MWA Project

Configuration Management Plan

MWA Project

MWA Consortium

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1.   INTRODUCTION

1.1   IDENTIFICATION

This Configuration Management Plan (CMP) describes the plans, processes and approach to be adopted for Configuration Management on the MWA Project.

1.2   SCOPE

This document describes the top-level MWA Configuration Management plan for the MWA Project. It describes the activities for the collection and control of all significant data items (management documents, contracts, engineering drawings, program source codes, parts inventories, etc.) in the MWA Project. Multiple geographically and institutionally distinct groups co-operate on this project, so a Configuration Management philosophy that is readily implemented by each group, but allows the Project Management Office (PMO) to oversee the overall MWA Configuration is important.

The specific goal of the CMP is to ensure all documents required to describe a particular release version of the MWA Instrument are suitably captured and controlled across the Project. This includes work schedules, project management plans, hardware descriptions, software source codes and configuration files, source data files, bills of materials, amongst others. Furthermore, the set of documents describing a particular Configuration can be easily identified by the Project.

A general review process that governs those data items requiring peer or management review is also described herein.

1.3   DOCUMENT OVERVIEW

This document appears in two major parts, the Introduction, Referenced Documents and Acronyms and Definitions sections introduce the document and define the scope and useful terms, while the Configuration Management itself is covered in Section 4.

The document is structures as follows:

- Section 1 Introduction
- Section 2 Reference Documents
- Section 3 Acronyms and Definitions
- Section 4 Configuration Management

2. REFERENCED DOCUMENTS

2.1 STANDARDS

[1]

[2]

2.2 MWA DOCUMENTS

[3] MWA-XXX-XXX - Project Management Plan (PMP), MWA Project, XX October 2009, Revision XXXX.

[4]

2.3 OTHER DOCUMENTS

[5] CRaTER Configuration Management and Review Process, Revision A, 18-May-2005.

3.   ACRONYMS AND DEFINITIONS

The following list of acronyms, abbreviations and definitions are used within this document.

3.1   ACRONYMS AND ABBREVIATIONS

Table 1 contains the acronyms and abbreviations used within this document.

Table 1 Acronyms and Abbreviations	
Term	**Meaning**
CCB	Change Control Board
CE	Commissioning Engineer
CI	Configuration Item
CR	Change Request
ECO	Engineering Change Order
PDF	Portable Document Format
PE	Project Engineer
PM	Project Manager
PMO	Project Management Office
PS	Project Scientist
QM	Quality Manager
SME	Subject Matter Expert
TEMP	Test and Evaluation Management Plan

3.2   DEFINITIONS

Table 2   Definitions contains definitions of terms that are used within this document.

Table 2 Definitions	
Term	**Description**
Project Database	The distributed data store for all Configuration Items and memo items for the MWA Project, all of which may be distributed across more than one physical database.
Overall Project Database	The specific physical Database that, by reference, contains all the other subordinate databases and the CIs and memos within them.
Subordinate Database	One of the several repositories that can be tailored to suit different purposes, e.g. source code version control, etc.
Configuration	The consistent set of revision levels of all Configuration Items at a given instant in time that constitutes a valid "version" of the MWA Telescope Project.

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4. CONFIGURATION MANAGEMENT

The function of Configuration Management is to ensure that the entire set of documents and other data items (collectively, the Configuration Items) required to fully describe a particular instance of the MWA Project Configuration along its development path are managed, related and controlled.

Each Configuration, past, present and planned should be able to be referenced independently of any other Configuration and will be tested as such as outlined in the Test and Evaluation Management Plan (TEMP).

All Configuration Items will be archived in a database or databases across the MWA Project in such a way that each Configuration can be extracted for review, implementation, verification, deployment or any other required purpose.

The Change Control Board (CCB) will be the entity responsible for implementing the Configuration Management Plan.

