ASTRI Mini-Array
Data & Documentation Management Plan

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DOCUMENT HISTORY		
Issue/Revision	**Date**	**Modification**
1.0	10/08/2020	First release
1.1	16/10/2020	Deleted Section 4 Updated Section 4.3 (previously 5.3) Added Sections 5,6,7 on Requirements and use cases coding, Action/Issue tracking and ASTRI Mini-Array PBS
1.2	12/11/2020	Updated System Engineering WP in figure 1.

1 Introduction

The ASTRI Mini-Array is an INAF project aimed to construct, deploy and operate a set of 9 Cherenkov telescopes of the 4 meters class at the Observatorio del Teide in Tenerife (Spain). The ASTRI Mini-Array will observe astronomical sources emitting at very high-energy in the TeV spectral band.

1.1 Purpose

This document is the ASTRI Mini-Array Data and Documentation Management Plan.

It defines the data & documentation policy of the ASTRI Mini-Array Project.

It applies to all documents related to the ASTRI Mini-Array project during the entire life cycle of the project itself.

1.2 Scope

The ASTRI Mini-Array Data and Documentation Management Plan describes the procedures to manage to all data and documentation produced for the ASTRI Mini-Array project from the identification procedure to the review and approval process.

Furthermore, describes the ASTRI Mini-Array project documentation system founded on a common database that allows an up-to-date information exchange between all project participants in order to permit an efficient communication system compatible with the configuration management system.

1.3 Content

Section 3 deals with the document identification procedure, the preparation of the documents and describes the documents review and approval process.

Section 4 describes how the documentation is archived in the ASTRI Mini-Array project database and retrieved from it.

Section 5 is devoted to requirements and use cases coding

Section 6 deals with action/issue reference and tracking procedure

1.4 Definitions and Conventions

1.4.1 Abbreviations and acronyms

AD	Applicable Documents
ASTRI	Astrofisica con Specchi a Tecnologia Replicante Italiana
DMS	Data Management System
GUI	Graphic User Interface
IAC	Instituto de Astrofisica de Canarias
IACT	Imaging Atmospheric Cherenkov Telescope
ID	Identification Code
INAF	Istituto Nazionale di Astrofisica

OAS	Osservatorio di Astrofisica e Scienza dello Spazio
PBS	Product Breakdown Structure
PO	Project Office
RD	Reference Documents
SCADA	Supervisory Control and Data Acquisition
WBS	Work Breakdown Structure
WP	Work Package

2 Applicable and reference documents

2.1 Applicable Documents

[AD1] ASTRI Mini-Array Project Management Plan ASTRI-INAF-PLA-1000-001

[AD2] ASTRI Mini-Array Product Breakdown Structure ASTRI-INAF-DES-2000-001

2.2 Reference Documents

[RD1] Space Project management: Configuration and information management ECSS-M-ST-40C Rev. 1, Version 6 March 2009

3 Data & Documentation management

The ASTRI Mini-Array project data and documentation management system established allows to:

- maintain a database for all documents produced during the project
- verify that all documents required by the project are produced and delivered
- number the documents following the numbering system of codification defined here under
- periodically inform on received and issued documents
- fully approve changes before introduction in the baseline documents
- set-up a receipt, recording, and dispatch system for all technical and project management data.

Due to the complexity of the project, the Data & Documentation Manager is in charge to control the documentation status of the entire project. His/Her tasks are:

- Assign a univocal code to each new document requested by the team. To each team member is requested to ask for such code before releasing a new document even in draft form;
- Check the consistency of the document (title, date, reference, AD and RD) and produce the read only document. The review process of the document is in charge of the author of the document;
- Store the read only document in the project archive.

3.1 Documentation identification and numbering

Each document is codified by an identification code that appears on the heading of all pages. This permits the unambiguous identification of a document and facilitates its use and management. The sharing of the same code between two documents is strictly forbidden.

The Document Identification Code (Document ID) is made of five elements separated by a dash symbol "-":

Document ID: ASTRI-<originator>-<document type>-<WP code>-<number>

The elements of the Document ID are defined in section 3.1.1, in Table 1, Table 2, and Table 3.

A representative example, referring to the present document, of a configured ASTRI document file name is reported below:

Example ASTRI-INAF-PLA-1300-001

The (consecutive) <number> of the document reference is assigned by the ASTRI Data & Documentation manager at the creation of the document itself so WP managers responsible for the document shall request the number in advance. This number is fixed and shall not be modified when the document is updated. This identification shall be accompanied by the revision/issue number.

Document file names shall comply to the following naming convention, using the "_" (underscore) symbol as a separator.

Document File Name: <Document ID>_i<issue>.<revision>_<Title>.<file extension>

Apart from the document ID, an issued document shall be identified also with an issue/version number. The list of the issues and revision along with dates and description of modifications shall be mandatorily included in a dedicated section of the document called "Document History". The issue number shall be included whenever referencing a particular issue of the document. If the number is not present it is intended at the last issue available. Document versioning is thus implemented by means of the i<Issue>.<revision> fields, each one composed by a digit. The <Issue> field starts at value 1, <revision> field starts at value 0.

The value stored in the <Title> may be an abbreviation of the actual document title.

A representative example of a configured ASTRI document file name for the present document is reported below:

Example: ASTRI-INAF-PLA-1300-001 _i1.0_documentation_management.docx

3.1.1 Document reference

Table 1 shows the current list of documents' originators. This list is subject to modifications due to the possible entry in the project of new scientific partners and/or contractors.

