

# SECOND TARGET STATION (STS) PROJECT

## Interface Sheet for Moderator Reflector Assembly I&C and Moderator Reflector Assembly (MRA)



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Reflector Assembly (MRA)**

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## 1. PURPOSE

This document defines the interface between Moderator Reflector Assembly I&C (S.06.03.04) and Moderator Reflector Assembly (MRA) (S.03.04). The interface described in this document will provide inputs to the design of MRA I&C and MRA. Requirements derived from this document are included in the Target Controls Requirement Document and MRA Requirement Document.

The scope of this document is the complete interface definition for the interface between MRA I&C and MRA as identified in the parent Interface Control Document S01020500-IC0009 between Integrated Control Systems WBS S.06 and Target Systems WBS S.03.

### 1.1 INTERFACING PARTS OR COMPONENTS

No.	Components (MRA)		Components (MRA I&C)	
	Name	Functional reference Number	Name	Functional reference Number
1	MRA Process Instrumentation		Monitoring and control of MRA	

## 2. ACRONYMS AND DEFINITIONS

I&C	Instrumentation and Controls for Integrated Control Systems
ICD	Interface Control Document
IS	Interface Sheet
MRA	Moderator Reflector Assembly
P&IDs	Piping and Instrumentation Diagrams
PCD	Process Control Description
PLC	Programmable Logic Controller
SSC	Structure, System or Component
WBS	Work Breakdown Structure

## 3. REFERENCES

### 3.1 DOCUMENTS APPLICABLE TO THE INTERFACING SSCS

Ref	Document Titles	Document Control System Location
[1]	Interface Control Document for Integrated Control Systems and Target Systems	S01020500-IC0009
[2]	Integrated Control Systems Requirement Document	S06000000-SR00002
[3]	Target Controls Requirement Document	S06030000-SR0001
[4]	MRA Requirement Document	S03040000-SR0001
[5]	Top level MRA drawing	S03040000-M8U-8800-A10000

## **4. INTERFACE DEFINITION**

### **4.1 TECHNICAL DESCRIPTION OF THE INTERFACE**

Spalled neutrons will be moderated (reduced in energy) by a pair of compact moderators, located above and below the target to optimize the production of high-brightness cold neutrons. Because of the compact and coupled nature of the STS design, the moderators and reflector will be combined into a single assembly.

MRA is responsible for providing and installing all MRA process instrumentation.

MRA I&C is responsible for providing control system hardware, software, and user interfaces for MRA systems including the EPICS-based control system and PLC-based controls.

Anything outside the noted criteria of this document requires review by MRA I&C and MRA.

#### **4.1.1 Design Responsibility**

##### **4.1.1.1 Piping and Instrumentation Diagrams (P&IDs)**

Target Process Systems (S.03.09) is responsible for designing and drafting the P&IDs for the MRA. MRA and MRA I&C will provide input for the instrumentation and controls portion of the P&IDs.

##### **4.1.1.2 Process Control Description (PCD)**

Target Process Systems (S.03.09) will provide a PCD, with input from MRA, describing the proper functionality and control for MRA, including the following:

- Machine Protection System (MPS) interlocks and process control interlocks (if applicable)
- Sequences of operation for start-up, running, and shutdown (if applicable)

Target Process Systems (S.03.09) will also provide an Setpoint and Alarm List, with input from MRA, showing process control setpoints and alarm limits for the field instrumentation.

##### **4.1.1.3 Software**

The PCD and Setpoint and Alarm List, described in Section 4.1.1.2, will serve as design input to the MRA I&C software which will provide monitoring and control of the MRA field instrumentation. This includes PLC logic, EPICS configuration, operator interface screens, process data monitoring, and alarm handling.

##### **4.1.1.4 Field Instrumentation and Final Control Element Selection**

MRA will provide process conditions for the field instrumentation to MRA I&C, who will provide technical expertise on the instrumentation selection and/or development. MRA will be responsible for the final selection and purchase of the instrumentation, calibration certificates, and manufacturer drawings. MRA and MRA I&C will work to together to ensure all devices are compatible with the STS standard PLCs. MRA I&C will prepare Instrument Datasheets to document the instrumentation selected.

#### **4.1.1.5 Instrumentation Installation Diagrams**

MRA will provide fabrication drawings showing field instrumentation locations and installations.

#### **4.1.1.6 Wiring of Field Instrumentation and Final Control Elements**

MRA I&C is responsible for providing documentation for field instrumentation cable terminations via a connector at the Vacuum/Ambient boundary and at the PLC enclosures. For dual element thermocouples, both thermocouples will be utilized. MRA I&C will also provide fabrication drawings and wiring drawings for the related PLC cabinet assembly.

#### **4.1.2 Procurement**

MRA is responsible for procurement of the MRA field instrumentation. All field instrumentation shall be purchased with calibration certificates and manufacturer drawings.

MRA I&C is responsible for the procurement of control system hardware, including PLC cabinet assemblies, intermediate junction boxes and/or cable connectors, and cable/conduit between the PLC cabinet and field instrumentation. They will also procure any software packages required for control and monitoring of the field instrumentation.

#### **4.1.3 System Installation**

MRA will be responsible for installing all field instrumentation.

MRA I&C will be responsible for installing PLC cabinet assemblies, intermediate junction boxes and/or cable connectors, and cable/conduit between the PLC cabinet and field instrumentation. They will also be responsible for configuration of field instrumentation, as required.

