Instrument Safety Readiness Review
Operation and Maintenance Documents Status

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European Spallation Source (ERIC), Lund, Sweden

Outline

1. Operation and Maintenance Documentation: Status
2. DREAM Systems Operation and Maintenance Manual: Overview

Operation and Maintenance Documentation: Status

System	Title	CHESS	Status
DREAM	DREAM Systems Operation and Maintenance Manual	ESS-5969231	Released
Personnel Safety System (PSS)	Operations Manual for DREAM Personnel Safety System	ESS-5802045	Preliminary
Control Hutch and Sample Prep	Maintenance Manual	ESS-5009707	Released
Sample Vessel	DREAM sample vessel: Installation Manual DREAM sample vessel: Operation and Maintenance Manual	ESS-5584946 ESS-5796667	Released Released
Sample Positioning	DREAM Sample Support: Operation and maintenance manual	ESS-5989291	Released
Cave Crane	DREAM Crane technical data	ESS-5065082	Released
Sliding platform	DREAM Telescopic platform – user manual	ESS-5065088	Released
Goods Lift	Dream Lift technical data	ESS-5064913	Released
Supply Systems	CEP Maintenance plan Power distribution systems A Framework for Timing Across the ESS Linac	ESS-5067485 ESS-2756565	Released Released
Neutron Guide Shielding	User and maintenance instruction of DREAM guide shielding	ESS-5796753	Released
Disk chopper system (PSC1, PSC2, OC, BC)	DREAM Disc Chopper User and Maintenance Manual (top-level document)	ESS-5767432	Released
T_0-chopper	DREAM T0 Chopper System User and Maintenance Instructions	ESS-5767434	Released
Collimation System	DREAM Slit System Maintenance and Repair Manual SmarAct. Stick-Slip_Positioners_Assembly_Instructions	ESS-5763526 ESS-5767319	Released Released

Operation and Maintenance Documentation: Status

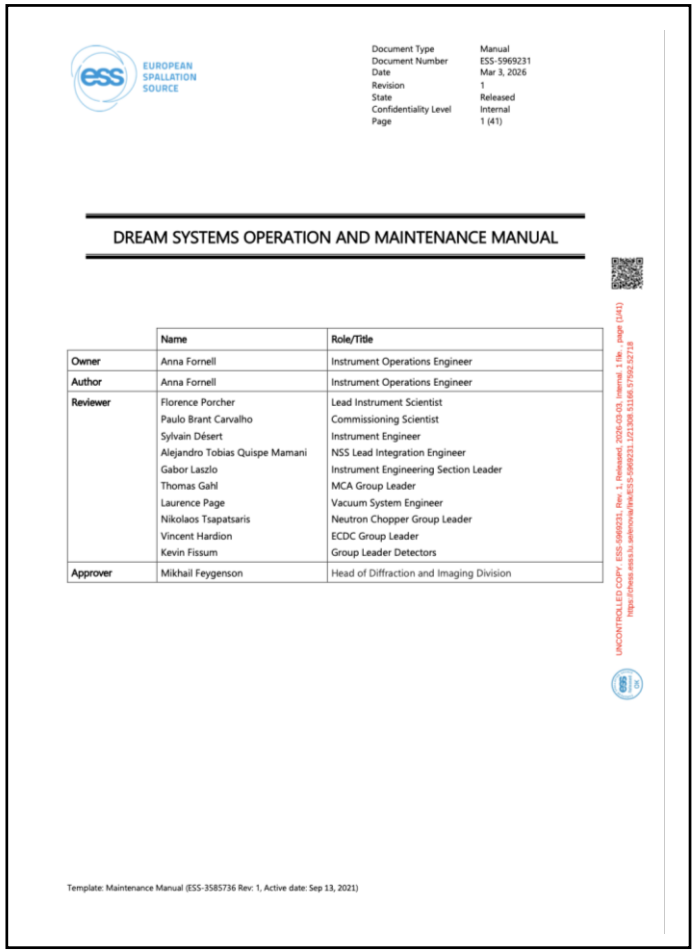
System	Title	CHESS	Status
Beam validation (Beam monitors)	DREAM monitor manual	ESS-3873788	Released
Instrument safety shutter 1 (“Heavy shutter“) incl. support	NSS Instrument safety Shutter Mechanics Operation and Maintenance Manual	ESS-3049036	Released
Beam Delivery System (Guides)	Neutron guide maintenance	ESS-6005317	Released
BBG (Bridge Beam Guide)	NSS BBGOA Maintenance Manual	ESS-5227353	Released
Detectors	DREAM HR and SANS Detector Manual DREAM Mantle Manual DREAM End Cap Manual DREAM Mantle Detector Frame Installation Manual DREAM Mantle Detector Module Installation Manual DREAM Detector Support Structure: Operation and Maintenance Manual	ESS-5355487 ESS-5086149 ESS-5094821 ESS-5584949 ESS-5584951 ESS-5796669	Released Released Released Released Released Released
Guide field	DREAM – Guide field	ESS-5767107	Released
Motion control	Generic service and maintenance plan for MCA cabinets and boxes	ESS-5483415	Released
REMS	REMS – Maintenance and Operations Concept	ESS-1157543	Released
Gas mixing system	Panel-ML-CLSA Operations Manual	ESS-5765344	Released

