SKADI STAP Report Oct 2020

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Executive summary

This STAP report summarizes the progress of the SKADI construction project since the last STAP in April 2020. Major advancements were made concerning the sample cave, in bunker optics as well as detector integration. Collimation and collimation shielding are well under way to start their tendering. There is a paragraph for the individual instrument sections to detail the progress made concerning the respective components.

In-Bunker components

There are only two possible suppliers for the in-bunker components, since the high m values (m>4) can only be produced by either SNAG or SDH, using metal substrates. Technical discussions for offers with both companies have begun, so that a contract probably can be awarded before the end of 2020. Since the suppliers seem to be very busy, it is considered to take the vacuum housing out of the tender and award it to a steel-construction company or do it in-house to alleviate possible over-loading of the guide suppliers. Interfaces between neutron optics and vacuum housing then will be part of the tender.

Choppers

Kick-off meeting has taken place in May. SKADI will use an already accepted design for the slow moving choppers at ESS. Material is collected for the respective CTV.

Collimator and Collimator shielding

Call for tender for the collimator will be published by the end of 2020. Collimation CTV is already passed, call for tender will be published early in 2021. This shielding also includes the common shielding wall with ESTIA, which needs to be delivered mid-2022 in order for ESTIA to progress as planned.

Sample Cave

The tendering for the sample cave was preceded by a qualification of the manufacturers, which was an open call. During this Request for Participation (RfP) a description of the sample cave was published, along with questions concerning the experience of the companies concerning hadronic shielding and heavy (more than 5 t) shielding doors. Three companies qualified during this procedure and are now in the closed process, bidding for the contract. Discussion about safety standards with ESS has been started and will be integrated into the negotiation part of the bidding process after the first offers have arrived. Deadline for the first offer is Friday, 9th of October. Awarding the contract is projected for December 2020.

It should be noted that during discussions with the ESS polarization analysis group (Wai Tung Lee) and the sample environment group (Alexander Holmes) additional requirements concerning the magnetic properties have been identified. Those are necessary in order for the polarization analysis chosen by ESS to function properly. ESS opted for ex-situ polarized SEOP 3He analyzers. Those 3He cells can be depolarized by remnant magnetic fields, induced by the 18 T magnet. Those requirements can only be met by using a partially stainless steel cave. Several cost saving exercises have led to a design that avoids carbon steel in a 2 m radius from the sample position, inside that radius stainless steel is used. Since those requirements could not have been foreseen during the budget and scope setting meetings it was not budgeted. The additional budget is requested by a change request. Pending the acceptance of the change request those additional requirements can be met by the final design of the sample cave. Construction with the current scope would necessitate a different choice of polarization analysis of the ESS to work, which is unlikely.

A meeting to finalize the sample table together with the ESS S/E group (Harald Schneider) has been scheduled for November.

Detector and Detector interfaces

The electronics and detection hardware are fully constructed and are in different stages of testing at the moment. Due to limited access to the FRM2 reactor, high flux tests of an assembly with high packing density have been postponed to Q1/2021. Cooling of the assembly is being tested under operation with a laboratory source. Since there is no full DAQ chain available at the moment, full testing with time synchronization in the manner projected by ESS will be done at a later date. Discussions about the delivery of the necessary hard- and software are ongoing (concerning the detector master board, software for the time synchronization, event formation units etc.) and are projected to take place in 2021.

Interfaces between the partially constructed detector housing and the detector tube are being discussed for the call for tender for the detector tube (planned April 2021). This includes also considerations about accessibility for maintenance and removal of the detector housing for maintenance. The call will include also the tenders for the motion unit of the detector.

Detector shielding has gone through preliminary design, CTV is to take place before the end of 2020.

Overall schedule

An overview of the delivery dates is given in Table 1. Delayed components and components at risk are color coded (red and orange respectively). Overall the delivery dates still seem achievable, and therefore also the full delivery of SKADI on schedule. The NBOA as the only component delayed and still at risk is due to Covid-19 and manufacturing problems, both of which also affect other instruments and are outside the control of the instrument team. Getting the full TG3 in Q4-21 is also at risk due to a general slow-down of replies and interaction due to Covid-19, but the single components are not as strongly affected. Other problems there include a general overload of the suppliers, de-priorization of SKADI and connected delays concerning available engineer time and procurement.
While the detector (SCS) is a very late component, testing is still delayed due to the limited availability of a full DAQ.

Table 1. Schedule for single components of SKADI. Delayed components are coded in red, components at risk are coded in orange.

Component	Delivery and Installation in spring	Delivery and Installation current
NBOA	Q1-20	Q2/21
In-Bunker	Q3-24	Q3-24
Polarizer, Fast Shutter	Q1-23	Q1-23
Choppers	Q3-23	Q3-23
SCS	Q2-24	Q2-24
Monitors	Q1-23	Q1-23
Sample Area	Q2-23	Q2-23
Hutch Area	Q4-23	Q4-23
TG3-Full	Q4-21	Q4-21
TG4-Full	Q2-24	Q2-24
TG5-Full	Q3-25	Q3-25

Current risk assessment

Risks are detailed in Table 2. Most of the risks are steady or reducing over time, the DAQ has been flagged as a rising issue. However, there close discussions have been started and the issue is currently being addressed.

Covid-19 at the moment only seems to have an indirect impact via the NBOA, the other components are not subject to delay for that cause. However, the situation is closely monitored, since it could be changing any time.

Table 2. Currently monitored risks for the SKADI construction project.

Active Risks (Top 3-5)		
Risk Category	Treatment[1]	Responsible Partner (Person)[3]
Risk Description	Trend[2]	Action taken/*proposed* (until date)
Schedule	Observe	ESS
Delays on NBOA milestones	Steady	ESS input to manufacturer
Schedule	Reduce	ESS
Delay of procurement of in-bunker components	Reduce	Coordinated with ESS and suppliers
Schedule	Reduce	ESS
Delay of SCS SubTG3, due to lack of DAQ chain (supposed to be provided by ESS to perform hardware tests)	Rising	Work on DAQ chain started, discussion in progress.
Schedule	Observe	LLB
Limited resources at CNRS (LLB) Purchase Office	Falling	Purchase officer dedicated to ESS projects
Schedule	Observe	FZJ
Covid-19 situation	New	Delays are being monitored, measures taken as necessary