EUROPEAN
SPALLATION
SOURCE

BIFROST PSS

BIFROST Instrument Safety Readiness Review (2025-12-05)

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2025-12-05

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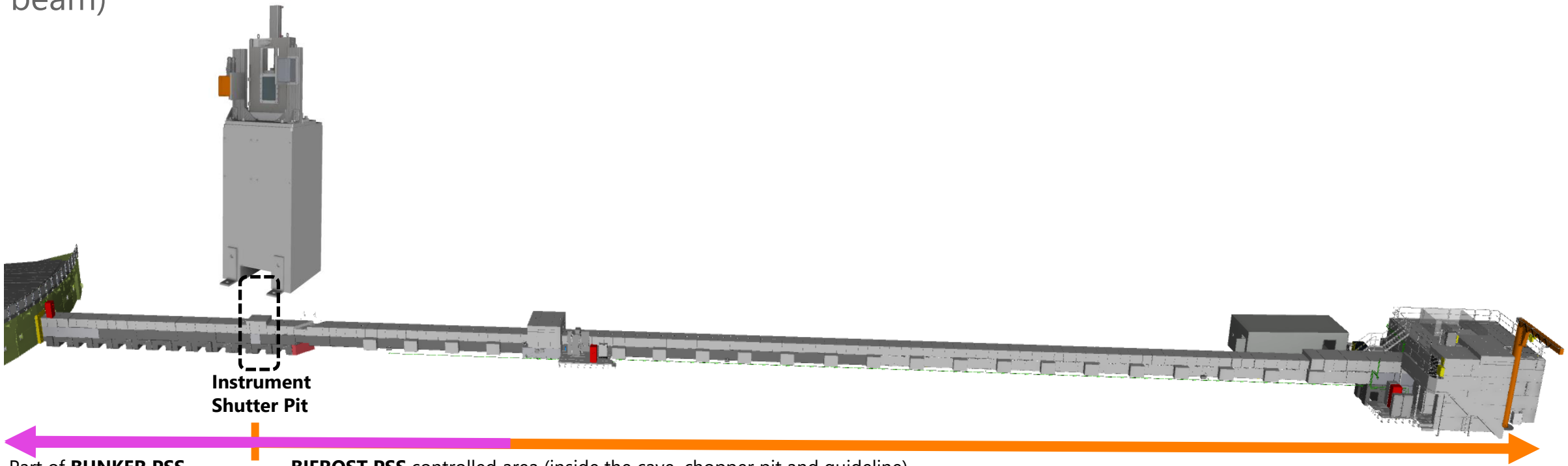
BIFROST PSS

The BIFROST PSS Controlled Area

The **BIFROST PSS** is the safety interlock system that ensures safe access for personnel to the BIFROST PSS controlled area.

The BIFROST PSS mitigates the Radiation hazards (mainly prompt ionising radiation from the neutron beam)



Safe when Proton Beam to Target is off

Safe when Neutron Beam is off (Instrument Shutter is closed)

