

Philippe Lebrun

1/11/2016

Report of the 14th Meeting of the ESS Technical Advisory Committee Lund, 5-7 October 2016

1. Introduction

The 14th meeting of the ESS Technical Advisory Committee (ESS-TAC) took place in Lund on 5-7 October 2016.


The meeting followed the agenda given in Annex 1. The Committee was given a specific charge (Annex 2), addressed in the meeting and answered in the oral report presented in the close-out session on 7 October 2016. The report proper constitutes section 3 of this document.

2. Participants in TAC

Present: Michael Borden (LANL), Tim Broome (ISIS), Michael Butzek (FZJ), Alberto Facco (INFN), Philip Ferguson (ORNL-SNS) [t-TAC chair], John Galambos (ORNL-SNS) [a-TAC chair], Frank Gerigk (CERN), Mark Heron (DIAMOND), Philippe Lebrun (CERN) [TAC chair], Alessandra Lombardi (CERN), Alban Mosnier (CEA), Anton Mösslang (KIT), Ralph Pasquinelli (Fermilab), Manuel Perlado (UPM), Szabina Török (MTA), Karen White (ORNL-SNS), Michael Wohlmuther (PSI)

Excused: Bertrand Blau (PSI), Matasoshi Futukawa (J-PARC), Robert Stieglitz (KIT), Hans Weise (DESY)


3. Report of TAC13



ESS Technical Advisory Committee
Summary Report of the 14th Meeting
Lund, 5-7 October 2016

Ph. Lebrun for the ESS-TAC

5-7 October 2016 ESS TAC14 1



General TAC14

- Well-organized, well-prepared meeting
 - Clear charge to Committee and Sub-Committees
 - Presentation topics in line with the charge questions
 - Documents available on the INDICO site in advance of the meeting
 - Commented replies to the recommendations of TAC13
 - Good hospitality of ESS (as usual)
- Project status
 - Impressive progress of CE construction
 - New recruitments in managerial positions, new position of «Project Manager»
 - Personnel at 460 (375 staff), expected to keep growing to 550
 - Licencing application submitted in time (May 2016)
 - First installation in time (Sep 2016)
 - Construction 25% complete, on track
 - EV 467 MEUR of which
 - 199 MEUR conventional facilities
 - 94 MEUR accelerator
 - 27 MEUR target
 - IK agreed and planned 524 MEUR, identified possible up to 685 MEUR
 - Under investigation: «cash facility» to bridge liquidity gap during construction

5-7 October 2016 ESS TAC14 2



Conventional facilities

- Electrical substation buildings complete
- Major works finished in
 - Accelerator tunnel
 - Klystron gallery
 - Cryo buildings
- Concrete works in most other buildings
- Piling works in neutron beam line gallery
- Target building
 - Pilings completed, work on bottom concrete slab ongoing
 - Final definition delayed
 - Rescheduling works to recover delays, but 6-month «float» on 2019 deadline essentially gone

5-7 October 2016

ESS TAC14

3



Organization for installation

- First approach presented
 - ESS Installation Coordinator
 - Subprojects Installation/Site Coordinators
 - WP Installation/Site Managers
- Needs better definition for efficient implementation
 - Terminology, roles and responsibilities to be defined unequivocally across the project
 - Relational channels in «Installation organigram» to be clarified

5-7 October 2016

ESS TAC14

4



Charge question

- Have the recommendations and concerns expressed by TAC13 been addressed adequately?
 - Generally yes



General concerns from the Committee [1/2]

- Interface issues
 - The Committee appreciates that the project has improved organization to address interface issues, as exemplified by the appointment of the ESS Project Manager, and the ad hoc Interface Advisory Committee (IAC) on the beam extraction and bunker design
 - Good start but a lot of work remains ahead
- IK contributions
 - The «agreed+planned» amounts (524 MEUR) approach the set objective of «agreed+planned+potential» (685 MEUR), on par with the IK intentions from Member Countries
 - Still, the «agreed» IK contributions only amount to 26 MEUR
 - In spite of this, work is proceeding in partner institutes on the basis of «Heads of Agreements»
 - This situation will however not allow to engage in series procurement (tendering and contracting)
 - The Committee is concerned that this may result in unrecoverable delays in production of series components, and recommends to accelerate the signature of IK agreements. This is a major threat to the project schedule.