Table 1. Originators

Originator	Description
INAF	Istituto Nazionale di Astrofosica
EIE	EIE group srl
MLT	Media Lario srl
HAM	Hamamatsu Photonics
WEE	Weeroc

Table 2. Document Type

Document Type	Description
DES	Design concept/architecture
DWG	Drawings (mechanical, electrical)
ICD	Interface Control Document
LIS	Lists
MAN	Manual
NCR	Non Conformity Report
PLA	Plan
PRE	Progress Report
PRO	Procedure
REP	Reports (internal, technical)

RFD	Request for Deviation
SOW	Statement of Work
SPE	Requirements and Specifications
TRP	Test Report

In selecting the appropriate WP code, one should take as reference the ASTRI Mini-Array WBS. For each work package the lowest level that shall be considered is the level shown in Figure 1.

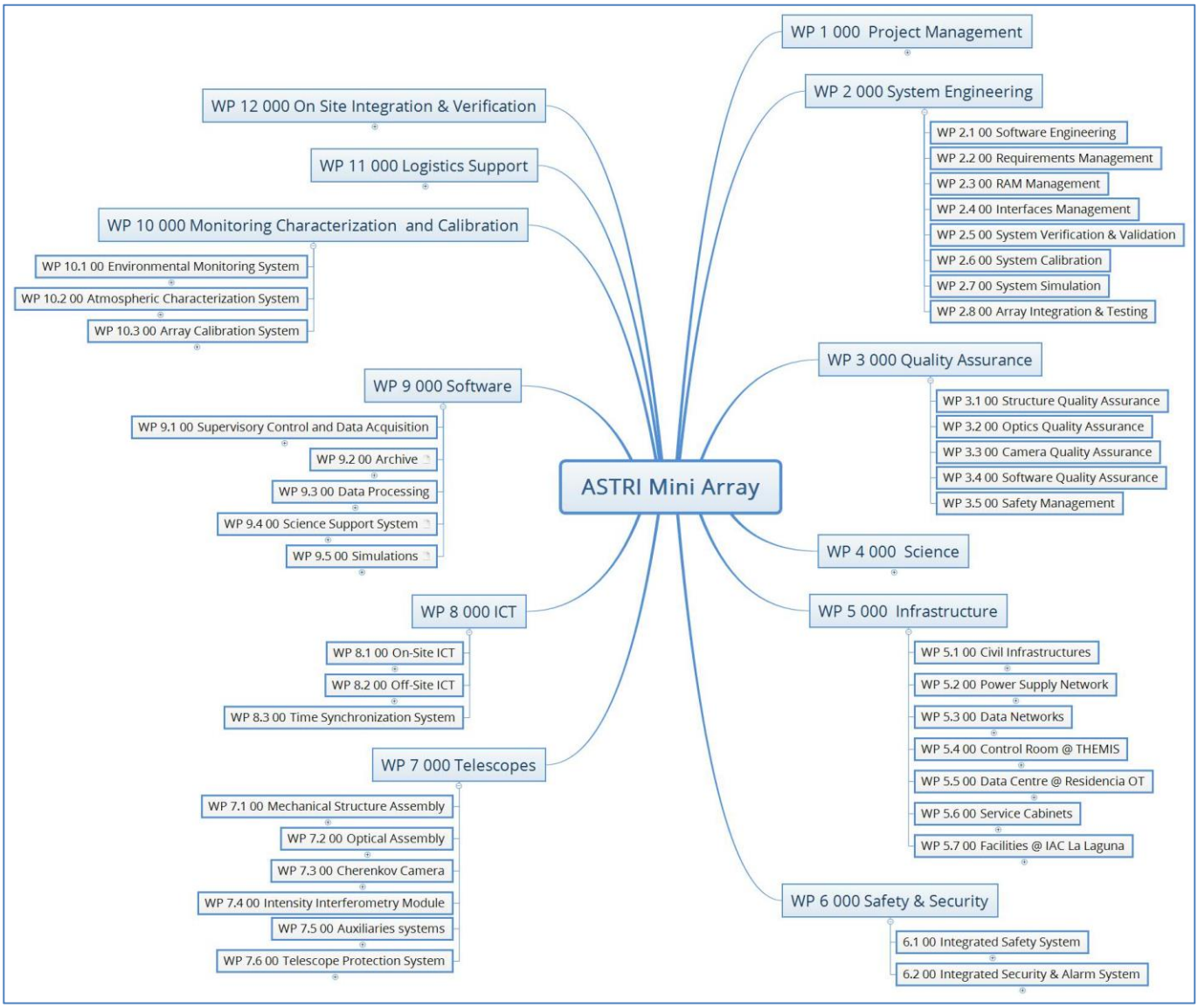

Figure 1. ASTRI Mini-Array WBS down to the third level.

Table 3 shows the work packages codes of the second level of ASTRI Mini-Array WBS. Note that WP1000, WP4000, WP11000, WP12000 stop at the second level.

Table 3. Work Package Codes

WP Code	WP title
1000	Project Management
2000	System Engineering
3000	Product Assurance
4000	Science
5000	Infrastructure
6000	Safety and Security System
7000	Telescopes
8000	ICT
9000	Software
10000	Monitoring Characterization & Calibration System
11000	Logistics support
12000	On site Integration & Verification

3.1.2 Minutes of Meetings

The minutes of meetings can have the form of a document and in this case the coding of the document is the one described in this section and section 3.2.2) or they can be directly recorded on the archive page of the meeting using the appropriate Indico function (in this case see section 4.5).

If in a document form the Identification Code for the minutes of a meeting will have a different format. It will be made of four elements separated by a dash symbol "-":

Document ID Minutes: ASTRI-MIN-<WP code>-<date>.

The WP codes are listed in Table 3 and the date will have the format YYYYMMDD.

3.1.3 Drawings and nomenclature

The drawings bear their own reference. Whenever drawings are part of a document, the drawings will bear their identification number and the reference of the subject document.

3.2 Document preparation

Technical and management documents will be:

- Written using ASTRI templates (which include, identification of the document, author);
- Reviewed and approved by designated authorized persons prior to being issued/revised (see later).

