EUROPEAN SPALLATION SOURCE

SAC-10
Science Director's Update

Lund, Sweden

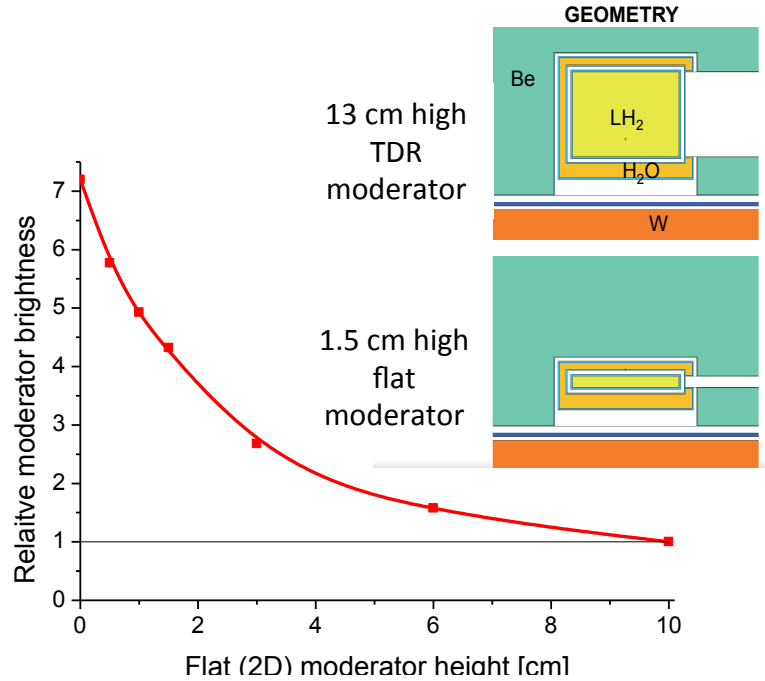
February 5-6, 2014

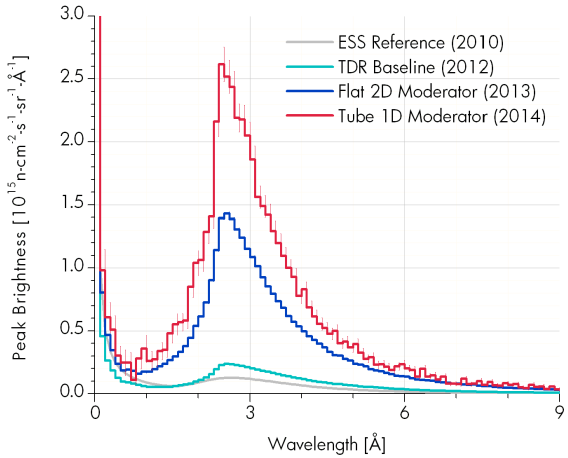
Key Activities in the Science Directorate Since SAC-9

- Instrument Proposals 2013
  - 16 Proposals were received covering a wide range of instrument choices
  - Organised and launched internal and STAP reviews
  - So far positive feedback from STAPs and proposers
- Annual Readiness Review
  - Huge effort to finalise construction plans and schedule
  - Focus to establish number of instrument that are possible to construct within the NSS budget OF 350€ Mil.
  - New NSS budget establishes a baseline for 16 instruments within the construction budget and the remaining 6 within the pre-operations budget.
  - Discussion on the pre-operations budget continue within the STC.
- Ramping up resources for instrument construction
  - Hiring in technology groups and engineers for instruments in phase-1

Enhanced flux neutron moderators

- New moderator concept:
  - Mechanism understood
  - Works for all neutron sources, including reactors.
- Harmonisation with Instrument Suite:
  - Complex optimisation is in progress over the instrument suite and sample sizes
  - collaboration between Instruments and Target division and many Instrument Consortia from our partners
- Timeline and milestones:
  - Feb. 12: 1st moderator workshop, refine parameter space for further optimisation
  - March, second half: 2nd moderator workshop
  - April 30: New moderator configuration submitted to CCB