General concerns from the Committee [2/2]

- Schedule
 - In absence of signed production contracts for series components, the present project schedule (and thus the 2019 deadline) can only be speculative
 - Rebaselining of schedule will have to be done when this is settled
- ES&H
 - The Committee takes note of the appointment of a new Associate Director for ES&H
 - The Committee advises to expedite the implementation of operational safety in order to be fully ready within the next 6 months for starting component tests and installation
- Procurement
 - A large amount of procurement has to be done in the coming 2 years
 - The Committee recommends to set up an efficient purchasing service with experienced buyers
- Staffing
 - Staff numbers are in line with the plan for staff complements
 - In order to prepare for installation and commissioning, the Committee advises to recruit (and retain) not only young people, but also experienced staff

5-7 October 2016

ESS TAC14

7




Proposed topics for TAC15

- ESS procurement processes and progress
- Status of all IK Agreements and Heads of Agreements
- QA enforcement at IK contributors
- Status and plans of ES&H
- Plan for co-current pre-operation, installation and commissioning in 2020-2023
- Status of cryogenic system and procurement of cryogenic plants
- Energy efficiency and waste heat recovery
- Radiation safety
- Electrical standards and procedures across project
- Survey and alignment

5-7 October 2016

ESS TAC14


8



Report of a-TAC14 5-7 October 2016

Alberto Facco, John Galambos (Chair), Frank Gerigk,
Alessandra Lombardi, Alban Mosnier, Ralph Pasquinelli

5-7 October 2016 ESS TAC14 9



a1) The Accelerator session focuses on the RF systems of the accelerator, ... → regarding the design and early prototyping?

- **Comments**
 - Reassuring to see progress on klystrons and modulators, but need to continue pushing for integrated full tests. Ensure procedures are in place for long term high power tests in Lund
 - Multiple LLRF efforts are being undertaken by IK partners, and a strong coordination by ESS is important
- **Recommendations**
 - Investigate LLRF lessons learned from XFEL and place a high priority on hiring an experienced digital LLRF person at ESS soon
 - We recognize that full technical validation for the first of series production components may cause schedule delays. However, skipping these tests can cause

5-7 October 2016 ESS TAC14 10



a1) ... focuses on the RF systems of the accelerator,...
→ regarding the proposed procurements and system assembly
which partly is done at IK partners?

- **Comment**

- Industry series production through IK partners require final signed agreements. It is apparent that agreements remain unsigned, and this represents a significant schedule risk

- **Recommendation**



a1) ... focuses on the RF systems of the accelerator,...
→ about the plans for integration in the RF gallery and
installation?

- **Comments**

- As previously commented, taken as a whole, the installation schedule is very aggressive, and unlikely to be met
- Reasonable to have a plan for missing the 570 MeV proton beam in 2019 deadline
 - We note that it is possible to generate neutrons at energies below 570 MeV, i.e. be sure the warm linac is in place
- We endorse the installation support through IFJ-PAN

- **Recommendation**

- Ensure a complete 3-d model with both technical components and utilities is in



a1) ... focuses on the RF systems of the accelerator, ...
→ about the proposed testing?

- **Recommendation**

- All test stands need to be operational in time to validate the production prototypes (technical demonstrators)



a2) ... schedule for the RF systems is challenging and delays are showing up. Success largely depends ...industry to deliver ...communicate experience on that matter: how likely is it that companies will deliver on time and what can be done to improve the situation?

- **Comments**

- Very unlikely that all industrial schedules will be met across the board
- Nearly all large industrial procurements need to be placed by next spring for the proposed schedule to be met

- **Recommendation**

- Have ESS staff spend meaningful time at vendors during development and tests



a3) Does the TAC have comments on the organization for installation? Shared experience from other facilities is welcome ...