Presentations for conferences, reviews, etc. shall also be made using the ASTRI Power Point (ppt) template.

Minutes of meeting (MoM) will be written using the ASTRI template (which includes actions description and responsible for the action). The chairperson will produce written minutes for each meeting, and this document will be the formal record of all decisions taken.

The documents are produced in DIN-A-4 size portrait or, when necessary, landscape or A3 layout. The documents shall be written in English. Preferred word processors are those in the Microsoft Office suite, Latex and Google Docs.

Office and Latex templates can be downloaded from the ASTRI document archive at the following link: https://redmine.oas.inaf.it/projects/astri-mini-array/dmsf?folder_id=41.

Links to Google Docs templates will be distributed by the WP managers/coordinators.

3.2.1 Document composition

A document is mainly composed by:

- Cover sheet
- Page Header
- List of Authors
- Table of contents
- List of Figures and Tables
- Document History
- Introduction
  - Purpose
  - Scope
  - Content
  - Definition and conventions
- Applicable and Reference documents
- Text paragraphs
- Annexes (if applicable)

3.2.1.1 Cover Sheet

The main elements of the cover sheet are:

- Standard Page Header (and relevant information)
- Document title
- Project authorization signatures

3.2.1.2 Page Header

The page header is composed by:

- Project logo
- Project name
- Institute and/or company logo(s)
- Document Identification number
- Issue and revision
- Date ("dd Mmm yyyy" format, eg. 01 June 2020)
- Page number

3.2.1.3 Document History

The Document History lists all alterations to the document, by listing the new change index, the date of the change and the section/paragraph number with information about the reason for change.

3.2.1.4 Table of Contents

The Table of Contents lists all paragraphs which are contained in the document showing the paragraph number, the paragraph title (same as within the text) and the paragraph page.

3.2.1.5 Introduction

This paragraph summarizes the scope of the document, its content and definitions, including abbreviation and acronyms and their complete description, used within the document.

3.2.1.6 Applicable and Reference documents

This paragraph lists all documents, and only those, which are referenced within the content of that specific document:

- Applicable Documents (if applicable)
- Reference Documents (if applicable)
- Standards/Handbooks (if applicable)

3.2.1.7 Text Paragraphs

The text paragraphs are structured by the author's needs and contain all descriptive text, tables and figures. The content of each table and figure is briefly described with a short caption.

3.2.1.8 Annexes

This section contains all the document annexes.

3.2.2 Minutes of Meeting composition

Minutes will be composed by:

- Cover sheet
- Page Header
- Author
- Participants
- Agenda
- Text Paragraphs
- List of Action items

3.3 Document categories

Documents are classified according to two categories A, and I:

- Category A (Documents for Approval): documents to be formally approved by ASTRI-PO. Any change has to be agreed by the ASTRI-PO.

- Category I (Documents for Information): progress reports, minutes of meeting, presentations for conferences and reviews.

The approval of a Category A document is evidenced on the Document front page by the signature of the ASTRI Principal Investigator or Project Manager.

The minutes of a meeting even if formally in the Category A do not always need PM or PI approval but they can be approved by the participants of a meeting at the successive meeting.

3.4 Document review, approval and update process

All documents follow the life cycle:

- preparation (by the author)
- review
- verification (potentially by several people, e.g. to confirm correctness of technical contents of document & conformance to quality standard)
- approval (to confirm that this document may be used during a later project phase). All documents need approval as described in Section about document categories. If it is a configuration item document, it shall be placed under configuration control.
- distribution
- modification
- replacement and archive.

The author is responsible of the document and for its content. The author is also responsible to follow the correct procedure for the approval prior to ask for submission in the ASTRI data and documentation archive.

3.4.1 Internal Approval Cycle

The internal approval cycle is performed in accordance with the Institute/Contractor policies and is certified by the hand-written signature on the original cover sheet.

The formal emission of the document is performed only after successful completion of the signature release cycle, embracing, as a minimum the following signature:

- Author(s) → editing
- Work Package Manager → Verification
- System Engineer(s) → Approval
- Project Manager/Principal Investigator → Release

The actors of the approval workflow can be different from what listed above depending on the document to be released.

3.4.2 Updating of document

The updating of a document is done according to one of the following methods:

- issuing of a new document version with minor revisions
- reissuing the complete document

The updated document must be submitted to Review/Approval according to its class.

A record of the history of updates is reported in the Document History sheet.

4 Data & Document distribution and archiving

As soon as they become available, the ASTRI Mini-Array Data & Documentation Manager protects and distributes documents according to the level of confidentiality of information they contain.

4.1 Documentation Format

All deliverable documents to the archive shall be made available to the ASTRI Mini-Array Data & Documentation Manager in electronic format.

The formats accepted will include the following:

- Searchable PDF files as the standard file format for delivering read-only documents
- MS Word or LaTeX for transferring documents in editable format
- MS Excel spreadsheets for transferring financial or technical information
- Microsoft Project for the transferring schedule information
- JPEG as standard file format for photographic pictures or images.
- MPEG for videos
- TIFF with LZW or other lossless compression for technical images
- DWG for Technical/CAD drawings (PDF can be considered)
- STEP (protocol AP203) for exchange of 3D drawings
- Enterprise Architect projects for management of requirements and architectural design and for exchange of UML/SysML diagrams.
- XML for exchange of data models.

4.2 Documentation distribution

A dedicated repository server shall be used as holding area of the files to be exchanged among the ASTRI Mini-Array Project teams.

The Documentation and Data Management Manager is appointed to manage this activity and will provide upon request the relevant rules.

The file protocol for the exchange of the documentation is the same of the active database. Therefore, the ACROBAT PDF standard is normally adopted for the officially released documents. If special needs of the source file will be requested, they will not substitute the formal exchange of the PDF format and will be subject of dedicated request case by case.