#### **4.1.4 System Testing**

Prior to MRA Integration Testing, MRA I&C will provide ICS checkout procedures/testing which include the following:

- Verifying wiring is installed correctly
- Verifying the instrumentation is performing as required
- Testing control algorithms to the extent possible without endangering equipment
- Verification of signal from field instrumentation to EPICS

MRA will provide overall System Integrated Testing which includes sequence of operation, start-up, and commissioning procedures. MRA I&C will support this testing.



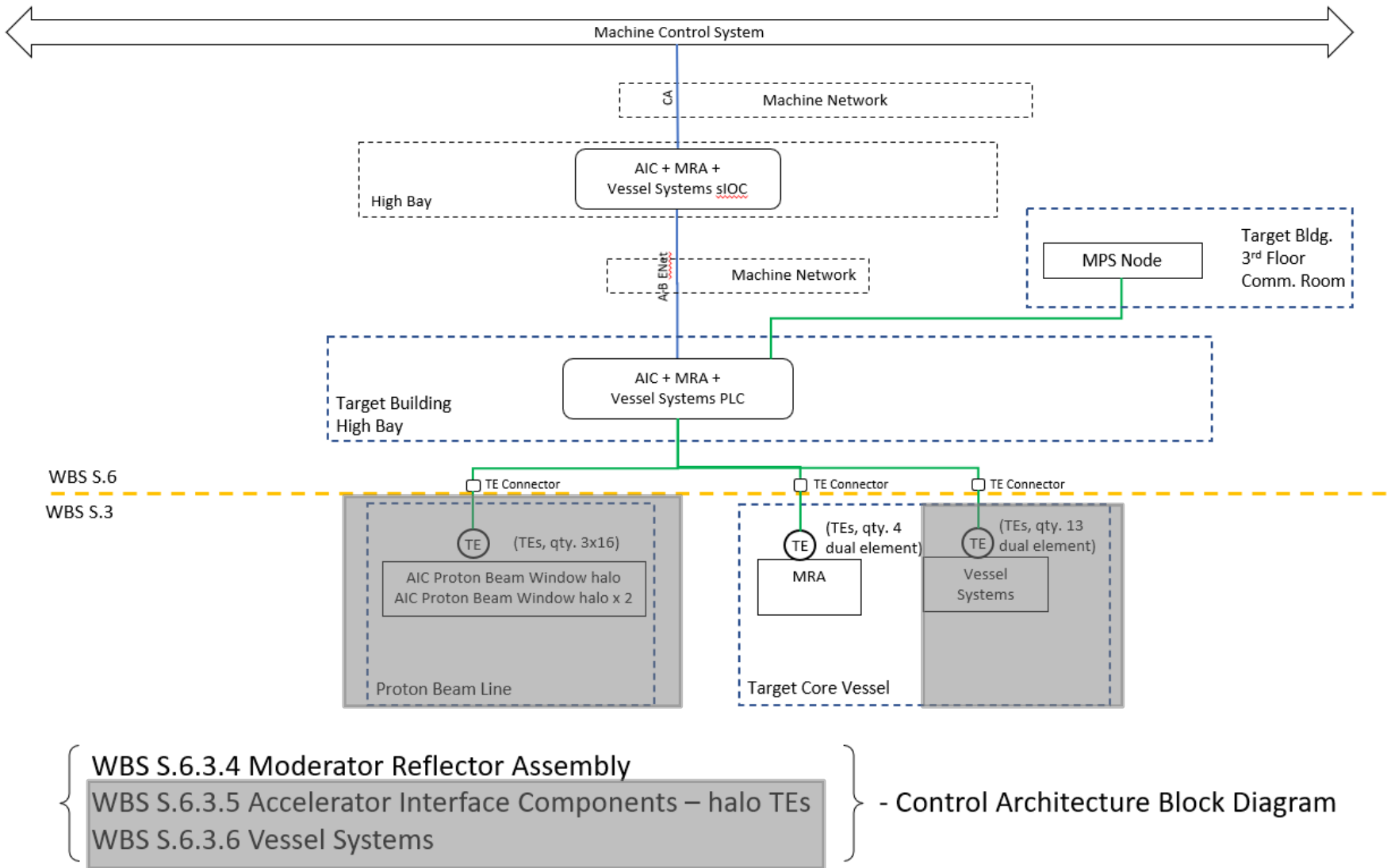
#### 4.1.5 Summary of Design Responsibility

Table 1 below summarizes design responsibility of MRA and MRA I&C:

Summary of Design Responsibility	
MRA (S.03.04) Target Process Systems (S.03.09)	MRA I&C (S.06.03.04)
S.03.09 - P&ID (S.03.04 and S.06.03.04 will provide input)	Software (PLC, EPICS, operator interface screens, etc.)
S.03.09 – PCD (S.03.04 will provide input)	Instrument datasheets (S.03.04 will provide process conditions)
S.03.04 – field instrumentation procurement and procurement documentation (S.06.03.04 will provide input selection)	Wiring diagrams for instrumentation
S.03.04 - field instrumentation installation diagrams	Fabrication drawings for PLC cabinet assembly
S.03.04 - Installation of field instrumentation	Installation of PLC cabinet assemblies, intermediate junction boxes and/or cable connectors, and cable/conduit between the PLC cabinet and field instrumentation
S.03.04 - System integration testing (S.06.03.04 will support)	Configuration of field instrumentation, as needed
	ICS checkout testing

#### 4.2 INTERFACE DATA

The block diagrams shown in Figure 1, illustrates the interfaces between field instrumentation. Accelerator Interface Components (AIC) and Vessel Systems are not in the scope of this document.



*Figure 1: Moderator Reflector Assembly (MRA)  
 (Accelerator Interface Components and Vessel Systems are not in the scope of this document)*