Outline

1. Operation and Maintenance Documentation: Status
2. DREAM Systems Operation and Maintenance Manual: Overview

DREAM Systems Operation and Maintenance Manual: Overview

- Released in CHESS ESS-5969231
- References and links to CHESS documentation for Operation and Maintenance of DREAM sub systems
- Living document, will be developed during cold- and hot-commissioning



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DREAM SYSTEMS OPERATION AND MAINTENANCE MANUAL

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Template: Maintenance Manual (ESS-3585736 Rev: 1, Active date: Sep 13, 2021)

DREAM Systems Operation and Maintenance Manual: Overview

Sections:

1. **Scope of this document**
2. **System characteristics and general information for entire instrument**
3. **Physical location**
4. **Instructions for operation**
5. **Information for component maintenance**
6. **Troubleshooting**
7. Glossary
8. References

DREAM Systems Operation and Maintenance Manual: Overview

1. Scope of this document

- Contains top-level descriptions for the safe operation and maintenance, together with links to relevant documents for the sub-systems.

- Operation: The procedures listed in this document are intended for ESS staff and not external users. It does not include standard ESS procedures that are common across multiple instruments or are described in detail elsewhere.

- Maintenance: All maintenance tasks must be carried out by qualified personnel following instructions within the relevant sub-system maintenance manuals and a specific TRA for the task.

DREAM Systems Operation and Maintenance Manual: Overview

2. System characteristics and general information for entire instrument

- Table with top-level FBS for DREAM

- Overall documentation
  - System design description, CATIA model in EPL, Table of Motion, P&ID, Radiation Safety Report, Instrument Hazard Analysis, CIDL, Area Risk Assessment

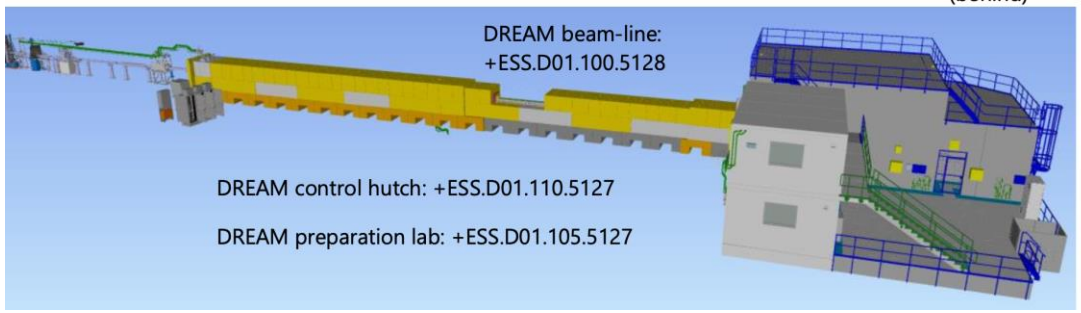
- General relevant documentation
  - NICOS User guide, Task Risk Assessment for DREAM general activities, Local Rules, Scipp general documentation, VISA user guide