All not formal documents or information exchanges will be sent by e-mail.

4.3 Documentation and data file archiving & retrieving

The ASTRI Mini-Array Data & Documentation Manager maintains a documentation database to make available a constantly updated record of all issued documents together with their revision history.

The Documentation Management Tool chosen for the ASTRI Mini-Array project is the Redmine DMS hosted and maintained at the INAF – OAS Bologna institute.

Its main features are the following:

- Recording of received and issued documentation
- Friendly query to search documents
- Directory structure
- Document versioning history
- Email notifications for directories and/or documents
- Document locking
- Multi (drag/drop depending on browser) upload/download
- Multi download via zip
- Direct document or document link sending via email
- Configurable document approval workflow
- Document access auditing
- Integration with Redmine's activity feed

All documents, but the minutes of the meetings, for the ASTRI project are accessible from the link: https://redmine.oas.inaf.it/projects/astri-mini-array/dmsf.

To access the documentation database, inserting the above link on your browser, you will be redirected to the login page then enter your username and password.

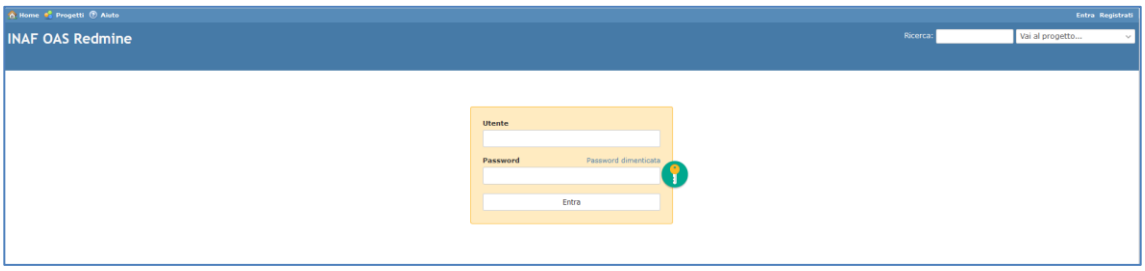

Figure 2. Login page for the INAF OAS Redmine system

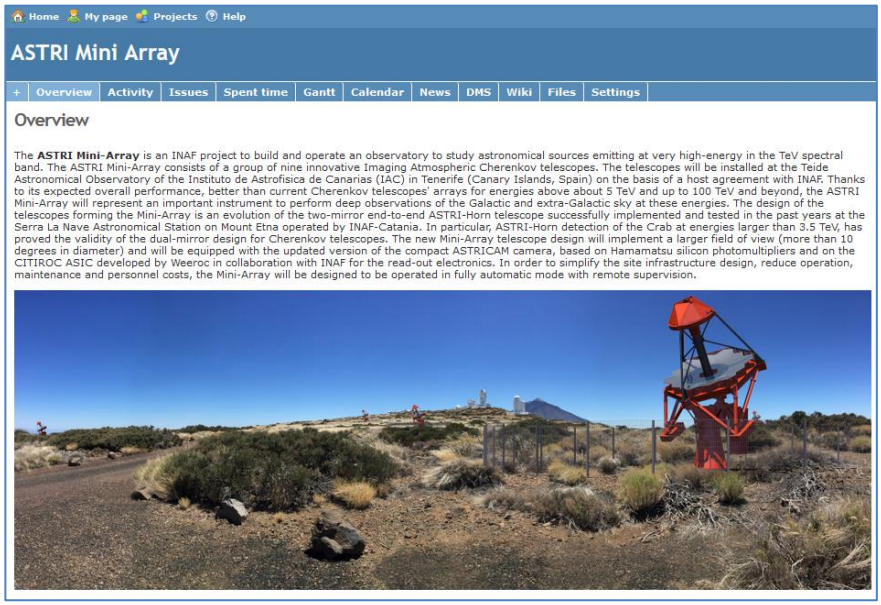

Figure 3. The ASTRI Mini-Array Redmine main page

If you are not registered to the ASTRI Redmine then go to the registration page at the following link https://redmine.oas.inaf.it/account/register and follow the instructions.

Figure 3 and Figure 4 show the ASTRI Mini-Array Redmine main page and the ASTRI Mini-Array Document Management System (DMS) main page. This last page can be accessed from the main page by clicking on the DMS tab (Documenti if you have selected Italian as preferred language for Redmine).

Figure 4 shows the structure of the DMS main page. Apart from the Template directory containing various document templates, the page reproduces the first level of the ASTRI Mini-Array WBS structure. The WBS structure is reproduced down to different levels depending on the subsystem (see Figure 6).