- **Comments**

- IK contributors should be expected to “live in Lund” during installation / commissioning activities to ensure their equipment works on site
- SNS installation lessons learned will be communicated to ES management

- **Recommendations**

- Make arrangements to accommodate long term stays for IK contributors
- ESS staff need to prepare to transition from coordination/ project management activities to “hands-dirty” activities with IK contributors, to a greater extent than presently occurring. E.g., be prepared to participate in development and acceptance tests at foreign partner labs



a4) Integration on-going ... some aspects of accelerator integration with MPS, TSS and PSS are presented and also some aspects of documentation... comments and reactions ??

- **Comment**

- For like-systems that are supplied by multiple IK contributors (LLRF, protection,...) important for ESS to serve as a strong integrator, ensuring commonalities and imposing project standards

- **Recommendation**



Comments

- The procurement of 3 solid state amplifiers and 6 klystrons for the NC linac does not include any spares
- The in-house production of waveguide components by ESS-Bilbao presents a certain risk, especially for more complicated items like splitters, directional couplers, phase shifters, etc. High-power tests of these items is mandatory before launching the series production
- Presently ESS-Bilbao cannot sign any contracts as Spain has not yet officially signed as ESS ERIC member. The modulator tendering is ongoing and should be ready for signature in Jan. – mid Feb. 2017. Signature delays will delay procurement
- Publication of modulator tendering notice is already 4 months late with respect to presented planning
- Delivery of 3 modulators and 3 klystrons is expected 1 year after signature, which seems unrealistic

Recommendation

- Provision of at least 1 spare solid state amplifier and 1 spare 252 MHz klystron



Comments

- We appreciate that Huddersfield will be involved in the commissioning process
- Tendering issues are causing delay and first deliveries are expected in September 2017 for installation. The risk for delayed delivery is high



Medium and high beta RF

- **Comment**
 - IOT / klystron choice for the high-beta cryomodules should be fixed early 2018 to finalize the design of the high power amplifier and to keep the time-schedule of the 2nd phase

5-7 October 2016

ESS TAC14

19




Test Stand 2

- **Comment**
 - Regarding the number of cryomodules to be re-tested at Lund, at least one cryomodule should be tested again after a successful testing at Saclay in order to validate the transport

5-7 October 2016

ESS TAC14


20



Report on ICS at TAC14 5-7 October 2016

Mark Heron, Karen White

5-7 October 2016 ESS TAC14 21



Previous Recommendations

1. Design out dependencies on network services (e.g. LDAP or Active Directory) outside the operational ICS network to enable the machine to operate without an external network connection. [This has been addressed in the network design.](#)
2. ICS should promote ICS solutions and standards within ESS and to IK partners. [ICS Handbook has been released and communicated to staff and IKCs.](#)
3. Strengthen the ICS Integration Group, by adding a few **senior** engineers, in order to meet the overall ESS project schedule. [One engineer has been added, but this group still needs more experienced staff to deliver the planned scope of work.](#)
4. ESS senior management should support the enforcement of standards from ICS across the project. Failure to do so will incur technical debt and introduce unnecessary risk to the project. [Senior management has demonstrated commitment to enforcing the standards.](#)

5-7 October 2016 ESS TAC14 22



Findings

- ICS has made substantial progress in past 6 months.
- A major re-plan has been completed and recommended technical solutions are deployed on test stands and at IK partners.
- There are 29 staff and 6 contractors currently in the ICS with 11 positions planned to be filled in 2017.
- ESS EPICS Environment (EEE) is deployed and used locally and at IKCs along with the ESS naming convention
- ICS staff have been on-site in Catania to help with control integration of the proton source
- Draft version of ICS Handbook is available

5-7 October 2016

ESS TAC14

23



Findings

- The 2015 external review of the MPS produced recommendations which are being addressed. There is now better engagement from Accelerator Division and increased awareness of MPS is evident. There is a lack of information from some IK partners on MPS interfaces.
- PSS scope is project wide, with a development process based on IEC61508 and compliance with Swedish radiation regulations. PSS will be installed in phases, with an initial phase to support partial commissioning of the accelerator up to the DTL and the remainder of the vault PSS being commission as a second phase. In the past year there has been an external review of PSS with a number of recommendations which are being actioned.
- A high speed digital platform to support high data rates from some subsystems is being developed as part of an IK agreement through an established industrial partner. Technical risk is mitigated through a port of an existing VME design to MTCA.

