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| APS Stimulus Prototype Software Design Requirements Document  TMT.CTR.TEC.??.???.DRF01 |

February 10, 2017

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Introduction

## Introduction

This document is the Design Requirements Document (DRD) for the APS Stimulus Prototype software.

TBD

## Purpose

TBD. This document is expected to change as TBD.

## Scope

This document is an informal description of requirements for the prototype, and will be useful in determining APS-ICS level 3 requirements.

## Applicable Document

Applicable documents are containing information that shall be applied in the current document.

1. TBD

## Reference Documents

Reference documents contain information complementing, explaining, detailing, or otherwise supporting the information included in the current document.

1. TBD

## Change Record

|  |  |  |  |
| --- | --- | --- | --- |
| Revision | Date | Who | Modifications |
| DRF01 | 2/10/2017 | SM | Initial Draft |
|  |  |  |  |
|  |  |  |  |

## Abbreviations and Definitions

**AO** Adaptive Optics

**CSW** Common Software

**DRD** Design Requirements Document

**OSW** Observatory Software

**TBC** To Be Confirmed

**TBD** To Be Determined

**TMT** Thirty Meter Telescope

# overall Description

This subsection puts the system into perspective with other related systems. A block diagram showing the major components of the larger system, interconnections, and external interfaces can be helpful.

## Perspective

TBD – describe where this fits in the scheme of APS.

## Sub-System Functions

Overview of the functional requirements.

## User and Operator Characteristics

### Use cases

TBD – put use cases here

### User Interface Requirements

All commands specified in the API document should be supported in the user interface, so that a user can execute API commands in real time. Acknowledgement return and completion return notification should be supported so that a command can be followed through its lifecycle from send to acknowledge to completion.

Command failures should be displayed in the user interface in real time.

Telemetry values should be displayed in the user interface in real time.

Alarm states should be displayed in the user interface if possible.

Lifecycle states should be displayed in the user interface for each Assembly and HCD.

## External Interfaces

A context diagram here.

## Constraints

The development of the software prototype shall be developed according to the software development process and software standards specified in the TMT Software Management Plan.

## Assumptions and Dependencies

TBD.

# Specific Requirements

## General Constraints

To Be Completed.

## Environmental Constraints

Not Applicable.

## Stimulus Software General Requirements

### Scope Requirements

TBD

### Standards Requirements

The prototype shall follow the solutions, policies or standards for OSW and TMT software development:

* Development environment including operating system(s) and hardware.
* Development tools (as required).
* Development language standard policy.
* Software development process.
* Source code availability and licensing requirements.
* User interface standards.
* Requirements or standards for documentation.
* Deployment platform including operating system(s) and hardware.

### General Design Requirements

TBD

## Functional Requirements

TBD.

## System Attributes

### Reliability and Availability

### Safety and Security

### Maintainability

## Access and Handling

none

## Other Requirements

none

# Appendix

## Requirements Coverage

This section summarizes how the CSW DRD covers the requirements of the OCD, ORD, and OAD. Table 3 contains each of the requirements discovered in the analysis of the Level 1 documents that impacts CSW and indicates how the DRD for CSW covers that requirement. The degree to which the DRD covers a specific requirement is given in the column **DRD?**. There are three different possible values for **DRD?** as shown in Table 2.

|  |  |
| --- | --- |
| **Level 1 Requirement** | **Description** |
|  | The CSW DRD fully addresses this requirement. |
|  | The CSW DRD partially addresses this requirement. Some details may be unknown or incomplete. |
|  | The CSW DRD not address this requirement. |

Table 2: CSW DRD requirement coverage symbols

In Table 3 shows who well we think the design satisfies the detailed requirement of the FPRD. Each requirement is shown with references to parts of the document and additional comments. Of the 62 requirements, 48 are fully addressed, 13 are partially addressed, and 1 is not addressed.

The 13 requirements partially addressed are all partial for the same reason. Each of these requirements from the OCD, OAD, or OAD requires something that CSW can not itself accomplish. For instance: REQ-1-OAD-9318 requires systems transmit health information. CSW can only provide the support to allow this; therefore, in the table it is partially addressed.