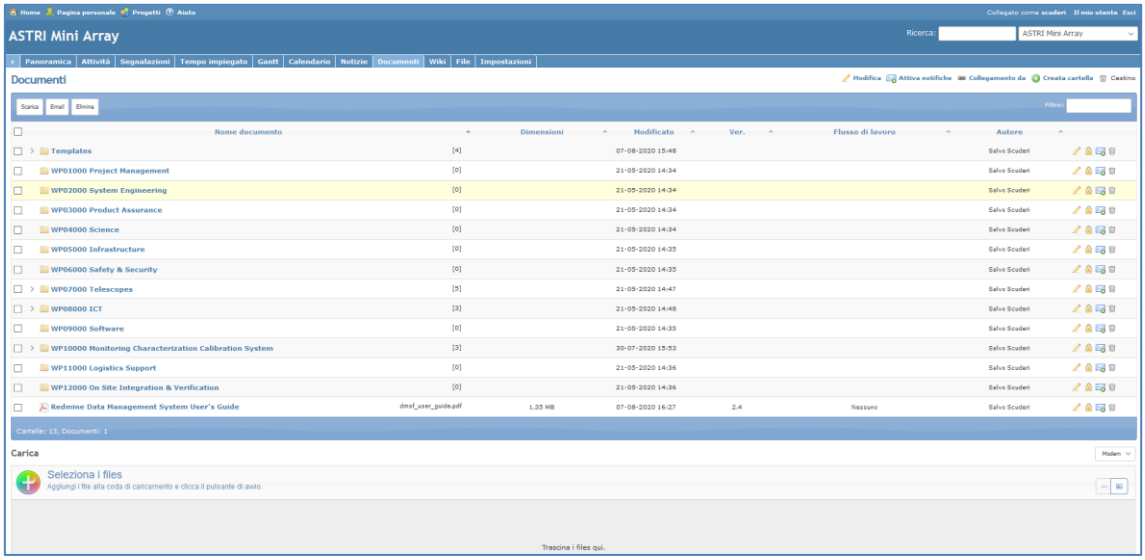

Figure 4. ASTRI Redmine Document Management System main page.

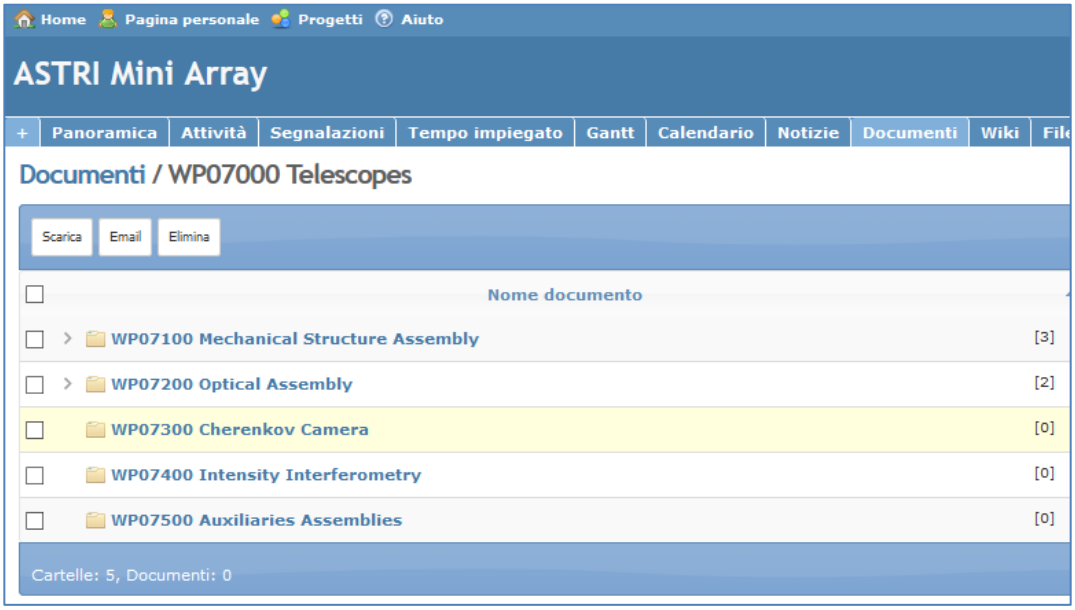

Figure 5. The telescope (WP7000) DMS page

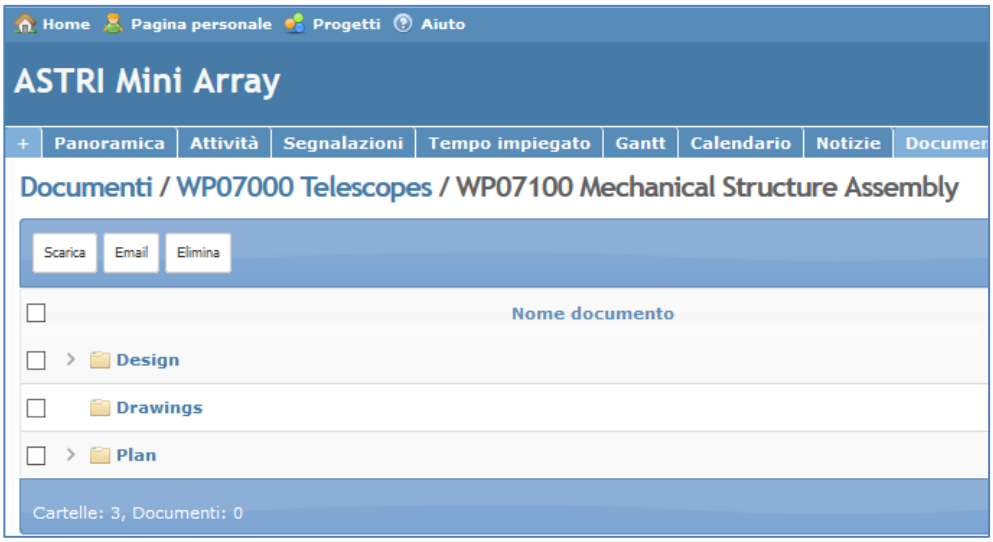

Figure 6. The Mechanical Structure (WP7100) DMS page

The last level in the directory substructure is the one containing the different type of documents (see Table 2 and Figure 6).

In some cases, this last directory can contain also a subdirectory “Templates” to archive document templates specific for that work package.

