

## MIRACLES TG2 SAD Checklist

	<b>Name</b>	<b>Affiliation</b>
<b>Authors</b>	MIRACLES team	ESS Bilbao
<b>Reviewers</b>	Harald Schneider	ESS-SAD
<b>Approver</b>	Arno Hiess	ESS

## **1. INTRODUCTION**

Scientific Activities Division (SAD) is responsible for the Science Support Systems (SSS) work package. To be able to support the instruments in construction and operation it is important that the instruments are designed to take SAD requirements, ref [1],[2],[3],[4], into account. This checklist is intended to help instruments be aware of these requirements to a sufficient level before starting detailed design. For its scientific exploration an instrument might require certain sample environment equipment and support laboratories. Such needs shall be discussed and agreed on between the instrument team and SAD according to ref [5].

## **2. SCOPE**

This checklist cover interfaces between an instrument team and ESS Scientific Activities Division. It encompasses mainly the areas of mechanical interfaces for sample environment, utilities supplies for sample environment, control system for sample environment and sample handling and instrument specific lab space. The checklist also serves to document that needs for sample environment equipment and support laboratories have been discussed between the instrument team and SAD, ref [5]. Actual requirements and specifications for sample environment equipment and support laboratories are tracked elsewhere [6].

The checklist intends to check if an instrument is mature enough from SAD point of view to pass TG2. Instrument teams should check the box that they think best represents the current instrument status for each row.

Validation Report

Item	Document Number	ESS-0062987				SAD TG2 Review comment	Team comment
	Date	Jul 4, 2016					
	Brief descriptions of areas relevant for SAD at TG2						
		Not relevant	Not yet considered	Importance		Cost allocated in inst. budget	
				Minor	Major		
<b>1. Sample Environment Equipment</b>							
Related doc: ESS-0000960 Science Support Systems Work Package Specification; section 1.4.2							
<b>1.1 Instrument specific sample environment equipment:</b>							
	Scope budget and timelines for each system adequately defined?					x	A cryofurnace will be available from operations funds, budget for integration will be transferred to ESS SAD group during Cold Commissioning, procurement might be done by ESS. Synergy with C-SPEC for sample changer at ambient Temperatures,
	Responsibilities and interfaces during construction, operation, maintenance adequately agreed and documented?				x		
	Synergies with other instruments and pool sample environment equipment investigated?				x		
<b>1.2 Pool sample environment equipment</b>							
	Needs adequately expressed?				x		ESS pool can be used up to 400 mm, incl. small ESS magnet
	Requirements and timelines agreed upon?				x		Priorities are defined.
<b>2. Support Laboratories</b>							
Related doc: ESS-0000960 Science Support Systems Work Package Specification; section 1.4.2							
<b>2.1 Instrument specific support user laboratories</b>							
	Scope budget and timelines for each lab adequately defined?		x				Simple sample preparation/mounting will be done on the platform, instrument specific lab.

Responsibilities and interfaces during construction, operation, maintenance adequately defined?									
Synergies with other instruments and common user laboratories investigated?									Considering the availability using common user labs
<b>2.2. Common user laboratories</b>									
Needs adequately expressed?									Upon request by user
Requirements and timelines agreed upon?									We need access to common labs during hot commissioning
<b>3. Sample environment: Mechanical Interfaces</b>									
Related doc: ESS Sample Environment Mechanical Interfaces for Instruments (CHESS reference: ESS-0038078)									
<b>3.1 Access</b>									
Transport path between instrument and SE lab									Free path at ground level, local crane 1t with clearance to floor
Provision of an area within 20m of instrument to prepare SEE									2 panels in the budget, 1 will be used to prepare the next experiment close to the cave, on top of the platform
Area to allow SEE to enter/exit instrument									Access from top
Adequate volume within instrument to accommodate SEE (and ancillary) at the sample position									Up to 400mm dia.
<b>3.2 Sample area</b>									
L/XL support level defined									Limitation to 400 mm
Space for SEE									
Standard sample mounts									Top flange
Utility supplies									2 panels included in the budget, 1 close to the sample area, one in the preparation area
Instrument Crane									1t load jib crane, 5 m jib, 6m clearance