FBS	System Name	Shorthand name
=ESS.NSS.H01.DREAM	*DREAM*	
.G01	DREAM Vacuum System	
.F01	Personnel Safety System (DREAM PSS)	
.A01	Beam Transport and Conditioning	
.F01	Neutron Guide Shielding	
.B01	Beam Validation	
.B01.B01	Beam Monitor System M1 (PSC)	
.B01.C02	Beam Monitor DAQ System in Instrument Zone	
.B01.C01	Beam Monitor DAQ System in Bunker Zone	
.B01.B03	Beam Monitor System M3 (cave entry)	
.R01	Chopper System	
.R01.R01	Chopper System	PSC1, PSC2, OC, BC
.R01.R02	Chopper System	T0 chopper
.R02	Beam Geometry Conditioning	
.R02.R01	Collimation System	
.W01	Beam Delivery System	
.W01.W01	Beam Delivery in Bunker	
.W01.W02	Beam Delivery outside Bunker	
.R03	Beam Cut off	
.R03.R01	Instrument Safety Shutter 1	Heavy shutter
.R03.R02	Beam Stop	
.R03.R03	Instrument Safety Shutter 2	
.R05.R01	Neutron Polariser Insert	
.R05.WH01	Guide Field	
.W02	Beam Extraction System	
.W02.WH01	NBOA – Neutron Beam Optics Assembly	
.W02.WH02	BBG – Bridge Beam Guide	
.U01	In Bunker Mechanical support system	
U01.U01	Heavy Shutter Support	
.A05	Supply System	
.A05.W01	Electrical Power & Earthing	
.A05.K01	Timing System Distribution	
.A05.W02	Process Utilities	
.A05.Q01	Gas mixing system	
.A02	Sample Exposure System	
.W01	Sample Positioning	
.AS01	Sample Conditioning	
.AS02	Other Sample Environment	
.C01	Sample Vessel	
.A04	Support Systems	
.A01	Control Hutch	
.F01	Fire protection	
.A02	Sample Preparation Facility	
.G01	Lift	
.B01	Scattering Characterization System	
.B01	Neutron Detector System	
.C01	Neutron Detector Electronics	
.B02	Neutron Analyser System	
.B03	Polarisation Analyser System	
.K02.K01	Experiment Control	
.U01	Experimental Cave	
.GM01	Local Crane	
.WS01	Sliding platform	
.G01	HVAC cave	
.F01	Cave Shielding	
.K01	Instrument Automation Control System	
.K02	DREAM Motion Control 2 (Collimation)	
.K01	DREAM Motion Control 1 (In-bunker)	
.K03	DREAM Motion Control 3 (Sample Area)	

DREAM Systems Operation and Maintenance Manual: Overview

3. Physical location

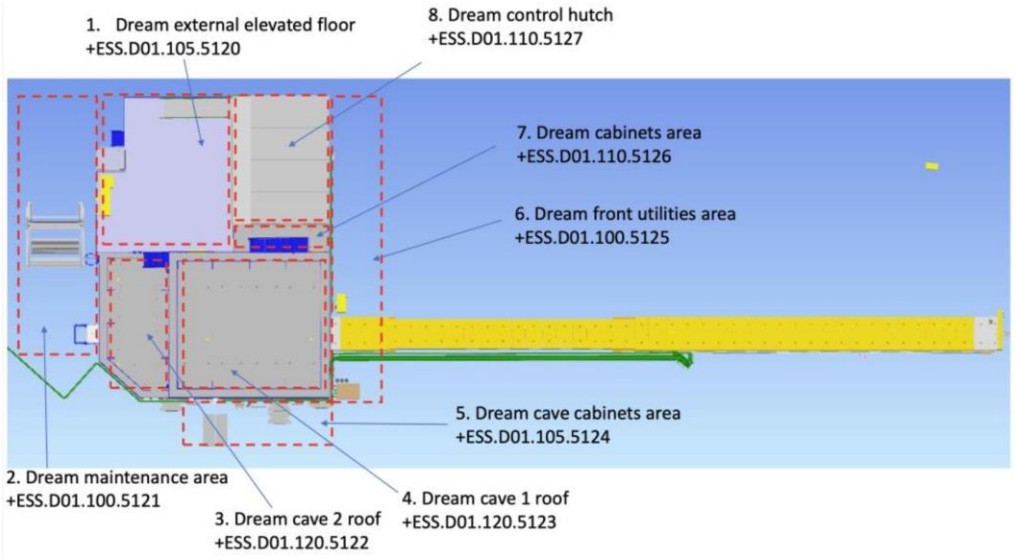
- Images illustrating the LBS of DREAM



DREAM cave cabinets area: +ESS.D01.105.5124 (behind)