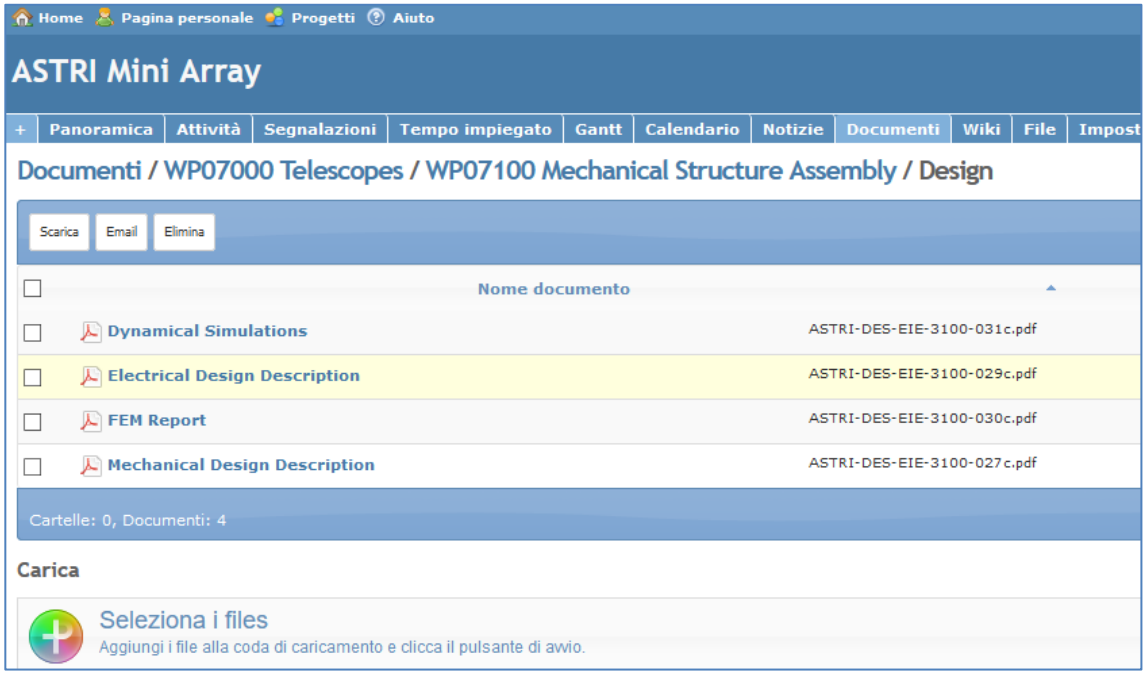

Figure 7. Document archived in the Design directory of WP07100 (Mechanical Structure)

Finally, in the DOCTYPE directory, the files are stored. The files can be viewed and downloaded by clicking on them.

The DMS user manual is available at https://redmine.oas.inaf.it/dmsf/files/84/view.

4.4 Document approval workflow through Redmine DMS

Redmine DMS allows to set up an approval workflow (see section 8.1.17 of the user manual). The specific procedures for the ASTRI Mini-Array project have not been implemented yet. Until then the procedure for the approval of a document will be "manual".

4.5 Meeting Minutes Archiving

The minutes of the various meetings or telecons will be archived on the ASTRI Indico WEB site, in the page specific for that meeting. Telecon organizer/chairperson are responsible for creating the Indico page and upload the minutes.

The minutes can have the form of a document and in this case the coding of the document is the one described in sections 3.1.2 and 3.2.2 or they can be directly recorded on the Indico page of the meeting using the appropriate Indico function (see Figure 8).

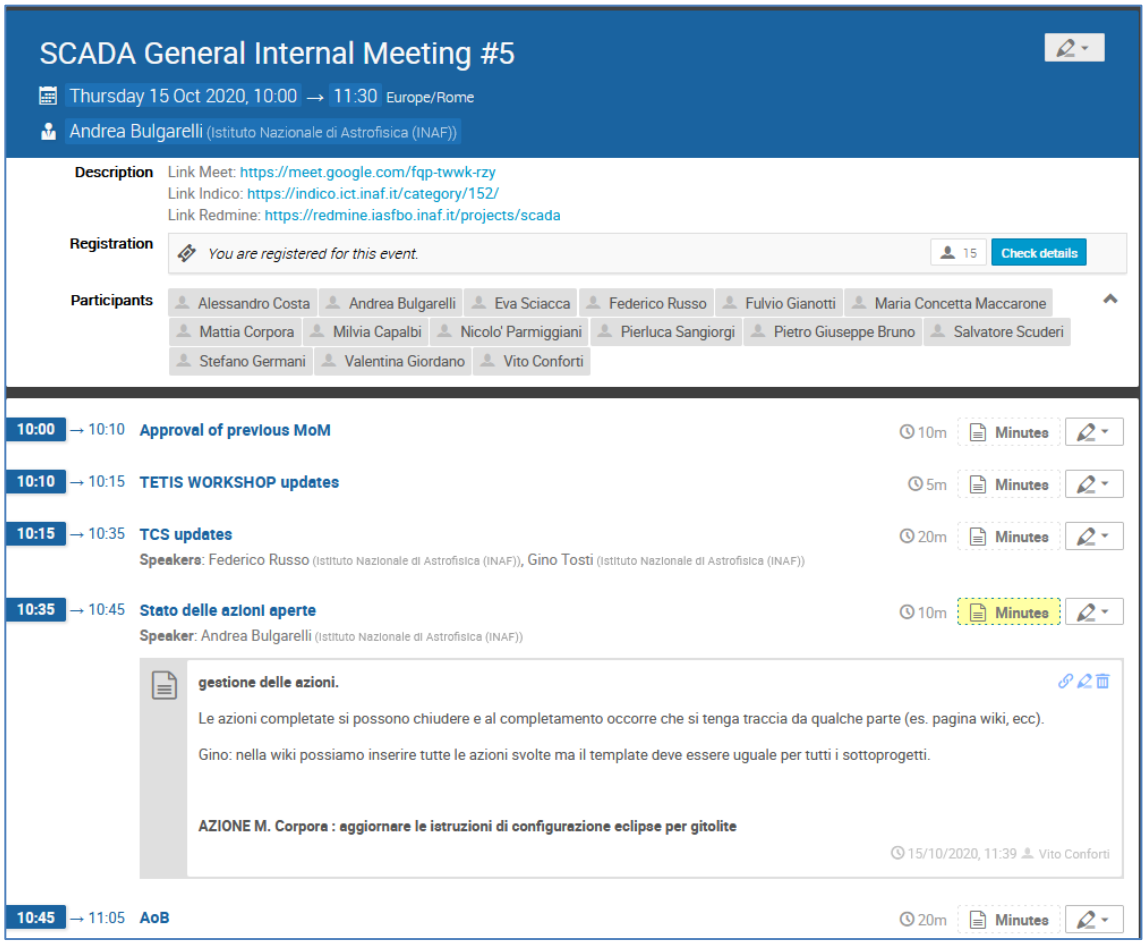

Figure 8. Example of meeting with minutes on Indico.

