S01020500-IC0009

SECOND TARGET STATION (STS) PROJECT

Interface Control Document for Integrated Controls and Target Systems

Dana Humphreys
Tommy Michaelides
Mike Strong

January 26, 2023

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE US DEPARTMENT OF ENERGY

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Approvals

ICD for Integrated Control Systems and Target Systems		ISSUE DATE: January 26, 2023
PREPARED BY Dana Humphreys, Tommy Michaelides, Mike Strong	PROJECT Second Target Station	DOCUMENT NUMBER: S01020500-IC0009

	Signature / Date					
	Rev. 00	Date	Rev. 01	Date	Rev. 02	Date
STS Configuration Authority	Graeme Murdoch		Graeme Murdoch			
	/s/ Graeme Murdoch	*7/29/2022*	Graeme Murdoch Digitally signed by Graeme Murdoch Date: 2023.01.30 13:09:46 -05'00'			
Integrated Controls Configuration Control Manager	Steven Hartman		Steven Hartman			
	/s/ Steven Hartman	*7/22/2022*	Steven Hartman Digitally signed by Steven Hartman Date: 2023.01.26 17:19:30 -05'00'			
Target Configuration Control Manager	Peter Rosenblad		Peter Rosenblad			
	/s/ Peter Rosenblad	*7/25/2022*	Peter Rosenblad Digitally signed by Peter Rosenblad Date: 2023.01.28 10:34:38 -05'00'			
Integrated Controls Co-author	Dana Humphreys		Dana Humphreys			
	/s/ Dana Humphreys	*7/22/2022*	Dana L. Humphreys Digitally signed by Dana L. Humphreys Date: 2023.01.26 17:25:57 -05'00'			
Integrated Controls Co-author	Tommy Michaelides		Tommy Michaelides			
	/s/ Tommy Michaelides	*7/22/2022*	Tommy Michaelides Digitally signed by Tommy Michaelides Date: 2023.01.26 18:50:29 -05'00'			
Target Co-author	Mike Strong		Mike Strong			
	/s/ Mike Strong	*7/22/2022*	Mike Strong Digitally signed by Mike Strong Date: 2023.01.27 08:25:12 -05'00'			

Revision	Description
00	Initial Release
01	Revised to add MPS reference & TVP interface sheet IST10081

CONTENTS

1. PURPOSE

This purpose of this document is to control and coordinate the release of Interface Sheets (IS) documenting interfaces existing between Structure, System or Components (SSCs) in S.06 Integrated Control Systems and SSCs in S.03 Target Systems. This Interface Control Document (ICD) ensures:

- Each Structure, System or Component within Integrated Control Systems that has an interface with an SSC in Target Systems has all necessary design input data from its corresponding SSC, and vice versa, when it is needed
- Each SSC from Integrated Control Systems and Target Systems that contains an interface with an SSC from the other knows what data is needed by the other SSC and when it is needed
- That each interface is completely defined.

2. SCOPE

The scope of this document is to provide a complete listing of all interfaces between Integrated Control Systems and Target Systems.

3. ACRONYMS AND DEFINITIONS

AIC	Accelerator Interface Components
CEC	Credited Engineering Controls
CMS	Cryogenic Moderator System
I&C	Instrumentation & Control
ICD	Interface Control Document
IS	Interface Sheet
LCS	Leak Collection Systems
MRA	Moderator Reflector Assembly
PPS	Personnel Protection Systems
SSC	Structure, System or Component
TBD	To Be Determined
TPS	Target Protection Systems
TVP	Target Viewing Periscope
WBS	Work Breakdown Structure

4. REFERENCES

4.1 DOCUMENTS APPLICABLE TO THE INTERFACING SSCS

Ref	Document Titles	Document Control System Location

5. LIST OF INTERFACE SHEETS BETWEEN INTEGRATED CONTROL SYSTEMS AND TARGET SYSTEMS

Forecasted Interface Sheets are listed in this table, including relevant information to be included in the Interface Sheet.