DREAM cave 1: +ESS.D01.100.5123, +ESS.D01.105.5123, +ESS.D01.110.5123

DREAM cave 2: +ESS.D01.100.5122, +ESS.D01.105.5122



DREAM Systems Operation and Maintenance Manual: Overview

4. Instructions for operation

4.1 Overall Instrument Safety

- DREAM PSS System
- DREAM Motion Safety System

4.2 Overall Instrument Operation Procedures

- Instrument Operation Modes
  - Production mode (General access allowed)
  - Maintenance mode (Larger maintenance activities)
- Sample & Sample environment Installation and Removal
- Regular alignment procedures
- Regular calibration procedures
- Data reduction

DREAM Systems Operation and Maintenance Manual: Overview

5. Information for component maintenance

Examples:

5.9. Chopper System ("T_0-Chopper system")

The FBS for this sub-system is: ESS.NSS.H01.DREAM.A01.R01.R02. Location is +ESS.D01.100.4002.003.

5.9.1. Recommended maintenance tasks and expected frequency.

Please refer to the maintenance and operation manual for the sub-system below.

5.9.2. Specific task procedures not included within the sub-system manuals

Not applicable.

5.9.3. Reference documents

Document Type	ESS (Chess) Number
Design Description	ESS-0451350
Drawings and 3D model	ESS-4003925, ESS-1407556
All relevant maintenance & operation manuals	ESS-5767434
Other useful links	

DREAM Systems Operation and Maintenance Manual: Overview

5. Information for component maintenance

Examples:

5.14. Beam Stop

The FBS for this sub-system is: ESS.NSS.H01.DREAM.A01.R03.R02. Location is +ESS.D01.105.5122.

5.14.1. Recommended maintenance tasks and expected frequency.

No maintenance is planned.

5.14.2. Specific task procedures not included within the sub-system manuals

The beam stop is mounted on the wall between first and second DREAM experimental cave. It is mounted from inside the second cave. It can be removed from this position and be used downstream the second cave.

Before removing the beam stop, the neutron flight tube downstream of the DREAM SANS detector shall be removed to avoid damage. The flight tube is connected to the large neutron window upstream of the SANS detector and protrudes into the beam stop cavity. It is supported by two alignment features as typically used for neutron guide vessels.

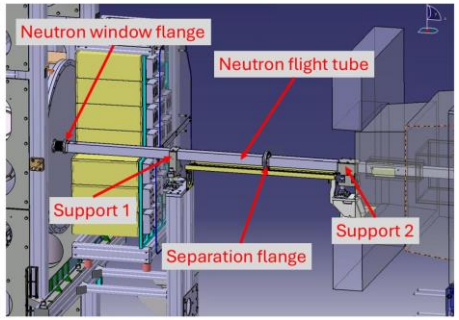


Figure 5: Neutron flight tube assembly.

To remove the neutron flight tube, follow the steps:

1. Vent the in-cave vacuum system.
2. Unmount SANS detector. Figure 5 shows left part of SANS already removed.
3. Remove bolts on neutron window flange bellow, downstream side.
4. Remove bolts on separation flange in the middle of the flight tube.
5. Unmount lid of support 1 and loosen clamp screw(s) on side.
6. Lift upstream part of flight tube upwards out of the support.
7. Unmount lid of support 2 and loosen clamp screw(s).
8. Pull downstream part of flight tube out of the beam stop cavity.

After removal of the flight tube, the beam stop can be pulled out of the wall protrusion by unloading the weight (approx. 6 tons) with the overhead crane and pulling it out horizontally, sliding and guided on the support table.

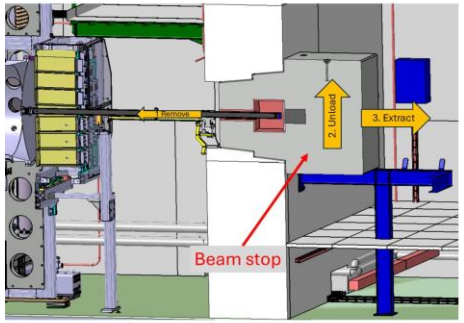


Figure 6: Removal of the beam stop.

5.14.3. Reference documents

Document Type	ESS (Chess) Number
Design Description	ESS-0451350
Drawings and 3D model	ESS-5159410
All relevant maintenance & operation manuals	Not applicable
Other useful links	

DREAM Systems Operation and Maintenance Manual: Overview

6. Troubleshooting

- Useful hints to help identify frequently experienced issues with instrument equipment

7. Glossary

8. References

Thank you!
Questions?