5 Requirements and Use Cases Coding

5.1 Requirements coding

The requirement code is defined as follow ASTRI-PBS_Id-XXXX.

- The PBS_Id refers to the identification code of the element to which the requirement refers to as defined in the PBS (see for example Figure 9).

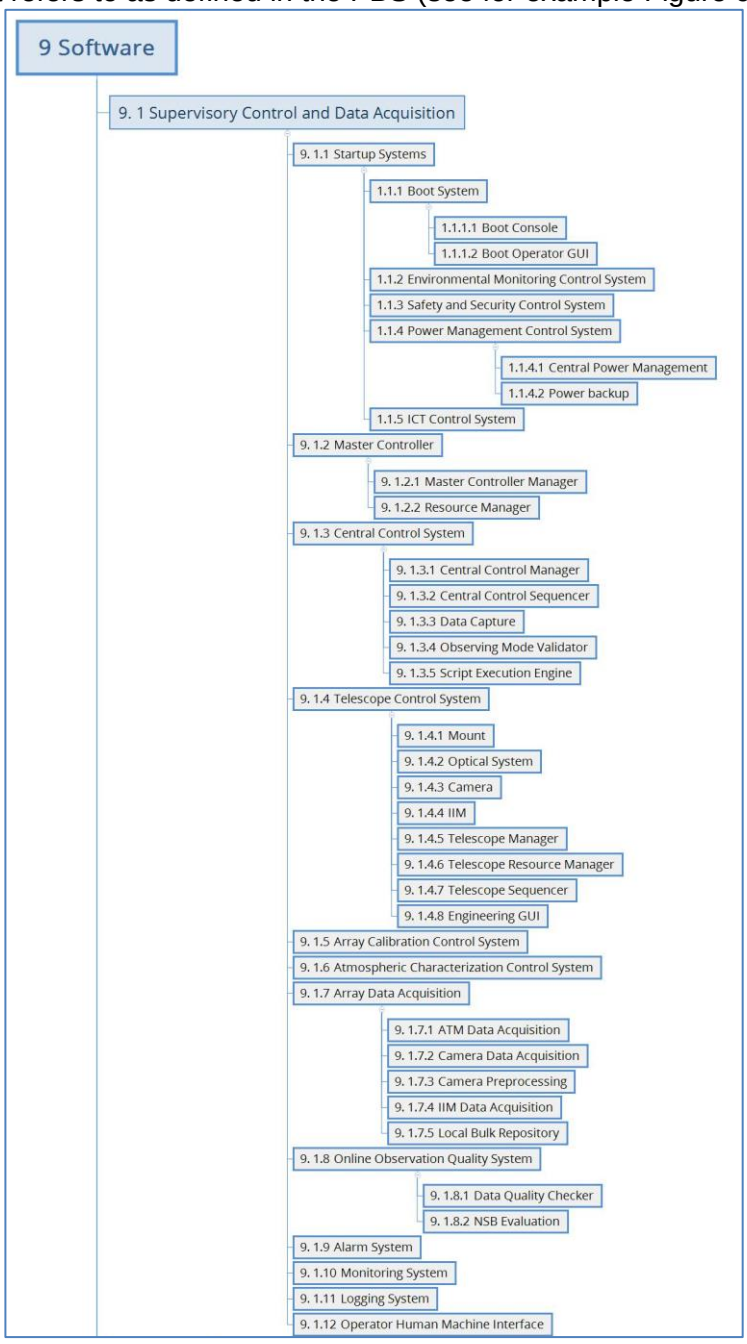

Figure 9. Example of ASTRI Mini-Array PBS - SCADA software

- The XXXX digits refers to the type of requirements and the correspondent coding is reported in Table 4.

Table 4. Definition of code for type of requirement

Type of requirement	Code
Environmental	1000
Functional	2000
Design	3000
Physical	4000
Interface	5000
Product Assurance	6000
Verification	7000
Package, Transportation and Handling	8000

So, the code for a functional requirement for the SCADA software will be ASTRI-9.1-2000 while that for an interface requirement for the Telescope Control System Engineering GUI will be ASTRI-9.1.4.8-5000.

Top level requirements referring to the ASTRI Mini-Array as a system are identified by the code 0 (e.g. ASTRI-0-1000 for environmental requirements)

5.2 Use Cases coding

The use case code is defined as follow ASTRI-UC-PBS_Id-XX where PBS code has the same meaning as in section 5.1 and XX is a sequential number.

So, again, an ASTRI Mini-Array general use case will be ASTRI-UC-0-01.

6 Action/Issue reference and tracking

The ASTRI Mini-Array project will use Redmine issue tracking system for action reference and tracking. WP leader starting from their Redmine page can create a new issue using the appropriate feature in Redmine.

As example Figure 10 shows the issues Redmine pages for the SCADA work package while Figure 11 show a new issue form for the ASTRI Mini-Array project.