5-7 October 2016

ESS TAC14

24



Comments

- ICS has improved confidence in budget and schedule as a consequence of the re-planning. The group faces substantial increase in activity in the coming year and success will be highly depend on filling vacancies. In the coming two years a significant portion of the control system will have to be delivered as part of accelerator installation. ICS will have to work closely with both IK partners and with the ESS installation teams.
- The software group should be prepared to address issues with the EEE as they arise to maximize controls development productivity.
- ICS still lacks sufficient experienced engineers to meet the ESS project milestones; recruitment plan should be aggressively pursued.
- ICS delivery is at risk due to persistent procurements delays.
- ICS should provide guidance for technical groups to define archiving and alarm parameters well in advance of commissioning.

5-7 October 2016

ESS TAC14

25



Comments

- Good progress with the Beam Interlock System and in addressing recommendations from the MPS review. The MPS Group should be proactive in working with suppliers and customers to define interfaces. The group should aim to be an intelligent provider of MPS and give leadership on overall MPS functionality and interplay between MPS and technical subsystem. The MEBT chopper input to the BIS should be maskable to ensure efficient use of commissioning time is possible.
- PSS is following a good safety design process. Separation of ODH from PSS gives independence of operation which will prove useful during maintenance periods. The external review recommendations are quite serious and need addressing in the near future. Processes for PLC software development and change management need to be in place before PLC systems are developed or deployed.
- The PSS design should provide sufficient test modes to allow work to be accomplished in the tunnel while selected systems are operated

5-7 October 2016

ESS TAC14

26



Comments

- ICS is being proactive by providing funds to support the design work on the digital platform by the industrial partner. Around ~400 digital controller boards are due in batches from May 2017, but the production run cannot proceed until the IK contract is in place. This represents a significant risk. When the board becomes available ICS should have firmware and software resources available to work with customer groups.
- Very good progress has been made identifying additional IK partners in ICS. Continuing to spend more resources to secure additional IKCs for ICS may be counterproductive and a distraction from delivering the required control systems.

5-7 October 2016

ESS TAC14

27



Recommendations

1. ICS should give priority to execution of technical work over search for further IK agreements
2. ICS should ensure they provide complete input for integrated installation planning and implementation

5-7 October 2016

ESS TAC14

28



ICS Charge Questions

c1) Are the interfaces between the ICS and Accelerator Systems defined and documented well enough for this stage of the project?

No, this is a work in progress.

c2) Are the progress and the future outlook of the systems presented appropriate and what are potential bottlenecks?

Progress has been better during the last 6 months than any previous period between TAC meetings, however, more experienced controls engineers are needed and delivery of software and hardware needs to ramp up to meet project milestones.

c3) Are the different software tools and infrastructure developed well enough for this stage of the project? Are the processes around these tools properly defined?

The tools and infrastructure are in use at ESS and IK partners. Feedback from these customers is the best way to ensure the ICS is able to support the ESS project deliverables. Processes need further development.



ICS Charge Questions

c4) Are there any issues/risks with the scalability and performance of the software products when ramped up to operations level?

Unknown. Historically, EPICS has proven to scale very well, with several sites running comparable numbers of IOCs, PVs, etc. However, ESS may well be the first large EPICS site to make extensive and exclusive use of PV Access (V4) which has only so far been demonstrated on a much smaller scale.

c5) Do the ICS standardization efforts regarding ICS hardware, ICS software, EPICS, Machine Protection and Personnel Safety Systems correctly and realistically address the requirements needed to implement the ESS mission and schedule?

Yes, the ICS standards are appropriate to meet ESS requirements. As noted above, rate of controls delivery needs to increase to meet the ESS schedule.