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Annual Review of the European Spallation Source (ESS) Project

Executive Summary and Recommendation

Lund, Sweden

November 12-14, 2013

Review Committee
for the Annual Review of the
European Spallation Source (ESS)
November 12-14, 2013

Committee Chair, Marzio Nessi, CERN
Committee Coordinator, Mark Reichanadter, SLAC

Subcommittee 1
Accelerator

* ** Philippe, Lebrun, CERN
Mikael Eriksson, Max-Lab
Carlo Bocchetta, SOLARIS
Maurizio Vretenar, CERN
Francis Perez, ALBA

Subcommittee 2
Target

* ** Phil Ferguson, ORNL-SNS
Yujiro Ikeda, J-PARC
Friedrich Groeschel, IFMIF
Georg Bollen, MSU-FRIB

Subcommittee 3
Integrated Control System

* Bob Dalesio, BNL
Anders Wallander, ITER
Mark Heron, Diamond Light Source

Subcommittee 4
Neutron Scattering Systems

* Shane Kennedy, ANSTO
** Ken Herwig, ORNL-SNS
** Sean Langridge, ISIS
Mark Johnson, ILL (DMSC)
** Geoffrey L Greene, UT-SNS
Winfried Petry, FRM-II

Subcommittee 5
Infrastructure

* ** Tim Watson ITER
Wilhelm Bialowons, DESY
** Peter Lundhus, formerly of Öresundskonsortiet and Femer Belt
Ingvar Carlsson, formerly of TVL (Energy)

Subcommittee 6
Cost and Schedule

* Steve Gilligan, ITER
Cathy LaValle, BNL-NSLS-II
Barbara Thibadeau, ORNL

Subcommittee 7
Management, Sourcing, Integration, SHE and QA

* Torsten Åkesson, Lund University
Ken Blackler, ITER
Helmut Krech, formerly of ESRF (in-Kind)
Serge Prat, XFEL (In-Kind)
Anders Unnervik, CERN (Procurement)
Andreas Hoppe, DESY (SHE)
Frank Kornegay, retired SNS-ORNL (SHE)
Paul Berkvens, ESRF (SHE)

Observers

David Edvardsson, Swedish Ministry of Education and Research
Morten Scharff, Danish Ministry of Science, Innovation and Higher Education
Philippe Lavocat, French Ministry of Higher Education and Research
Pascale Delbourgo, French Ministry of Higher Education and Research
Sven Landelius, Chair ESS AB
Tom Barrett, EIB

*** = Subcommittee Chairperson**
**** = Member of ESS Advisory Committee (SAC, TAC, CFAC)**
Count: 34 (excluding observers and coordinator)

First impressions

- The first ESS annual review took place at LUND the 12th-14th November 2013
- Present : ESS project team, 33 members of the review team organized in 7 subcommittees and 7 observers (see next slide for details)

First impressions:

- The review committee congratulates the ESS team and its management for the quality of the material and presentations submitted to the reviewers
- The ESS is now a real project from all points of view, well shaped and well organized. ESS is now managing to the established baseline.
- A big effort was made in the last 10 months to build up an organization structure with names and clear responsibilities attached to it
- The management of the project is strong, well determined, motivated and success oriented. The ESS overall schedule foresees first protons on target in December 2019. The cost cap has been fixed to 1.843 Beuro (year 2013).
- ESS will start real construction work in June 2014 (ground break)

4 - Neutron Scattering Systems Subcommittee

Shane Kennedy, Ken Herwig, Sean Langridge, Mark Johnson, Geoffrey Greene, Winfried Petry

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- Brief description of the mandate and of the subject to be reviewed
  - To review the technical design and specifications of the NSS
  - To assess the maturity of scope definition, cost, schedule and risk of the NSS
  - To assess the readiness of the NSS management team and adequacy of staffing for move to construction phase
  - To assess the appropriateness of the plans for managing in-kind contributions
- Status up to the review and brief description of the present achievements
  - NSS have done a commendable job in establishment and implementation of a process for engaging the EU community in the instrument selection process
  - Neutron technologies division have identified key competencies required to be managed in-house and recruited competent leaders in all those areas
  - Progress towards initiation of construction of the first three instruments is well advanced
  - Concept development and design of essential neutron beam infrastructure; (transport systems, detection, automation, DAE etc.) is progressing in timely manner.