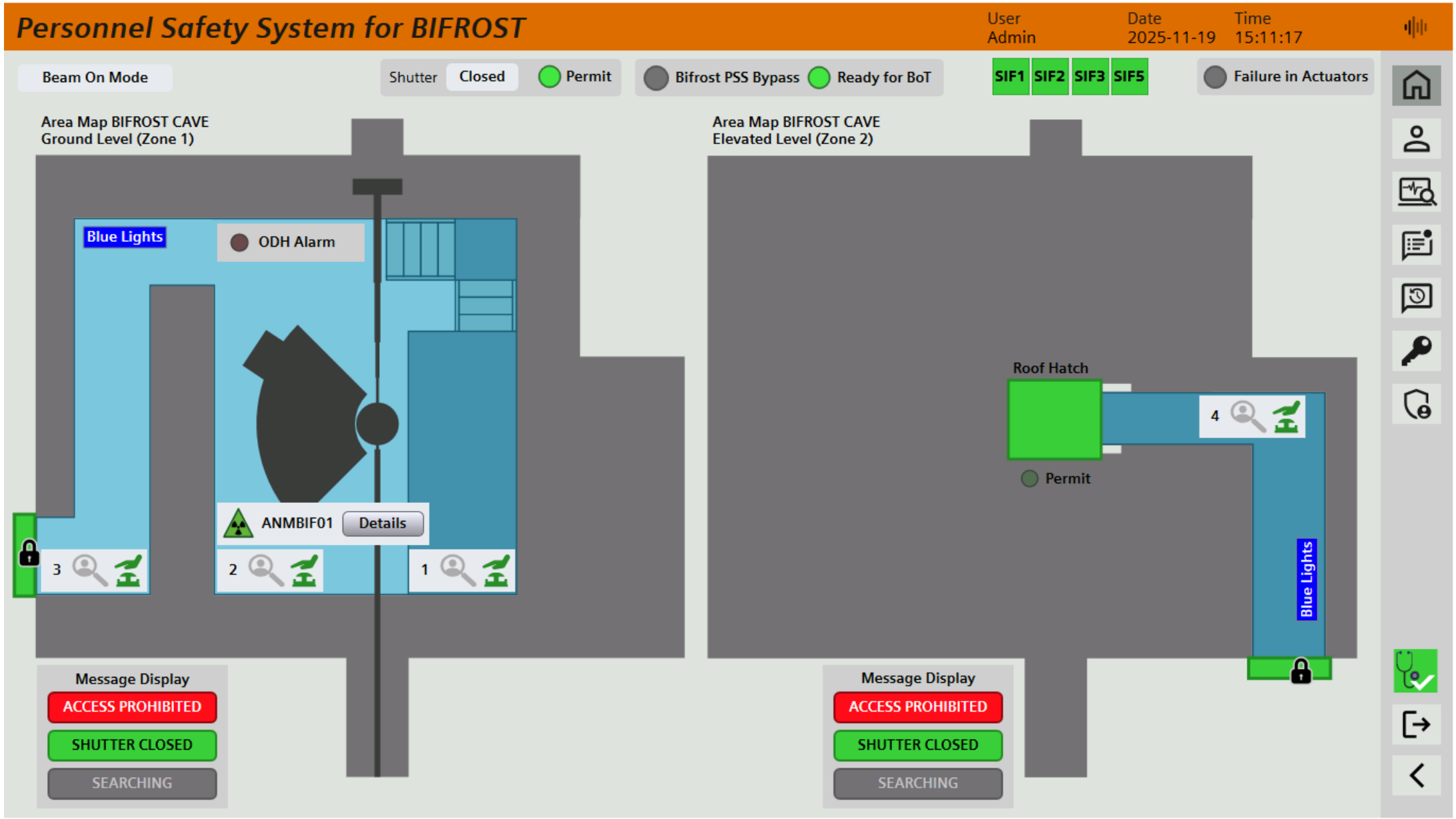
BIFROST shutter shielding report (ESS-5124576): the simulated dose rate inside the guide shielding at 70 meters is less than 1.5 µSv/hr

BIFROST PSS: Scope

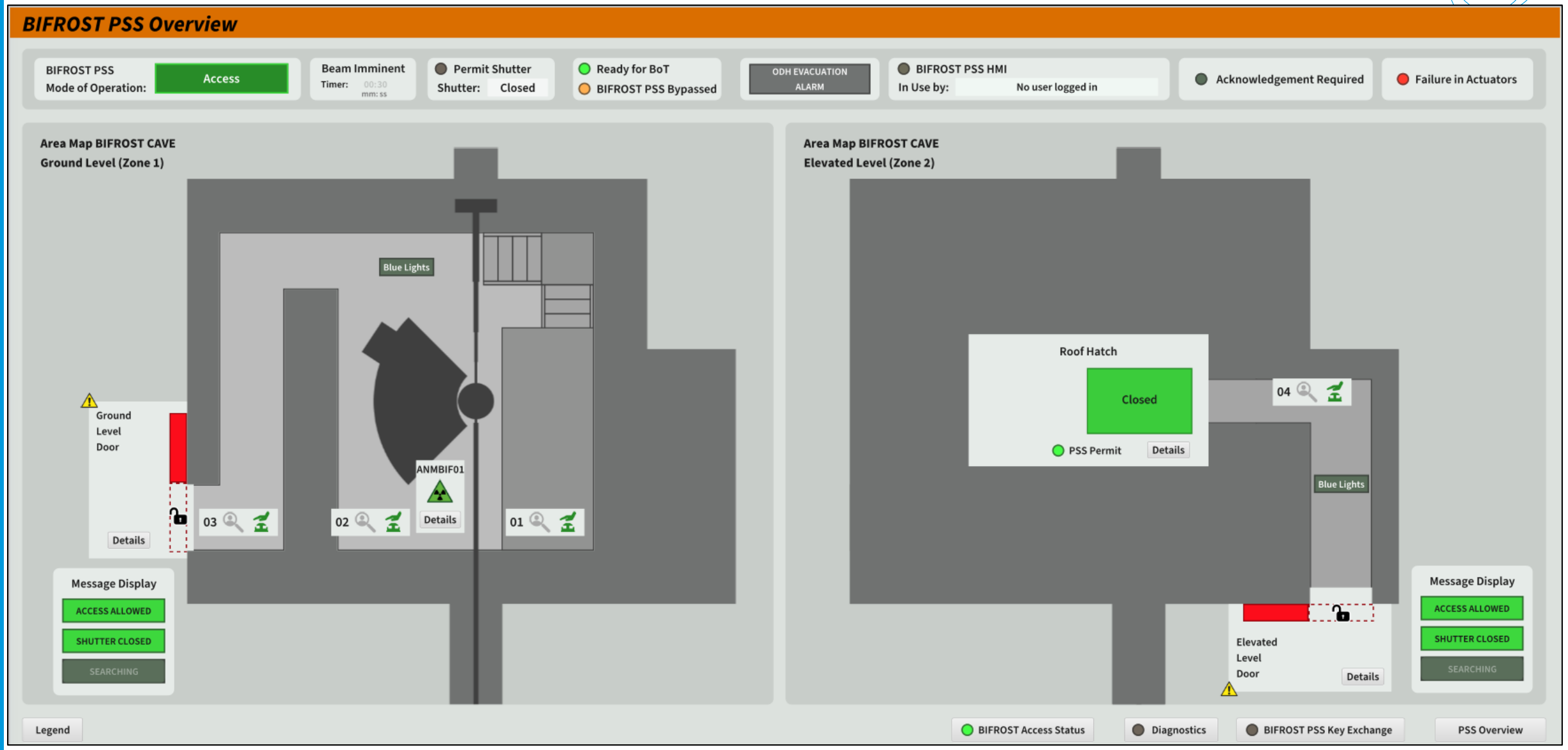
BIFROST PSS is the safety interlock system that implements the following Worker Radiation Safety Functions (WRSFs):