Report of t-TAC14 5-7 October 2016

Michael Borden, Tim Broome, Michael Butzek, Philip Ferguson (Chair),
Anton Moeslang, Manuel Perlado, Szabina Török, Michael Wohlmuther




General Findings from t-TAC

- Thanks again for the hospitality and the effort of the team to prepare
- The target system design continues to mature, and while things remain to be done the overall trajectory is very good
- Target Division was responsive to the TAC13 recommendations
- We support the findings of the bunker IAC, including the recommendation to expand the scope of t-TAC to include neutron transport and the instrument hall
- In-kind work in the Target Division seems to be progressing well and seems to be well managed
- Great to see a PhD student performing interesting work that is important to the project!
- History shows that target systems fail where we expect the systems to be weak from a standard construction standpoint. Remember the routine things where we expect the systems to be weak (e.g., welds) are where the target, reflector, etc., will likely fail

 t1) Are the proposed concepts and preliminary plan for the in monolith diagnostics and instrumentation appropriate and sufficient to satisfy the needs of monitoring the target wheel?

- **Observations**
 - Measurement of a long list of parameters is being considered
 - Diverse instrumentation is being investigated
 - Innovative methods are being developed for temperature measurement and tungsten block geometry
 - Only target diagnostics were presented. A “moderator ready for beam” will also be required
- **Findings**
 - Instrumentation is being considered that covers all of the target systems
 - How the parameter measurements will be used to inform operational decisions is not clear
 - Direct measurement of Tungsten block temperatures is not possible
 - Be aware that alignment of position sensors, gamma camera, etc., is critical and cannot be checked after installation. Robust alignment systems and mounting will be required
- **Recommendations**
 - Mature the target and monolith instrumentation suite
 - Decide which instrumentation will be used to confirm that the target is ‘ready for beam’ (What is meant by target failure?)
 - Define which parameters are in TSS and which are in MPS (current logic is good)
 - Define what action would be taken if a critical parameter moves ‘out of range’ (eliminate the need for personnel judgement as far as possible)
 - Continue the simulation calculations and analyses to establish the effects of off normal events and their consequences for safe operation of the target. This work is to mitigate the inability to measure target temperatures directly
 - ~~Continue the work on the gamma camera, laser distance and vibration measurements, and temperature measurements from outside the wheel~~

 t2) Are the interfaces with Accelerator Systems and Neutron Science Systems reasonable and manageable, with respect to the presented design solutions and choices for the monolith vacuum operation and the neutron beam extraction system?

- **Observations**
 - Target Division presented sound arguments to support operation of the monolith in vacuum
 - The monolith to experimental hall vacuum window has not been optimized for neutron transport
 - A comprehensive list of vacuum operation impacts was not presented
 - Target Division is maintaining the option for a proton beam window, which is the current baseline
 - A mechanism for water removal from the lowest position of the monolith was presented
 - There is no electrical equipment operating at high enough voltage in the monolith so that operating the monolith at low helium pressure close to the minimum of the Paschen curve is not an issue from this standpoint
- **Findings**
 - The lack of He for a heat transfer medium may cause unintended heating of critical components (e.g., cooling in upstream neutron guides or edge contact points may be a significant concern)
 - Differential pumping was discussed as being able to maintain transition of mbar vacuum levels to ultra-high vacuum for the accelerator, but no preliminary design or analysis was presented
- **Recommendations**
 - Continue to mature the decision, seek concurrence of the Accelerator Division & the project, and present details at TAC15, including a differentially pumped monolith design and the backup PBW design
 - A sloping catch basin for water removal is lacking but would insure maximum liquid removal from the monolith in an off-normal scenario.
 - A full helium system should remain in the baseline
 - Monolith inserts should be designed to be cooled independent of the monolith environment to preserve or consider a vacuum option



t3) Are the performed assessments and validations of the integrity and robustness of the spallation material thorough enough to constitute a solid basis for a safe commissioning and operation of the target?

- **Observations**

- Significant progress has been achieved on the selection of the spallation material W bricks
- A method for measuring Tungsten release factors for Iodine have been presented

- **Findings**

- The parameters for hot rolling of W should be defined more stringently. In particular the temperature window and the thickness reduction during the process should be part of the specification
- If not yet established, fracture toughness requirements should be defined
- Compressive residual stresses at the surface of the bricks might have a positive influence on fatigue life-time
- The two staged selection process for W material is endorsed
- An extended erosion (ETHEL) test would provide additional insight into W erosion issues