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- Future milestones (list with dates and description) necessary prior to start of construction
  - Continuous refinement of cost breakdown
  - Recruitment of key personnel for commencement of construction for first three instruments and for ramp up in workload for assessment of second wave of instrument proposals
  - Establishment of agreements with in-kind partners for implementation of instrument development and construction, and bringing full potential
  - Establishment of essential support services (e.g. procurement, recruitment, finance)
  - Conduct a detailed assessment of DMSC scope and budget
  - Resolve outstanding questions on moderator design –by April 2014
- Critical items and possible showstoppers
  - NSS budget is extremely tight
  - Clear pathways for maximization of in-kind contributions and leveraging of additional EU resources need further development
  - NSS needs to drive the design for key technical components of concern to NSS (e.g. moderator, shielding, interface boundaries..)

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- General assessment (implementation readiness, project organization, risks….)
  - Progress on definition of scope, and selection of first wave capabilities and processes for ongoing selection are well advanced
  - Progress on establishment of key in-house competencies is well advanced
  - Plans for management of instrument construction are in place
  - Cross-project communications strategies require some adjustments
  - Clarity is required on scope boundaries between NSS and other ESS sub-projects (e.g. target, CF, ICS, PM)
  - NSS project contingency requires further consideration

4 - Neutron Scattering Systems Subcommittee

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- Proposed list of recommendations
  - Conduct a project level review of NSS budget.
  - Establish an acceptable scope for NSS, consistent with budgetary constraints and seek endorsement of stakeholders
  - Establish clear agreement with other ESS sub-projects on scope boundaries (including agreement on financial responsibilities)
  - Conduct independent assessment of instrument construction cost, with 1st level cost differentiation (e.g. low, medium and high cost prototypes)
  - Recruitment of key personnel for implementation of instrument construction program.
  - NSS should maximize consolidation of procurements for key components with other subprojects (e.g. steel, concrete…)

Response to Review

- An internal two-day project-level review was held in November to increase NSS internal contingency.
  - Revision of NSS scope to match budgetary constraints.
- Planed a workshop to be held on the 25-26th of February to discuss models for In-kind collaborations for the ESS Instrument program.
  - Joint responsibility for delivering ESS Instruments
  - Financing
  - Collaboration centres
- Simplify communication of the Instrument construction costs
  - Review Planned in April 2014
- Focus of NSS project plans to maximise in-kind contributions
- The newly recruited Head of DMSC is establishing a detailed work program and recruitment time-line for DMSC

Defining Strategies for Technologies

- General Principles:
- Use existing technology whenever appropriate
- Develop when necessary together with our partners
- Work with our partners to develop and support standards for ESS technologies
  - Detectors: Support B10 thin film technology, build detectors together with partners
  - Data acquisition/motion control: Use EPICS control systems and draw from partner experience to implement ESS instrument control platform
  - Choppers: Wide partner and industry experience, developing standardisation strategy

ESS-ISIS Collaboration

- High level discussions between Science Directorate and ISIS management on collaborations in;
  - Control systems
  - choppers
  - detectors
  - software
  - shielding
- These discussions were reflected on an MOU signed in December 2014
  - Many bi-lateral interactions between ESS and ISIS on these areas
  - Join activities are been defined and to me agreed on in the very near fit ire
  - Significantly impacts strategies in various areas
- Prelude to UK involvement in ESS construction

