EUROPEAN
SPALLATION
SOURCE

ESS: An Introduction

Dimitri Argyriou
Director for Science

SAC Orientation
4 February 2014

What is ESS ?

What is ESS ?

What is ESS ?


ESS
Support Services


ESS
BUILT FOR BATTLE.
TOUGH FOR LIFE.
SHOP NOW
SHOP GOGGLES
SHOP EYESHIELDS
SHOP SUNGLASSES

What is ESS ?


ESS
Support Services


English
Springer Spaniels
at
Daz-End


ESS
BUILT FOR BATTLE.
TOUGH FOR LIFE.
SHOP NOW
SHOP GOGGLES
SHOP EYESHIELDS
SHOP SUNGLASSES

What is ESS ?

ESS-AÉG
Engineering Students' Society
Association des Étudiant(e)s en Génie

What is ESS ?

English Springer Spaniels at Daz-End

ESS Packaging Ltd

ESS-AÉG
Engineering Students' Society
Association des Étudiant(e)s en Génie

Welcome !

Road to realising the world's leading facility for research using neutrons

2007

ESS secretariat was set up in Lund

2009

Decision: ESS will be built in Lund

2013

ESS enter construction phase of the project

2014

Construction work starts on the site

2019

First neutrons on instruments

2023

ESS starts user program

2025

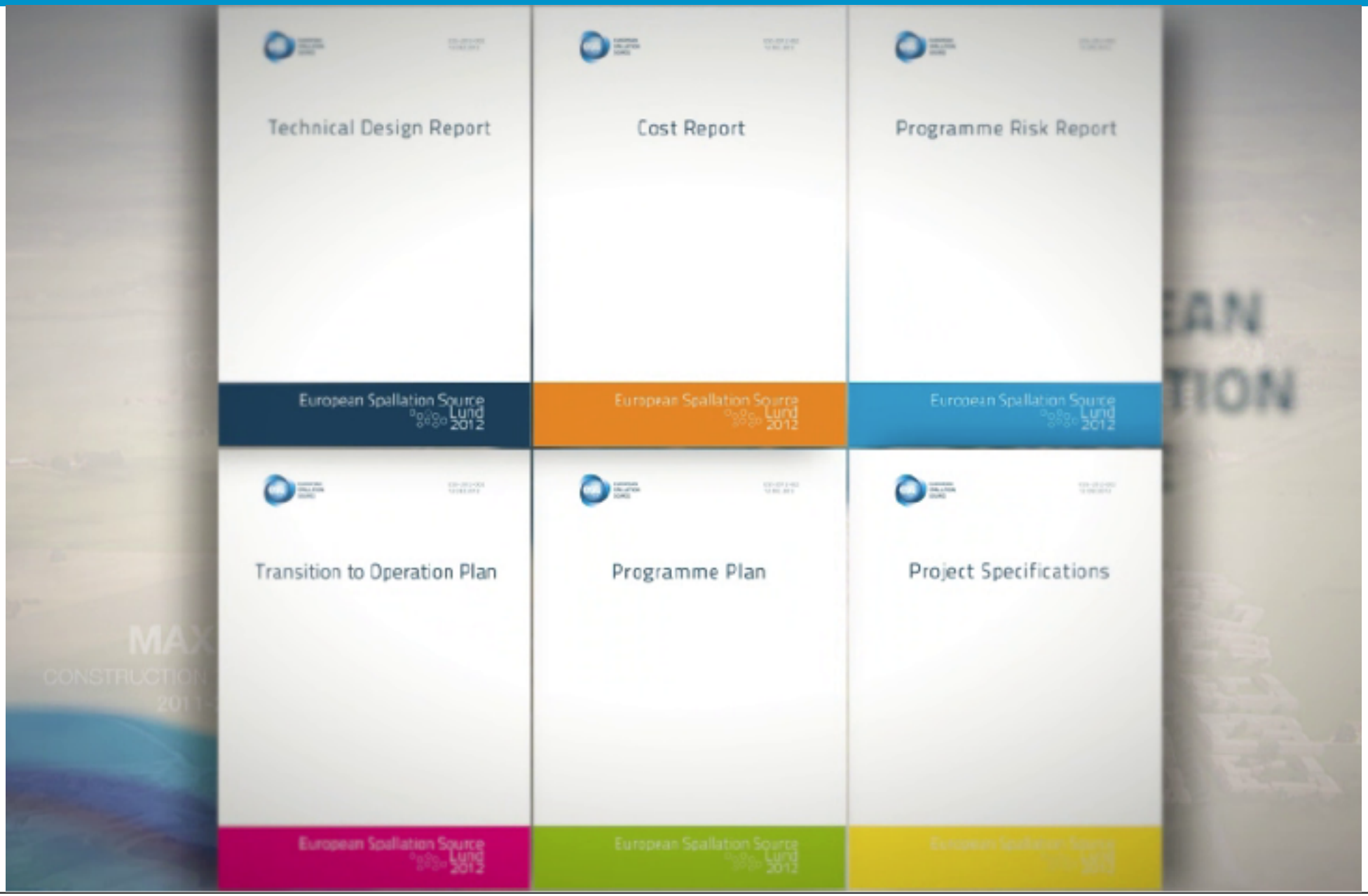
ESS construction complete

EUROPEAN SPALLATION SOURCE

Joint Nordic Focus on Research Infrastructure

James Yeck

Design update delivered 2012



The ESS Project

Proton Accelerator
Energy: 2.5 GeV
Frequency: 14 Hz
Current: 50 mA

Target Station
Solid Rotating W
He or Water Cooled
5MW average power
>22 beam ports

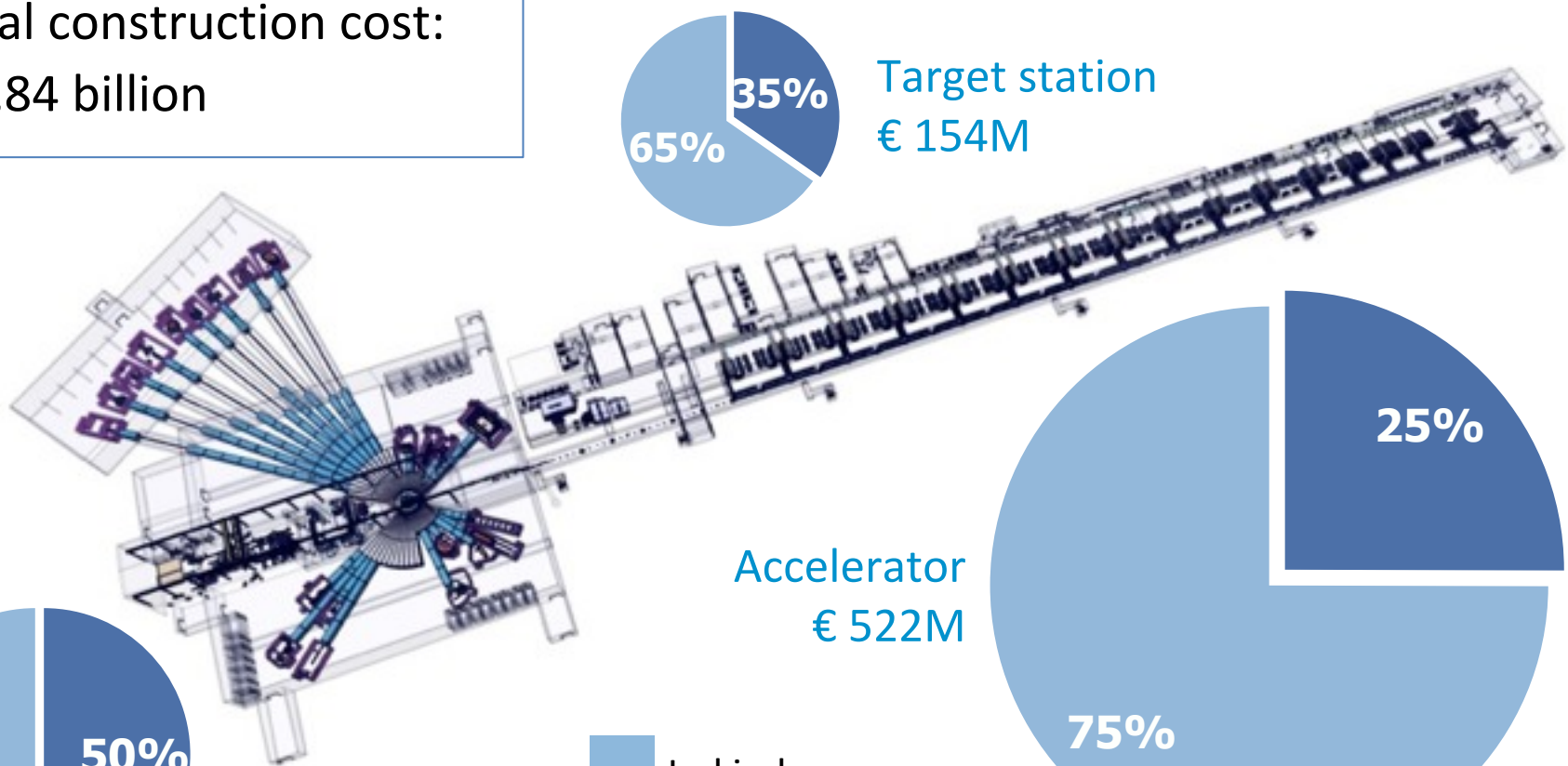
Instruments
22 Instruments in construction budget