- **Recommendations**

- The t-Tac believes the project should repeat the second stage of the selection process with new samples with refined specifications (especially for the temperature window and the thickness reduction during hot rolling) if this has not already been done
- Experiments on W release factors should be carried out as soon as possible
- Performed an extended ETHEL test and consider oxidation



t4) Comments and suggestions are expected regarding the design solutions for the cold moderator liquid hydrogen system

- **Observations**

- The presentation shows good progress on the liquid hydrogen system
- Procurement of key components is starting to take place
- Preliminary work on the ortho/para catalyzer and probe was presented

- **Findings**

- Lowering the operation pressure from 17 to 11 bar was recommended at the previous TAC, and has been implemented
- O/P Probe is known technology but requires a window as an optical view path into the LH2. Thermal cycling of the envisioned sapphire window will introduce a risk

- **Recommendation**

- Plan to exchange the sapphire window with a blind flange in case of failure to be



t5) Is the presented filter solution for the target helium cooling system sufficient, robust and appropriate for a safe and reliable operation and maintenance?

Observations

- Target erosion and ablation was reassessed compared to the TDR
- Generation of eroded particles was estimated from short term ETHEL experiments and vibration experiments

Findings

- The committee agreed that prediction of particulate formation is not accurate.
 - We don't believe the 3-4 kg/year number from the TDR, and are not sure about the current 10 g/year number
- Experience of existing facilities has shown unexpected particulate deposition on piping.
- Remote handling of filters during maintenance must be considered carefully
- Particulate monitors could be installed in the He loop (and may be planned)

Recommendation

- The system should be flexible enough to run with higher particle deposition than planned (e.g. space for additional shielding, consider where the filters are placed, etc.). Be careful

5-7 October 2016

ESS TAC14

37



t6) Does the proposed organization for installation of the target station seem appropriate for an efficient coordination of all installation activities performed by in-kind partners and contractors, concurrent with on-going building construction and parallel works of the Accelerator, Integrated Control and Neutron Science Systems?

Observations

- The urgency of establishing as soon as possible a highly effective installation organization has been addressed by ESS by proposing a Target project site organization

Findings

- After detailed discussions, it is clear that a lot of work (mostly primavera) has been completed for controlling various installation processes. t-TAC believes that the proposed structure has the potential to meet the ambiguous requirements for an effective coordination of all major target installation activities
- The implementation and execution of this plan is more effective the earlier the Installation Managers are known and appointed
- Significant installation will be completed within a short time (in parallel), requiring many people for a short time
- The organization may evolve or change in this area. It is good to keep the org chart up to date and communicate changes as work will proceed quickly

Recommendations

- Identify Installation Managers as soon as possible and start them working together as soon as possible.
- Utilize temporary services, target in-kind partners, and/or contracted industry for as much

5-7 October 2016

ESS TAC14

38

Annex 1

02/10/2016

Agenda of 14th TAC meeting

ESS Construction site

Wednesday 5, October 2016

TAC Lunch with IAC - Lunch area at ESS Construction site office TAC

13h00	TAC session (13h00 - 13h05) on Pacific Water
-------	--

Plenary Sessions (13h30 – 17h30) – Pacific Water

13h30	Welcome and overall status of ESS – R. Garoby/J. Haines (25'+5')
14h00	Status of Conventional facilities – K. Hedin (20'+5')
14h25	Progress and plans for Accelerator – M. Lindroos (35' + 10')

15h10: Coffee

15h30	Target overview – E. Pitcher (35'+10')
16h15	ICS overview – H. Carling (35'+10')
17h00	Organization for installation - N. Gazis, T. Lexholm (20'+10')

TAC session Accelerator (17h30 – 18h00) - Atlantic

Target and ICS

	Target and ICS - Pacific Water
17h30	Report from IAC chair about the bunker – R. Pynn

18h30: Transport to Farmshack

19h00: Social Dinner (Farmshack, Lund)

22h00: Transport to Hotel Planetstaden and ESS Tunvavägen/Lund C

Thursday 6, October 2016
ESS Construction site, Odarslövsvägen 113, Lund

Parallel sessions (8h30 – 12h30)