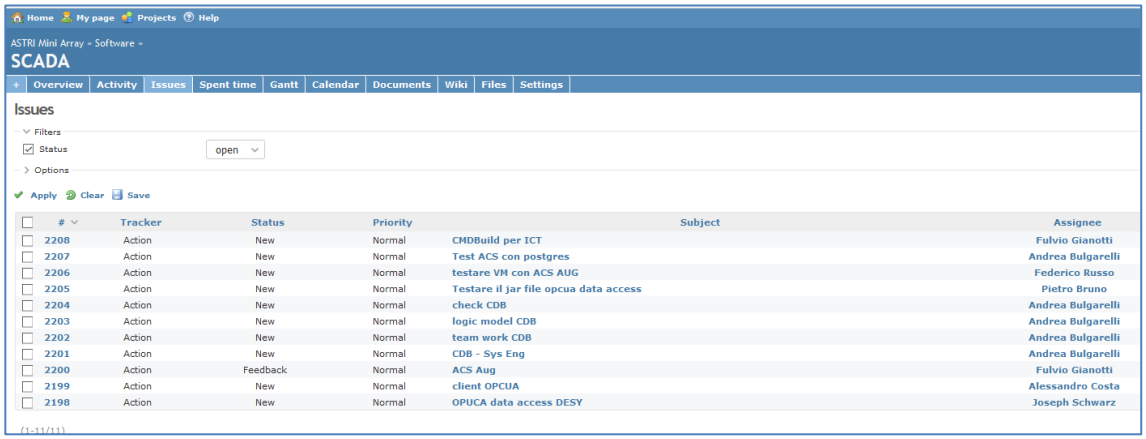

Figure 10. Issues page for the SCADA work package

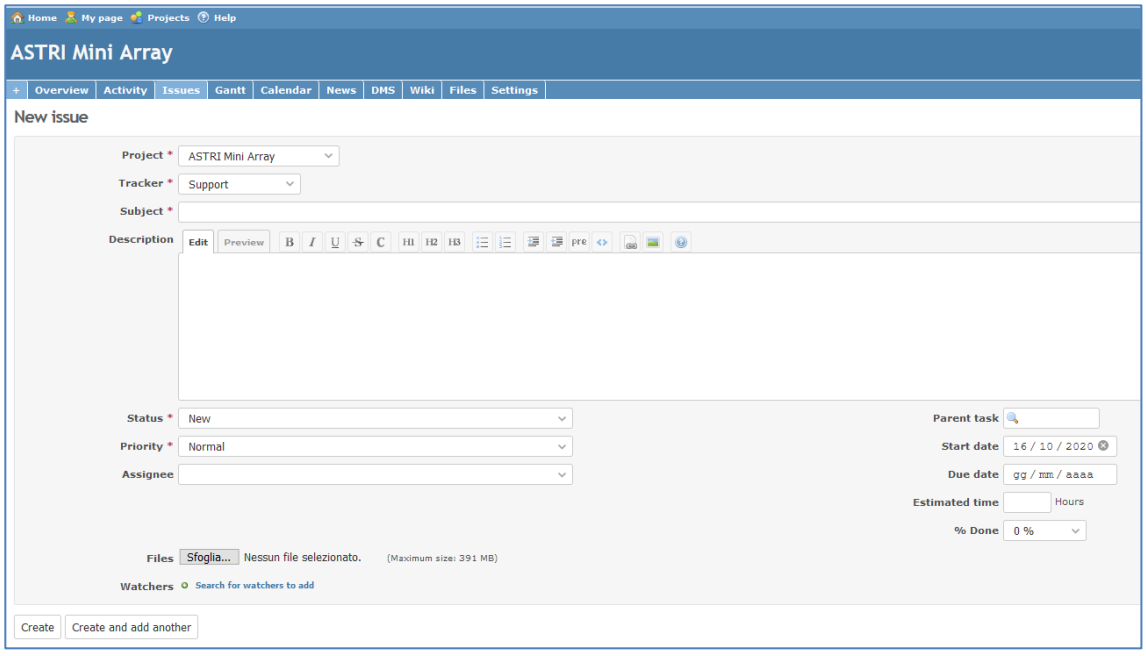

Figure 11. The New Issue Redmine form for the ASTRI Mini-Array project

6.1.1.1 Previous Action Item Tracking systems

All Action Items tracking systems used in the framework of ASTRI Mini-Array project before the publication of this document shall be dismissed. However, no porting to the new system is required.

7 Appendix – ASTRI Mini Array PBS

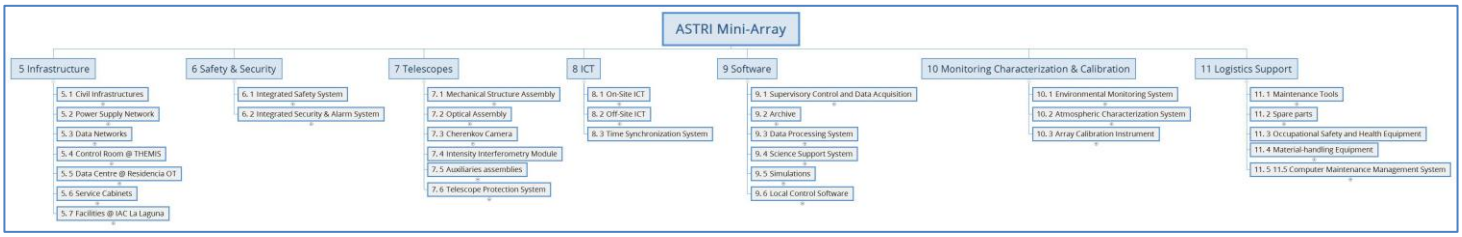

Figure 12. The ASTRI Mini-Array Product Breakdown Structure down to level 3.

Figure 12 shows the ASTRI Mini-Array PBS [AD2] down to level 3.

The complete ASTRI Mini-Array PBS can be found as PDF and Excel files in https://redmine.oas.inaf.it/projects/astri-mini-array/dmsf?folder_id=2