WRSF/RSF	Description	SSCs that implement the WRSF
WRSF-P-NSI-L2-021_Prevent flux	Prevents inadvertent opening of the instrument shutter if human presence in the BIFROST PSS controlled area	BIFROST PSS (=ESS.NSS.H01.BIFRO.F01)
WRSF-P-NSI-L2- 022_Grant/prevent human presence	• Prevent access to the BIFROST PSS controlled area by locking the access doors and interlocking the cave roof hatch drive system in a closed position • Prior to permitting access to the BIFROST PSS controlled area, a radiation monitor verifies the shielding integrity of the instrument shutter, If the radiation monitor detects elevated dose levels, the BIFROST PSS prevents access	BIFROST PSS (=ESS.NSS.H01.BIFRO.F01)
WRSF-P-NSI-L3-024_Stop flux **WRSF-P-NSI-L3-025_Stop flux**	Detect intrusion to the BIFROST PSS controlled area: • Interlocks the instrument shutter • Requests the Accelerator PSS (=ESS.ACC.F01) to switch OFF the proton beam to Target, if the instrument shutter is not detected closed within the designated time	BIFROST PSS (=ESS.NSS.H01.BIFRO.F01) Accelerator PSS (=ESS.ACC.F01)
WRSF-P-NSI-L3-026_Stop flux **WRSF-P-NSI-L3-027_Stop flux**	Detect the alarm and manually stop (ESOB) : • Interlocks the instrument shutter • Requests the Accelerator PSS (=ESS.ACC.F01) to switch OFF the proton beam to Target, if the instrument shutter is not detected closed upon pressing the ESOB	BIFROST PSS (=ESS.NSS.H01.BIFRO.F01) Accelerator PSS (=ESS.ACC.F01)
WRSF-P-NSI-L2-021_Prevent flux	If the BIFROST PSS receives a high radiation alarm from the designated radiation monitor downstream the instrument shutter when the BIFROST PSS controlled area is accessible, the BIFFROST PSS requests the Accelerator PSS to switch OFF the proton beam to Target	BIFROST PSS (=ESS.NSS.H01.BIFRO.F01) Accelerator PSS (=ESS.ACC.F01)