Accelerator (BrightnESS)	
8h30	Overview of the Linac RF Systems – A. Sunesson (15') NC Linac RF Systems – P. Gonzalez (ESS Bilbao) (15'+5') Spoke RF Transmitters – A. Fabris, C. Pasotti (Elettra) (15'+5') RF Interlock System 704 MHz – J. Molnar (MTA Atomki) (15'+5')
10h00	Coffee
10h30	Phase Reference Line – K. Czuba (Warsaw University of Technology, ISE) (15'+5') LLRF Systems 704MHz – M. Grzegorzolka (Polish Electronic Group) (15'+5') Medium and high beta RF – M. Jensen (15'+5') RF High Power Distribution systems SC Linac – R. Edgecock (University of Huddersfield) (15'+5') RF systems installation – D. Bocian (IFJ PAN Krakow) (15'+5') Cryomodule test stand at ESS Site – W. Hees (15'+5')

ICS (Cyclone)	
9h05	Progress on Machine Protection – A. Nordt (20'+10') Progress on Personnel Safety Systems – M. Mansouri (15'+10')
10h00	Coffee
10h30	Progress on integration – D. Piso Fernandez (20'+10') Status of ICS standards – T. Korhonen (20'+10') Update on Software scope – S. Regnell (20'+10') Progress on common high speed digital platform – Henrik Carling (20'+10')

Target (Brilliance)	
8h30	Response to tTAC-13 Recommendations – E. Pitcher (30') Target Wheel Instrumentation Needs and Plan – U. Odén (30') Decay Gamma Imaging of Target Wheel Internals – N. Borghi (30')
10h00	Coffee
10h30	Spallation Material Update – F. Sordo (ESS Bilbao) (30') Cryogenic Moderator System Update – M. Kickulies (30') Update on Monolith Vacuum Operations Mode – R. Linander (30') Radiation challenges of primary cooling return water – E. Klinkby (DTU) (30')

12h30: Lunch on site – Pacific Water – By invitation only

Parallel session Accelerator and ICS (13h30 -14h00)

Accelerator and ICS - Integration - BrightnESS	
13h30	Accelerator tasks wrt MPS, PSS, TSS – A. Ponton (15')
13h45	Component/signal naming, and Controls Configuration – I. Alonso (15')

Parallel session Target (13h30 -14h30)

Target - Brilliance	
13h30	Update on Tungsten Release Factor Experiment – M. Jensen (DTU) (30')
	Update on Target Helium Cooling System Filter Design – U. Odén – (30')

Accelerator - Test stand visit - LTH

14h00	Visit to RF and modulator test stand – D. McGinnis/C. Martins (60')
-------	---

TAC sessions (14h30 – 18h00) with additional interviews on TAC request

~ 16h00: Coffee

18h00:

Transport from ESS Construction site to Hotel Planetstaden

19h00: TAC Dinner (Hotel Planetstaden)

Friday 7, October 2016
ESS Construction site, Odarslövsvägen 113, Lund

TAC Sessions (8h30 – 12h15) with additional interviews on TAC request

~10h30 Coffee

12h15 -13h30: Lunch

Close outs (13h30 – 14h45)

13h30: Close out with DG and Technical Director - (if necessary)

14h00: Close out (open session)

14h45: End of meeting

Annex 2



Document Type	Agenda
Document Number	ESS-0067537
Date	Sep 8, 2016
Revision	1 (1)
State Confidentiality	Preliminary
Level	Internal
Page	1 (3)

Charge to the TAC for its 14th meeting on October 5-7, 2016

1. Introduction

The rate of progress of the ESS project has continued to increase during the past 6 months since the last TAC meeting and the project is now close to 25% complete. Construction on site has continued to advance at the foreseen high pace as well as the sub-projects both on site and at the in-kind partners.

The unavoidable difficulties that we encounter are being handled with the main goal of preserving the top-level milestones. Feedback and recommendations of the Committee to the applied solutions are eagerly expected.

The “Installation permit” (for devices generating ionizing radiation) has been submitted to the radiation safety authority (SSM) at the foreseen date, early last May. Interaction is actively taking place with SSM with the goal of getting approval in Fall 2017.

Numerous Technical Annexes and In-Kind Agreements have matured and been signed.