The one requirement not addressed is REQ-1-OAD-9210, *Each common service shall be asynchronous.* This requirement is bad and will be removed from the OAD. Some services will be asynchronous and some should be synchronous as necessary.

| **Requirement** | **Description** | **DRD?** | **DRD Requirement and Comments** |
| --- | --- | --- | --- |
| REQ-1-OCD-2275 | The TMT target acquisition sequence shall be highly automated… |  | * REQ-2-CSW-1000 * Requirement is about enabling and knowing what is needed. |
| REQ-1-OCD-2300 | The TMT Observatory shall monitor system performance for the following purposes… |  | * REQ-2-CSW-1000 * Requirement is about enabling and knowing what is needed. |
| REQ-1-OCD-3290 | Technical interface requirements must be developed, including…  3290 has several points. 1, 3 and 8 influence CSW. |  | * REQ-2-CSW-0010 – future proofing * REQ-2-CSW-1105 – motion control, device control * REQ-2-CSW-2500 * Most requirements cover command/control interface. |
| REQ-1-ORD-1000 | The observatory shall be able to operate and meet all the requirements for 50 years… |  | * REQ-2-CSW-0010 – design should be for long-term. |
| REQ-1-ORD-1375 | All mechanical and electrical components of the system shall be designed… |  | * REQ-2-CSW-0020 – hardware plan should discuss electrical components. |
| REQ-1-ORD-1700 | The system shall support classical observing. |  | * REQ-2-CSW-1000 * CSW does not implement classical observing, but must provide functions for system that will. |
| REQ-1-ORD-1705 | The observatory systems architecture shall be upgradeable… |  | * REQ-2-CSW-1000 * Requirement is about enabling and knowing what is needed. |
| REQ-1-ORD-9165 | Within the Observatory local area network (LAN), IT network traffic shall be partitioned… |  | * REQ-2-CSW-0020 * REQ-2-CSW-2505 * REQ-2-CSW-3005 * Hardware Plan Document |
| REQ-1-OAD-0210 | The CSW system decomposition element is defined as follows… |  | * OAD requirement establishing CSW. |
| REQ-1-OAD-3085 | In steady-state operations, the TMT Observatory shall have no more than 3% (TBC)… |  | * REQ-2-CSW-9000 |
| OAD Table 2 – p. 28 | Observatory Downtime Allocation |  | * REQ-2-CSW-9000 |
| REQ-1-OAD-4835 | Redundant IT hardware capacity (including pre-configured spares) must be available… |  | * REQ-2-CSW-0020 * Hardware Plan will discuss capacity and spares. |
| REQ-1-OAD-4845 | LAN network traffic shall be partitioned so that the following major components do not interfere… |  | * REQ-2-CSW-0020 * REQ-2-CSW-2505 * REQ-2-CSW-3005 * Hardware Plan Document |
| REQ-1-OAD-4855 | A hardware time bus system shall be implemented… |  | * REQ-2-CSW-4000 * REQ-2-CSW-4005 * REQ-2-CSW-4900 * REQ-2-CSW-4905 |
| REQ-1-OAD-9003 | The OES shall consist of a set of software subsystems that interact… |  | * REQ-2-CSW-0025 * REQ-2-CSW-1010 * REQ-2-CSW-1015 |
| REQ-1-OAD-9009 | The OES command-and-control architecture is hierarchical. The transition… |  | * REQ-2-CSW-2515 |
| REQ-1-OAD-9300 | Each software subsystem may consist of one or more lower-level… |  | * REQ-2-CSW-1015 |
| REQ-1-OAD-9033 | Data visualization tools must be provided for the following situations…  Bullet 3 |  | * REQ-2-CSW-3000 * REQ-2-CSW-3270 * Event Service enables this. 3270 is a visualization app for simple tech data. |
| REQ-1-OAD-9039 | Automatic system startup and shutdown processes… |  | * REQ-2-CSW-1210 |
| REQ-1-OAD-9042 | It shall be possible to run the TMT software system… |  | * REQ-2-CSW-1205 |
| REQ-1-OAD-9045 | All software servers shall be attached to an uninterruptible power system (UPS). |  | * REQ-2-CSW-0020 * Hardware Plan should discuss power. |
| REQ-1-OAD-9112 | Each subsystem can (but is not required to) use a different communication strategy… |  | * REQ-2-CSW-5750 |
| REQ-1-OAD-9619 | Each business object shall have a revision history. |  | * REQ-2-CSW-5000 * Configuration Service provides this. |
| REQ-1-OAD-9075 | The TMT software system shall be capable of transporting a mean technical data stream rate… |  | * REQ-2-CSW-3400 |

Table 3: Level 1 TMT requirements coverage in CSW DRD