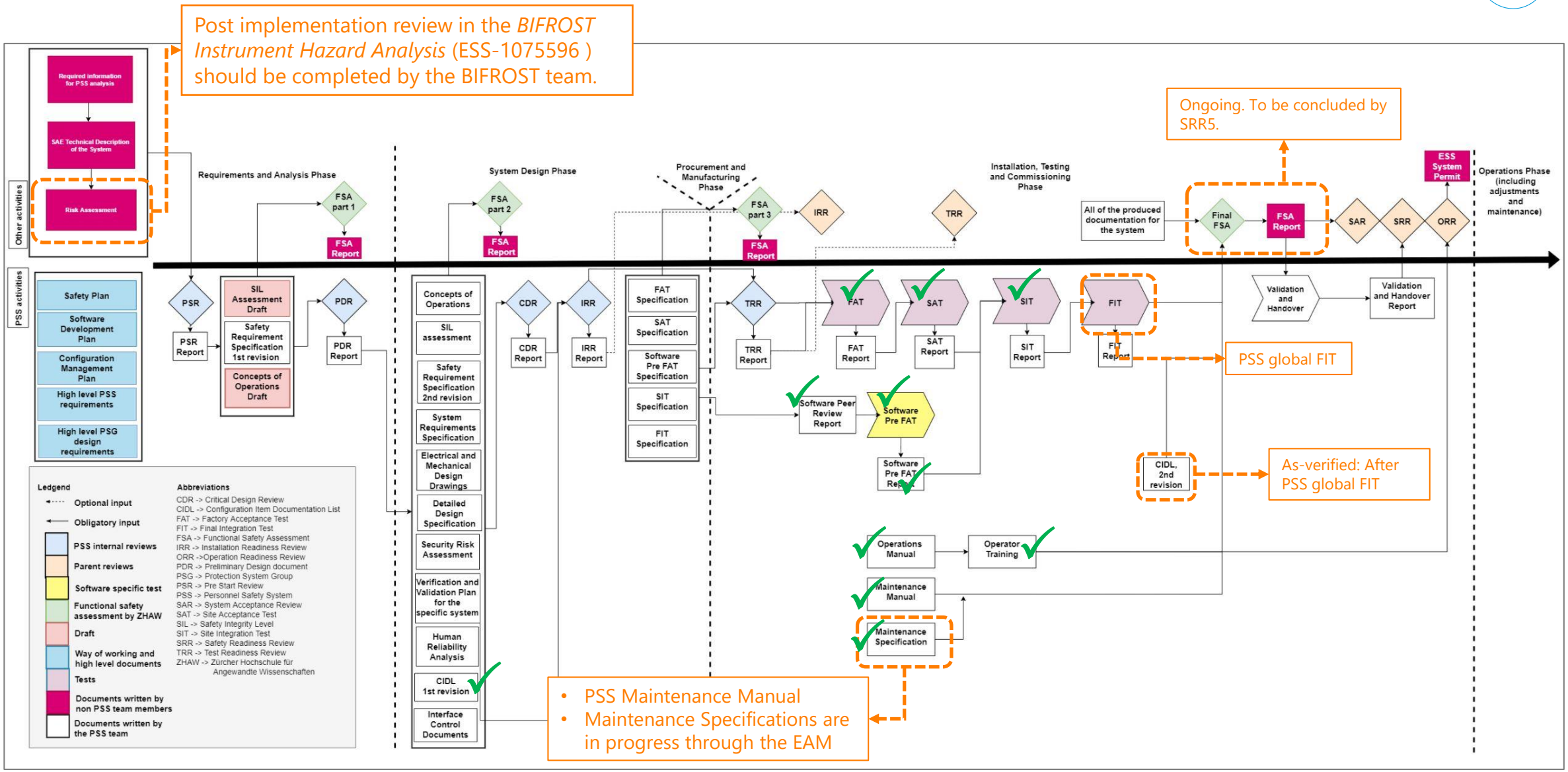
BIFROST PSS: HMI overview



BIFROST PSS: OPI overview



BIFROST PSS: current status



BIFROST PSS: Remaining work

ESS-5717299 - Non-compliance report for Bifrost PSS

Item	Comment
Test BIFROST PSS with ACC PSS	Part of PSS global FIT
ODH interface	Interface with the ODH system is not in place because of the standalone ODH monitor.
Blue light	Need to add blue light inside in front of the Access door on ground level to enhance blue light visibility from outside controlled area.
Fence	The area below the platform on the ground level must be fenced off.
Override Key for Locks	Keys must be installed in the break-glass units for the access doors

Thank you!

Questions?

Back-up slides

PSS global FIT

PSS SITs
ACC PSS SIT
TS PSS SIT
NWB SIT
SEB PSS SIT
TBL PSS SIT (iSRR)
LoKI PSS SIT (iSRR)
BIFROST PSS SIT (iSRR)
ODIN PSS SIT (iSRR)

PSS global FIT		
Nexus PSS HW SAT	Nexus PSS SIT	ESS PSS FIT (needed for SRR5)
Loop check from each PSS to Nexus	Integrated test between each PSS and Nexus	Integrated test from each PSS to Nexus and to ACC PSS
No access restrictions to PSS controlled areas is imposed by this test.	No access restriction and no impact on ACC PSS	• Access restrictions to the tunnel as ACC PSS shall be in Beam On mode. • Only impacting the ISrc and Bending Magnets (no impact on RF systems)
Potentially minimal disruptions to ACC PSS operation only during Nexus-ACC PSS loop check.	Access restrictions to TS PSS, Bunkers staircases, and instrument caves during parts of the test. (one area at a time)	Access restrictions to the areas listed in each of the following tests • TS PSS to ACC PSS test • NWB PSS to ACC PSS test • SEB PSS to ACC PSS test • Instrument PSS, TS PSS, NWB PSS, SEB PSS to ACC PSS test (only one instrument at a time)
Estimated time: 1 week	Estimated time: 2 weeks	Estimated time: 1 week