Status of Instrument Proposal Reviews

- ESS is committed to support and advice all instrument-consortia in order that their proposals are successful
- ESS has reviewed proposals and presented these to proposers and STAPs
- Most STAPs have met and provided feedback to Instrument Consortia
  - Consortia presentations to STAP with lively discussions
  - Feedback from proposers has been positive as they find criticisms helpful and constructive
  - STAPs have shown to take their role seriously and enthusiastically
- Final updated proposals that address STAP comments are due in March
- SAC meeting that reviews proposals is planned for May
  - Discuss prioritisation of instruments
- Many partners have expressed concern over available resources to complete update of proposals or to maintain resources until decision for instrument is made
  - There is a need to find “bridging resources” in several partner laboratories

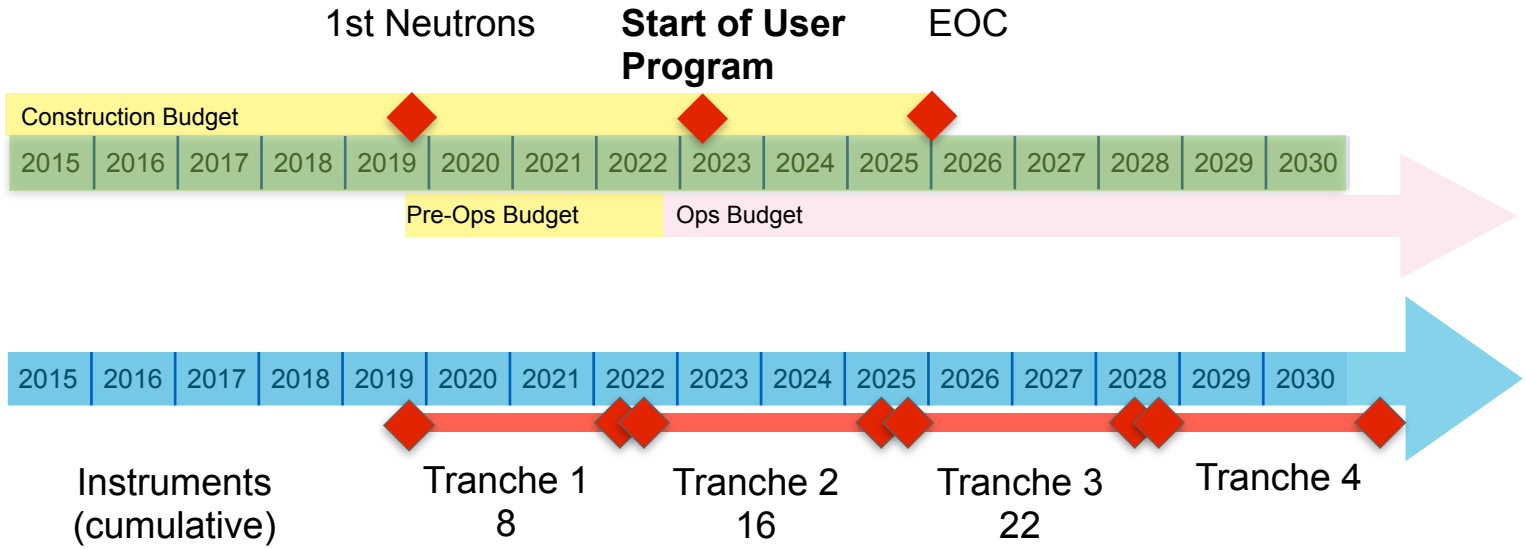
Moving the Instrument Program Towards Construction

- Workshop on "*In-kind Models for Instrument Construction*" to be held on February 25-26th in Malmo
  - Wide participation from our Partner sphere (Speaker from FZJ, TUM, PSI, ILL, LLB, ISIS, Delft and national coordinators participating)
  - Discuss financing of instrument, collaboration structures and principles, added value from in-kind contributions, collaboration centres
  - This is an important step in defining the means of building the Instrument suite of ESS
- IKON6 - Moving towards Construction to beheld in Lund 26-27th of February.
  - Instruments collaboration will be focusing more on construction issues as opposed to the development of instrument concepts
  - Topics include, instrument technologies, shielding, moderator definition and target configuration
  - Partner engagement in key technical issues