3.3 Magnetic considerations							
Support level defined						x	2m radius around sample non-magnetic requirement
4. Sample environment: Control system							
Related document: ESS Sample Environment Control System Reference (CHESS reference: ESS-0038165)							
4.1 Control system hardware							
Infrastructure for SE control rack (space, cooling water etc)						x	The rack can be installed either on the roof of the detector vessel or at floor level
Patch panel, cables and labyrinths between inside of cave and SE control rack.						x	Mounted/placed on top of the instrument , platform.
4.2 Control system software							
Potential SE equipment requiring fast data transfer (~ >1 kHz) <u>identified</u>							
Specific SE equipment requiring high accuracy time-stamping of SE data <u>identified</u>							
4.3 Integration process of sample environment equipment							
Instrument-specific SE equipment integration support required from SAD <u>identified</u> .							Budget is part of ESS Bilbao contribution, support is requested to SAD, the plan is to integrate the cryofurnace during early cold commissioning
Complex SE equipment that is expected to require extra integration effort <u>identified</u> .	x						No plan for running experiments in parallel or complex assemblies so far
5. Sample environment: Utility Supplies							
Related doc: ESS Sample Environment Utility Supplies Reference Document for WBS 13.6.X.5.6 (CHESS reference: ESS-0038163)							
5.1 Utility Supplies							
<b>Noted the SE requirements for:</b>							
Electrical power						x	2 utilities panels, including He-

	Cooling water					x		recovery system, gaseous exhaust,.
	Supply for gases, helium recovery and gaseous exhausts					x		
	Data connections					x		
<b>5.2 Number of required Utility Supplies Setups</b>								
	At the sample position					x		Cles to to the top flange of the Det. tank
	At the Area for SEE preparation at the instrument					x		On the top area of the tank
	Additional at the cave for Concurrent experiments running	x						No plan for running experiments in parallel so far
	For equipment on mezzanine	x						
<b>5.3 Panels</b>								
	Labyrinths considered					x		See above
<b>6. Sample Handling and instrument specific lab space</b>								
Related document: ESS Safety and Sample Workflow for Instruments Reference Document for WBS 13.6.X.7.1 (CHESS reference: ESS-0040840)								
<b>6.1 Sample handling</b>								
<b>Note the requirements to have:</b>								
	A sample storage cabinet on the instrument dimensioned according to expected sample size, dimension and expected throughput; cabinet has to be equipped according to hazards (flammable, activation,...)					x		Described in budget PBS
<b>6.2 Exhaust line to main stack</b>								

Use of exhaust line that allows to ventilate through the main stack (e.g. for secondary vacuum containment of hazardous samples, for experiments with gas flow,...); If used, HEPA filter and/or liquid trap will be a requirement	x						
<b>6.3 instrument specific lab</b>							
Use of access to standard fume hood ventilation duct (no activated gases, fumes); usable for hoods, powder boxes, glove boxes, ...	x						
Exhaust line that allows to ventilate through the main stack (e.g. for secondary vacuum containment of hazardous samples, for experiments with gas flow,...); If used, HEPA filter and/or liquid trap will be a requirement to avoid particles/liquids from entering the lines	x						

**3. SAD CHECKLIST FOR INSTRUMENT TOLLGATE 2**

Please put a mark in the box that best represents the current instrument status.

**4. REFERENCES**

[1] ESS-0038078 ESS Sample Environment Mechanical Interfaces for Instruments – Reference Document for WBS 13.6.X.2.3

[2] ESS-0038165 ESS Sample Environment Software Interfaces - Reference Document for WBS 13.6.X.5.7

Validation Report  
Document Number ESS-0062987  
Date Jul 4, 2016

[3] ESS-0038163 ESS Sample Environment Utilities Supplies - Reference Document for WBS 13.6.X.5.6

[4] ESS-0040840 1 ESS Safety and Sample Workflow for Instruments - Reference Document for WBS 13.6.X.7.1

[5] ESS-0000960 Science Support Systems Work Package Specification; section 1.4.2

[6] <https://ess-ics.atlassian.net/wiki/display/SA/Scientific+Activities+Division>