4.1 CHANGE CONTROL BOARD

In order to control the Project evolution, changes to each Configuration Item must be approved by the Change Control Board, the structure of which is defined below.
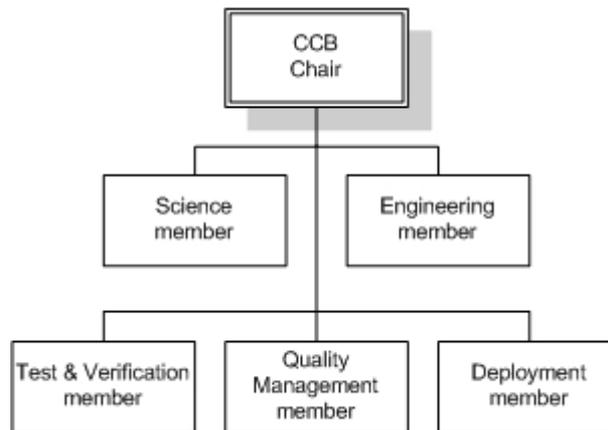
4.1.1 CCB Structure

Figure 1 CCB Organisation Chart

The various CCB roles identified above are filled as per the table below.

Table 3 CCB Roles	
Role	**Actor**
Chair	Project Manager
Science	Project Scientist
Engineering	Project Engineer
Test and Verification	Commissioning Engineer

Furthermore, particular Subject Matter Experts (SMEs) may be called on to assist the CCB from time-to-time, for those matters where their expertise or direct involvement is appropriate.

4.1.2 CCB Responsibility and Authority

The Change Control Board will initially have the responsibility of identifying the Configuration Items (CIs) that will be subject to formal change control but may rely on other MWA Project collaborators to assist in that process.

Since part of each Configuration will be the list of CIs required to fully describe that Configuration it will be possible to change the list of CIs as the project grows, by means of the Change Request process. Furthermore, the Configuration Management Plan itself will be a Configuration Item. In this way, the Configuration Management Plan will be subject to review and change control.

The Change Control Board has the responsibility to accept Change Requests (CRs), the authority to review those requests and ultimately accept or reject them on behalf of the Project; thereby creating new Configurations. Any project team member can create a CR and submit it for consideration by the CCB.

Where changes to the Configuration would require approval from or interaction with the MWA Board, project sponsors or other external stakeholders, the Change Control Board will liaise with those entities as part of the review process.

Finally, the CCB will be responsible for maintaining a Project Database in which to contain all the Configuration Items necessary to fully describe an instance of the Project.

4.2 PROJECT DATA ITEMS

Note that it is NOT the intention of the Configuration Management Plan to stifle innovating thinking, rather it should be recognised that significant changes to the Configuration have to be evaluated in light of the whole project. Therefore the CMP identifies two basic forms of project data item, with two kinds of "control" exercised over them.

The simplest is the less formal Memo item, which is under the control of the originating author and can be changed at will. Note that a Memo item is NOT a controlled document, and therefore cannot form part of a Configuration Item list.

The second type is the Configuration Item, being a "Controlled" data item which is subject to a formal review, approval and release process driven, by the Change Control Board, before being updated in the database(s) and released for consumption.

While both types of item may be stored in the same database, they are handled in different ways as described below.

4.2.1 Memo Items

If the purpose of recording a data item entry into the Project Database is to make it available at a preliminary stage, for example, for comment or internal discussion within the project, or simply to archive a work in progress at significant points, the data item can be "bookmarked". In this instance, any member of the project can, on their sole discretion, create a memo entry using the CR and accompanying Data Item. These memo entries will use a simplified form of the hierarchical numbering scheme to track changes. Typically the CR and attachments can be sent directly to the relevant Database Administrator for immediate inclusion in the Database and an acknowledgement email will suffice to note its confirmation and completion. Note that the CCB can authorise the Administrator to, in turn, allow the database user to directly create and maintain memo entries if it is expedient to do so. In this case the formality of the CR form may not be warranted.

Examples of Memo items include, but are not limited to, preliminary design sketches, exploratory discussions, specifications being sent to a vendor for preliminary quotation or indicative pricing or even laboratory notebook entries and digital photographs.

4.2.2 Configuration Items

In the Project Database, Configuration Items carry the full form of hierarchical numbering as outlined in the relevant appendix. New revisions of a Configuration Item are only approved for inclusion in the Database when they have been successfully reviewed and authorised by the Change Control Board. The trigger for this process is the submission of a Change Request to the CCB.

Note also that unsuccessful Change Requests are kept for reference purposes, but they do not form part of the Configuration, and therefore, are maintained as Memo items.

Examples of Configuration Items include, but are not limited to, Production Engineering Drawings, Bills of Materials, Contract Documents and Project Plans.