5 times brighter than SNS
30 times brighter than ILL

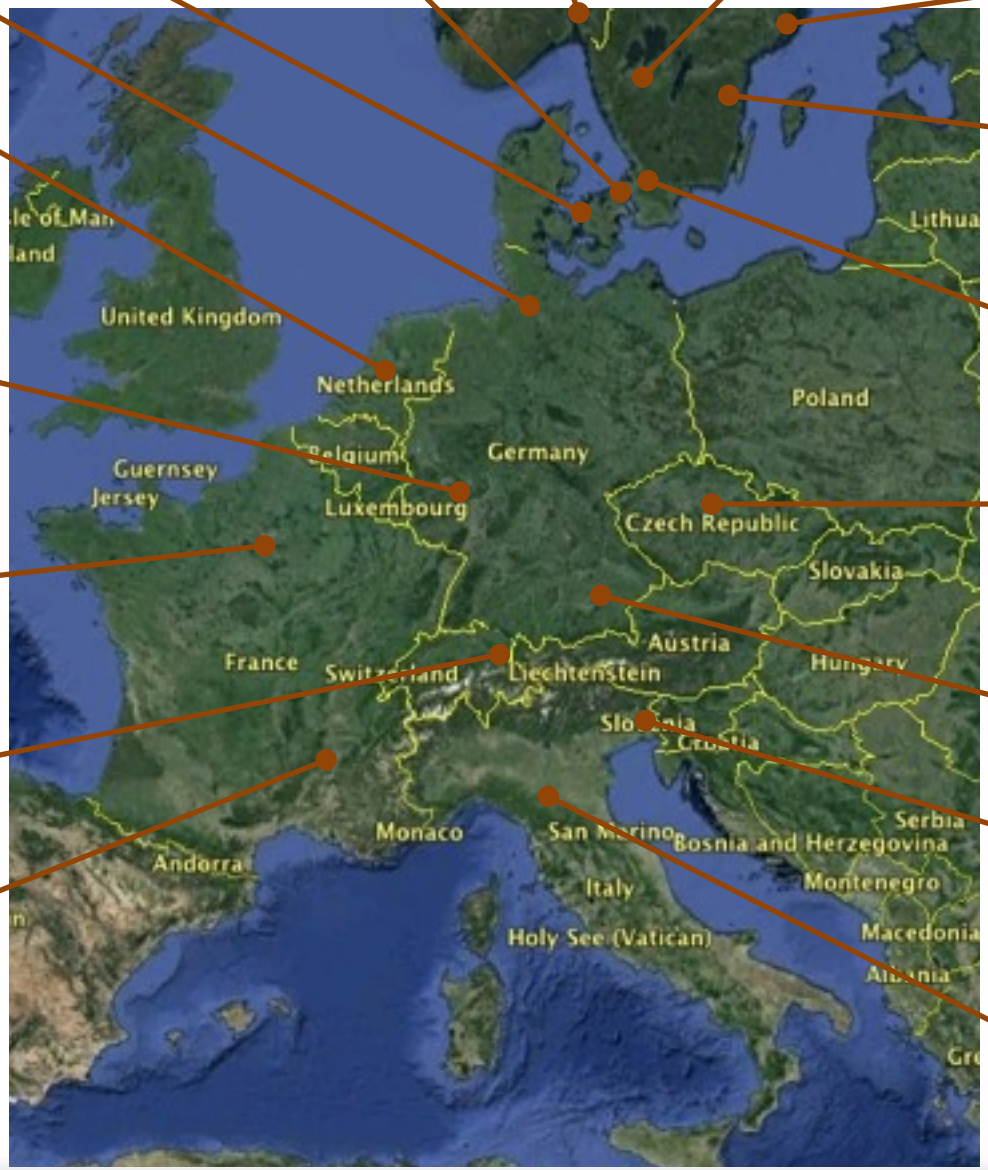
Total Cost of Project
1843 (2013) Mil €

ESS In-kind contributions potential

Total construction cost:
€ 1,84 billion

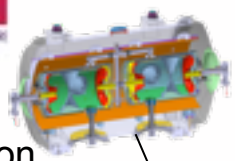


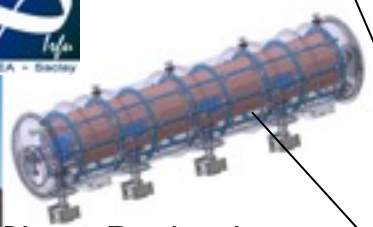
- http://europeanspallationsource.se/eoi
- 683 Proposals from 115 Respondents
- 52% Companies
- 48% Organisations


United Kingdom
Netherlands
Germany
Poland
Belgium
Luxembourg
Czech Republic
Slovakia
France
Switzerland
Austria
Liechtenstein
Hungary
Monaco
Andorra
Italy
Holy See (Vatican)
Serbia
Bosnia and Herzegovina
Montenegro
Macedonia
Guernsey
Jersey