Interface Sheet		L2 WBS 1	L2 WBS 2	Interface Points	Interface Steps	Responsible	forecast dates	
number	title	subsystems	subsystems	expected data	step listing		draft	released
S01020500 -IST10081	Interface between Accelerator Control Systems and Target Systems – Accelerator Interface Components (AIC), Target Viewing Periscope (TVP)	Integrated Control Systems - Timing S.06.02.05 Integrated Control Systems - Accelerator Computing & Network S.06.02.08	Target Systems - Accelerator Interface Components S.03.05	TVP: timing & network (beam image from Camera)	Determine how TVP image will be used	Target Systems	tbd	tbd
					Specify TVP control interfaces	Target Systems/Accelerator Control Systems	tbd	tbd
					Specify Camera interface	Target Systems	tbd	tbd
					Specify control logic (if any)	Target Systems	tbd	tbd
S01020500 -IST10124	Interface between Target Assembly Controls and Target Assembly	Integrated Control Systems - Target Assembly S.06.03.02	Target Systems - Target Assembly S.03.02	Motor control, synchronization of rotation with beam pulses, instrumentation, and control of Target Assembly*	Determine instrumentation & motor control need. Select & identify instrumentation. Define scope boundary and connections.	Aaron Jacques Dana Humphreys	7/6/2021	tbd
S01020500 -IST10125	Interface between Cryogenic	Integrated Control Systems -	Target Systems - Cryogenic	Instrumentation and control of the CMS*	Determine instrumentation need.	Jim Janney Dana Humphreys	7/6/2021	tbd

Interface Sheet		L2 WBS 1	L2 WBS 2	Interface Points	Interface Steps	Responsible	forecast dates	
number	title	subsystems	subsystems	expected data	step listing		draft	released
	Moderator System (CMS) Controls and Cryogenic Moderator System	Cryogenics System for Neutron Moderator S.06.03.03	Moderator Systems S.03.03		Select & identify instrumentation. Define scope boundary and connections.			
S01020500 -IST10126	Interface between Moderator Reflector Assembly (MRA) I&C and Moderator Reflector Assembly	Integrated Control Systems - Moderator Reflector Assembly S.06.03.04	Target Systems - Moderator Reflector Assembly S.03.04	Instrumentation and control of MRA*	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Jim Janney Dana Humphreys	7/6/2021	tbd
S01020500 -IST10127	Interface between Accelerator Interface Components (AIC) I&C and Accelerator Interface Components, Proton Beam Window & Collimator (Halo)	Integrated Control Systems – Proton Beam Line Interface Components S.06.03.05	Target Systems - Accelerator Interface Components S.03.05	Instrumentation and control for Proton Beam Window & Collimator (Halo)*	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Neelam Pradhan Dana Humphreys	7/6/2021	tbd
S01020500 -IST10128	Interface between Vessel Systems I&C and Vessel Systems	Integrated Control Systems – Vessel Systems S.06.03.06	Target Systems – Vessel Systems S.03.06	Instrumentation and control for Vessel Systems*	Determine instrumentation need. Select & identify instrumentation.	Chris Anton Dana Humphreys	7/6/2021	tbd