4.3 DATABASES AND ARCHIVE

4.3.1 Database Hierarchy

The Change Control Board will create an Overall Project Database, or nominate one of the existing project data containers to take on that function. All other data containers will then be reviewed for suitability, and if relevant, be included subordinate to the Overall Project Database and included by reference as required. The collected set of Overall Project Database and Subordinate Database(s) will be referred to simply as the Project Database.

The CCB will have the authority to assess and qualify the ways that the various subordinate databases are used by MWA Collaborators and will also mandate their proper use to ensure project consistency.

As outlined above, one or more databases will serve as the means by which Configuration Items are managed across the project. To date there are at least three separate 'containers' for project information, but in the previous absence of a Configuration Management Plan they are not always being used consistently or correctly and are insufficient to maintain a full Configuration.

It is anticipated that at a minimum, the existing Knowledge Tree and Subversion code repository can continue to be used at least as subordinate databases, if they are capable of the necessary functions required.

-- Insert database hierarchy diagram here --

Note: candidate databases must conform to the requirements below.

4.3.2 Database Administrators and users

The CCB will nominate an Administrator for each database who will be responsible for the maintenance of the database and the archiving of the CIs and other data within it. The CCB will be responsible for defining the Administrator(s) roles and responsibilities thereby defining each Administrator's level of autonomy.

In particular, the CCB should oversee the Overall Project Database.

Each database will also have a set of "users" who might be members of the MWA collaboration, or sub-contractors, or external parties, including potential science users.

4.3.3 Database Elements, Controls and Functions

Each database will provide the following minimum controls to the Administrator and its users, as described in the following sub-sections.

4.3.3.1 Record types

At a minimum the database stores records which treat the CIs as "controlled data items" in the sense that the item author is not necessarily the person who authorises that data item to be used as part of the Project Configuration. The database must also store the meta-data associated with each instance of each CI. There should be no limitation to the actual data type of a Configuration Item (eg. Word Document, schematic file, source code file etc.)

It should be possible for users to create and manage their own "memos" or uncontrolled documents within databases in order to capture exploratory thinking and other non-CI information. Memos could also be used to archive "work in progress" versions of Configuration Items during development.

It may be preferable that CIs and Memo Items are stored in different record types so they can be clearly separated. However, that does NOT preclude the body of a memo becoming part of the Project Configuration by means of a Change Request.

4.3.3.2 Access rights

A database must allow the Administrator to set access rights to each record, and on behalf of each User who may use the CI or Memo stored in that record.

These access rights at a minimum must include: read, create, change, and delete; and they will need to be separately controlled for each User. It would be preferable to have a further access right defining whether a given CI is "visible" to a given user.

For instance, there will be certain CIs that are should not be accessible at all to certain users (eg. Overall Budgetary Information to a project sub-contractor), and ideally in that case, those users need not even be aware that those CIs are part of the particular Configuration, that is, those CIs need not even be visible to those users. Note that this is subtly different from restricting read access.

4.3.3.3 User Identification

In order to enforce these access rights, each database must therefore provide a mechanism whereby a User is identified by the database (e.g. Username / password credentials in a login screen). A database must also allow the Administrator to update user credentials as required under the direction of the CCB.

4.3.3.4 Unique Identification of CIs

Individual versions of CIs must be obviously related, but clearly distinguishable, and stored separately so that the Project can be moved "forwards" and "backwards" between Configurations wherever that makes sense. There must therefore be some form of hierarchical numbering scheme suitable for that purpose which will form a Record Identifier Number for each unique instance of a CI. The numbering scheme within the Overall Project Database will be described in an appendix and should be used as a model for numbering schemes in the Subordinate Databases.

4.3.3.5 Auditing and reporting

Each database should support a means to generate some form of "audit reports" for individual CIs as well as sets of CIs, so that the development path of the Project can be seen and tracked. These reports should include a description of what has changed from one version of a given Configuration Item to the next (which information is captured on the CR form). For the Subordinate Databases, this means should be accessible by a program script or other automated tool, so that the CCB can generate an overall Audit from the Overall Project Database which will automatically include audit information from the subordinate databases.

4.3.3.6 Archive

All versions of all CIs in each database are archived in both their native format, and PDF, and these archives are linked into the database in such a way that the entire historical record is maintained and accessible. The PDF format version is useful where a reader of a CI does not have the tool required to generate that CI (e.g. schematic editor etc.).