Strategies to meet the NSS Scope and Goals

In order to deliver project scope NSS will need to;

- Draw from pre- and steady state operations funding.
  - Implies in-kind contributions into the operations phase of ESS
- Encourage and support community-lead funding initiatives to supplement instrument budgets.
  - Leveraging can provide conservatively up to 15% of the instrument cost.
- Interact with in-kind partners to devise plans to maximise the value that is obtained from their contributions



Instrument Construction Investment

Budget : 350 Mil €

Next 6-12 Months

- Relationships with Partners
  - Define and establish a “Resource Board” for Instruments
  - Define and establish “Instrument Collaboration Centers”
  - Define path and establish technical and software standards for Instrument Technologies and DMSC

- Instruments
  - Track progress of instruments in Phase 1 Engineering design
  - Review 16 instrument proposals and prepare for selection
  - Use “Early Success Strategy” as a means of defining the first 6-8 instruments
  - Commence design of Guide Bunker
  - Define and implement concept for Data Acquisition System

- Instrument - Target Interfaces
  - Review and validate light shutter option
  - Decide on angular beam-port separation
  - Decide on moderator optimisation

Priorities for 2014

- Launch instrument design phase
  - Define roles and responsibilities keeping in mind that instruments are to be build as a European-wide distributed project
  - Internal Review of program on 14th February
- Support decisions for the 2013 instrument proposal round
  - Some groups need support for proposals as funding in some cases is running out.
- Prepare for and execute integration of in-kind partners into NSS project
- Define and implement the In-kind model for NSS for the construction of instruments
- Define and implement synergies and collaborations on key technologies with other neutron sources and laboratories
- Together with target drive decisions on beam extraction, moderator and beam-port configurations

Feedback from SAC-9

- SAC-9 noted the hiring of a new head of the DMSC.
  - Plan for the DMSC will be presented in SAC10
- Detector strategy is been formulated and was reviewed (in part) by the Annual Readiness Review.
  - Subject to finding space on SAC agenda, strategy will be presented in commit meetings
- We discussed the early success strategy at SAC-9
  - STC has asked ESS management to apply a prioritisation plan of the selected instrument.
  - Early Success Strategy Document updated to include a wider scope than instruments.
  - Discussion on prioritisation of instrument in SAC-10
- Target Interfaces
  - We have put effort in improving our target interfaces and we are enjoying these benefits.
  - Strong collaborations and joint decision ownership of shutters options
  - Strong collaboration and joint decision ownership of moderator and beam extraction concepts.

Feedback from SAC-9

- STC approved incorporation of nMX, LOKI and ODIN to move forward into Phase-1 Preliminary design !
  - Project officially started on January 7th
  - Engineering resources are coming on-line
  - Major milestone for ESS in that it's wider collaboration
- Instrument construction plans
  - Annual review provided significant feedback and ideas on the plans that were presented on SAC-9
  - Reviewing role and responsibilities within the instrument construction project. Should work equally for internal as for external members of the project.
  - Developing models for in-kind collaborations with instruments
  - Revising plans to address comments from annual review
  - Annual review update planned for May, 2014.

SAC-10

- Updates
  - NSS (Oliver Kirstein)
  - Conventional facilities with focus on Experimental Halls (Michelle Everett)
  - Instrument proposals Update (Ken Andersen)
- Prioritisation for Instruments
  - Advice: How best to arrive at a prioritisation for instruments for the NSS Project
- DMSC Strategy
  - For Information and general comment
- Moderators and target configuration for information and advice
  - Fundamental Physics
  - Flat moderator
  - Instrument and moderator optimisation
  - Chip-IR beamport