Interface Sheet		L2 WBS 1	L2 WBS 2	Interface Points	Interface Steps	Responsible	forecast dates	
number	title	subsystems	subsystems	expected data	step listing		draft	released
					Define scope boundary and connections.			
S01020500 -IST10129	Interface between Target Utilities I&C and Target Process Systems	Integrated Control Systems - Target Utilities S.06.03.09	Target Systems – Target Process Systems S.03.09	Instrumentation and control of Target Process Systems*	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Don Montierth Dana Humphreys	7/6/2021	tbd
S01020500 -IST10130	Interface between Remote Handling I&C and Remote Handling	Integrated Control Systems - Remote Handling Systems S.06.03.10	Target Systems – Remote Handling Systems S.03.10	Instrumentation and control for Remote Handling*	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Steve Schrick Dana Humphreys	7/6/2021	tbd
S01020500 -IST10131	Interface between Target Vacuum Systems I&C and Target Vacuum Systems	Integrated Control Systems - Target Vacuum Systems S.06.03.11	Target Systems – Vacuum Systems S.03.11	Instrumentation and control for Target Vacuum Systems *	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Mike Strong Dana Humphreys	7/6/2021	tbd
S01020500 -IST10099	Interface between Target Protection and Target Process Systems	Integrated Control Systems - Target Protection Systems (TPS) S.06.06.05	Target Systems – Target Process Systems Activated Cooling Loops S.03.09.02	Selection of instruments, installation, and instrumentation to monitor the flow of cooling loop 1 and ensuring high quality standards for a CEC system.	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Don Montierth Tommy Michaelides	tbd	tbd

Interface Sheet		L2 WBS 1	L2 WBS 2	Interface Points	Interface Steps	Responsible	forecast dates	
number	title	subsystems	subsystems	expected data	step listing		draft	released
S01020500 -IST10100	Interface between Target Protection and Target Process Systems	Integrated Control Systems - Target Protection Systems (TPS) S.06.06.05	Target Systems – Target Process Systems Activated Cooling Loops S.03.09.02	Selection of instruments, installation, and instrumentation to monitor the temperature of cooling loop 1 and ensuring high quality standards for a CEC system.	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Don Montierth Tommy Michaelides	tbd	tbd
S01020500 -IST10101	Interface between Target Protection and Target Process Systems	Integrated Control Systems - Target Protection Systems (TPS) S.06.06.05	Target Systems – Target Process Systems Leak Collection Systems (LCS) S.03.09.04	Selection of instruments, installation, and instrumentation to monitor the core vessel liquid detection and ensuring high quality standards for a CEC system.	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Don Montierth Tommy Michaelides	tbd	tbd
S01020500 -IST10104	Interface between Target Protection and Target Assembly Systems	Integrated Control Systems - Target Protection Systems (TPS) S.06.06.05	Target Systems – Target Assembly S.03.02	Selection of instruments, installation, and instrumentation to monitor the target rotation and position ensuring high quality standards for a CEC system.	Determine instrumentation need. Select & identify instrumentation. Define scope boundary and connections.	Tommy Michaelides Aaron Jacques	tbd	tbd
S01020500 -IST10138	Interface between Target Personnel Protection	Integrated Control Systems – Target	Target Systems S.03	tbd	Determine the scope boundary and connections between personnel access and	Tommy Michaelides Mike Strong	tbd	tbd

Interface Sheet		L2 WBS 1	L2 WBS 2	Interface Points	Interface Steps	Responsible	forecast dates	
number	title	subsystems	subsystems	expected data	step listing		draft	released
	System and Target Systems	Personnel Protection Systems (PPS) S.06.06.03			target mechanical systems			

*Interface sheets noted will include internal S.06 interface between S.06.03-generation of Machine Protection System (MPS) trip signal in PLC and S.06.02-MPS node to MPS

6. INTERFACE SHEETS AND REVISION LEVELS

Release dates for each Interface Sheet are listed in the following table.

Interface Sheet Number	Release Dates				
	Initial Release	Revision 01	Revision 02	Revision 03	Revision 04
S01020500-IST10081	tbd				
S01020500-IST10124	tbd				
S01020500-IST10125	tbd				
S01020500-IST10126	tbd				
S01020500-IST10127	tbd				
S01020500-IST10128	tbd				
S01020500-IST10129	tbd				
S01020500-IST10130	tbd				
S01020500-IST10131	tbd				
S01020500-IST10099	tbd				
S01020500-IST10100	tbd				
S01020500-IST10101	tbd				
S01020500-IST10104	tbd				
S01020500-IST10138	tbd				