4.3.3.7 Project Releases

A compatible set of CIs that go together to form a particular instance of the Configuration are referred to collectively as a 'release'. Given that the release process will be controlled via the Overall Project Database, each Subordinate Database need not directly implement a release function, but must be suitable to support it.

4.4 CHANGE REQUESTS

The Change Request will be the means by which changes to Configuration Item(s) will be considered. Successful CRs will result in the creating of new entries in one or more of the Project Databases, those changes being outlined as part of the Change Request form. In the specific case of changes to engineering information (hardware designs, schematics, software designs, source codes etc.) these CRs may call out an Engineering Change Order to capture the required information for consideration during the review phase. Sample CR and ECO forms are available in the appendix.

The CR form is the cover sheet to which is attached all relevant documentation supporting the Change Request. Note that the CR form is an electronic document so attachments can be made using HTML hyperlinks to create an electronically transportable CR. Alternatively, the CR form can be completed, printed and physically circulated with the attached printed documents.

4.5 REVIEW PROCESS

The submission of the Change Request to the CCB starts the process shown diagrammatically below, leading ultimately (if successful) to the release of a new Configuration Item or Items.

-- Insert review process flowchart here --

The main stages of this process are discussed below.

4.5.1 Distribution

The process begins with the originator of a data item (or update) signing out a Change Request number from the overall Project Database, and document number if applicable, in the Change Log. The cover sheet will list one or more related documents and the reason for the proposed changes, as well as the principal changes since the previous (if any) release of the data item.

As indicated previously, if the data item is a Memo the relevant Project Database entry is updated directly without involvement from the CCB. These will not be considered further here.

However, if the CR relates to a Configuration Item, the document package (CR plus associated documentation) is delivered either electronically or physically to the Chair of the CCB.

4.5.2 Review and Comment

In the case of engineering documents, the review process is basically a peer review guided by the CCB, and conducted by reviewers having the appropriate technical competence for the item under review, and who are typically seconded to the CCB as required. This allows the CCB to drive frequent incremental reviews as designs progress, as opposed to larger, less frequent and more complicated reviews. This also ensures convergent development across the project.

The CR and Configuration Item must be distributed with sufficient notice, so that reviewers have time to assess and comment on the proposed changes, and sign off on the CR cover sheet. In the case of reviews to (for example) a Word(tm) document, it will be sufficient for the reviewers to use the "track changes" feature of Word to make comments. Each reviewer will then return his or her marked-up version of the document to the CR Originator for consideration.

Note that this may be an iterative process, where the originator may be asked to explain some feature to satisfy the reviewer. However, expediting the review process should be borne in mind at this stage.

The summary of these comments is then typically presented at a meeting of the CCB. At a minimum, there should be two full working days' notice of this meeting, to allow the distribution of Change Request and collation of comments.

In the case of a remote reviewer who is unable to sign the cover sheet of a CR distributed in physical form, the CCB will nominate one of its members who will be responsible for ensuring that the remote viewer's comments are passed back to the originator of the CR. This nominated member also signs off on the CR in lieu of the remote reviewer to indicate completion of this phase.

The review and comment phase is completed when the Change Originator has received all reviewers' comments, and all reviewers' signatures (or the nominated CCB member in lieu) appear on the CR cover sheet.

4.5.3   Approval

Typically the peer review will result in a number of actions, corrections, or even negotiations/discussions for the Change Originator to incorporate. The Originator presents the results along with the entire Change Request, to the CCB either electronically or via a meeting (as agreed by the CCB). The CCB may appoint an independent final reviewer, who returns their comments to the CCB for consideration.

The CCB then has two options it may exercise.

Firstly, if the CCB is satisfied with the Change Request reviews and recommendations, it may approve the change to the CI and authorise an update to the Project Database. This triggers the release process described next.

Alternatively, the CCB may reject the Change Request, and provide an explanation to the Change Originator. In this case, the Change process ends without affecting the Configuration, and the failed CR is saved as a Memo for future reference.

In either case, the CCB endorses the CR cover sheet with the final result of the CR.

4.5.4   Release

At the successful completion of the approval process, the document in both original and PDF format is submitted along with the CR cover sheet, to the Project Database administrator. The administrator then files the documents in the relevant archive and updates the Project Database, thereby completing the release process. Both forms of the new current release document are now accessible via the Project Database.