executable files, installation procedures etc.) DPS Integration and Verification Plan DPS Integration and Verification Procedure DPS Test Report DPS Non-conformance Reports (if required) DPS On-site Installation Procedure DPS Final Acceptance Test Procedure and Results	PRVS-TRE-00005-0001