The ESS organization and management has continued to evolve. In chronologic order:

- John Haines has been nominated as ESS Programme Manager since August 15, keeping his former responsibility for the integrated schedule and enlarging his role to oversee the whole ESS construction project,
- Ralf Trant is the new Associate Director for Health, Safety, Environment and Quality since October 1,
- John Womersley will become Director General on November 1, 2016.

The installation phase, which is beginning this fall, will become a major activity during the first half of 2017. A specific organization is being set-up for that purpose.

The 14th meeting of the TAC is an opportunity to describe how we are addressing issues and how we plan for the future. In such a period combining extensive/intensive planning

Document Type	Agenda
Document Number	ESS-0067537
Date	Sep 8, 2016
Revision	1 (1)
State	Preliminary
Confidentiality Level	Internal

together with execution work, the Committee's observations and recommendations will be especially precious.

2. Charge questions

Our first interrogation is about the follow-up of former TAC recommendations:

Have the recommendations and concerns expressed by TAC been properly addressed?

More specifically during this meeting, we would like the Committee to address the following questions:

- concerning the **Accelerator**:

a1) The Accelerator session focuses on the RF systems of the accelerator, following the request of the Committee at the last meeting. Does the TAC have recommendations on the systems presented:

- regarding the design and early prototyping?*
- regarding the proposed procurements and system assembly which partly is done at IK partners?*
- about the plans for integration in the RF gallery and installation?*
- about the proposed testing?*

a2) The schedule for the RF systems is challenging and delays are showing up. Success largely depends on the capability of industry to deliver within the foreseen schedule. We would like the TAC to communicate experience on that matter: how likely is it that companies will deliver on time and what can be done to improve the situation? The same question is asked for the installation and RF gallery integration schedule. Any comments or experience to share?

a3) Does the TAC have comments on the organization for installation? Shared experience from other facilities is welcome as part of the answer to this question.

a4) Integration is an on-going effort. Some aspects of accelerator integration with MPS, TSS and PSS are presented and also some aspects of documentation. TAC comments and reactions are expected.

- concerning the **Target**:

t1) Are the proposed concepts and preliminary plan for the in-monolith diagnostics and instrumentation appropriate and sufficient to satisfy the needs of monitoring the target wheel?

Document Type	Agenda
Document Number	ESS-0067537
Date	Sep 8, 2016
Revision	1 (1)
State	Preliminary
Confidentiality Level	Internal

t2) Are the interfaces with Accelerator Systems and Neutron Science Systems reasonable and manageable, with respect to the presented design solutions and choices for the monolith vacuum operation and the neutron beam extraction system?

t3) Are the performed assessments and validations of the integrity and robustness of the spallation material thorough enough to constitute a solid basis for a safe commissioning and operation of the target?

t4) Comments and suggestions are expected regarding the design solutions for the cold moderator liquid hydrogen system.

t5) Is the presented filter solution for the target helium cooling system sufficient, robust and appropriate for a safe and reliable operation and maintenance?

t6) Does the proposed organization for installation of the target station seem appropriate for an efficient coordination of all installation activities performed by in-kind partners and contractors, concurrent with on-going building construction and parallel works of the Accelerator, Integrated Control and Neutron Science Systems?

*- concerning the **Integrated Control System (ICS)**:*

c1) Are the interfaces between the ICS and Accelerator Systems defined and documented well enough for this stage of the project?

c2) Are the progress and the future outlook of the systems presented appropriate and what are potential bottlenecks?

c3) Are the different software tools and infrastructure developed well enough for this stage of the project? Are the processes around these tools properly defined?

c4) Are there any issues/risks with the scalability and performance of the software products when ramped up to operations level?

c5) Do the ICS standardization efforts regarding ICS hardware, ICS software, EPICS, Machine Protection and Personnel Safety Systems correctly and realistically address the requirements needed to implement the ESS mission and schedule?

The Committee is encouraged to provide also suggestions/comments and recommendations on any other subject it would find relevant.

A preliminary version of the TAC report is expected at the end of the meeting, in the afternoon of Friday 7, October. The final report is expected before the end of October. The Chairman will orally present the TAC#14 report to the ESS Council on December 5-6 in Bilbao.