Prototyping the ESS accelerator

Sebastien Bousson



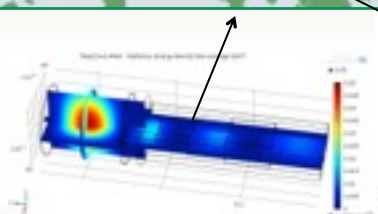


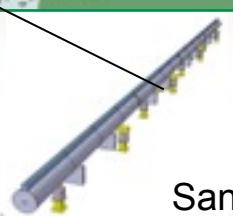
Pierre Bosland

CERN

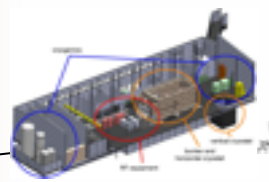
Roger Barlow

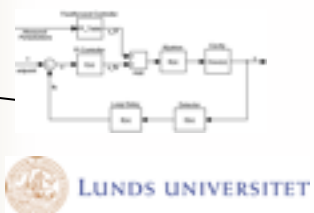
Ibon Bustinduy





Santo Gammino





Anders J Johansson

The National Center for Nuclear Research, Swierk

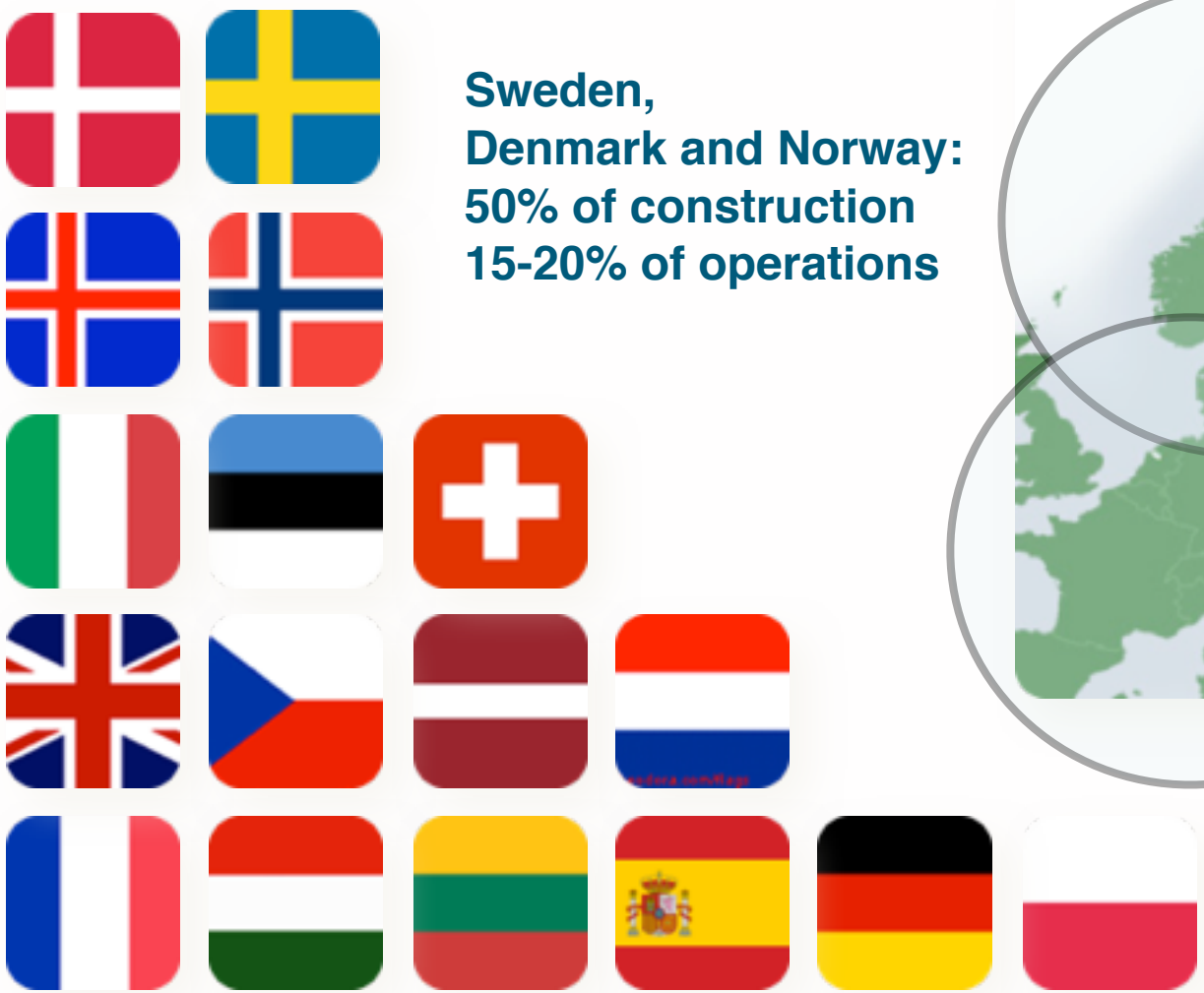
Short Update on the Politics

- **ESS continues to enjoy wide support from Science Community and European Nations.**
- **France recently announced that it will participate in the construction and operation of ESS.**
  - Support from French Science Community important !
  - ESS seen as an important infra-structure for France after finding from recent review.
  - Positive decisions in Switzerland and Czech Republic made already !
- **Numerous interactions on details of commitments between various countries and Host states;**
  - Germany, Spain Italy, UK, Switzerland, Poland, Baltic Countries and Holland.
  - Positive interactions with European Investment Bank
- **Host countries and management feel optimistic that we will be able to reach 85% threshold for commitments in order to begin construction in**

Organisation

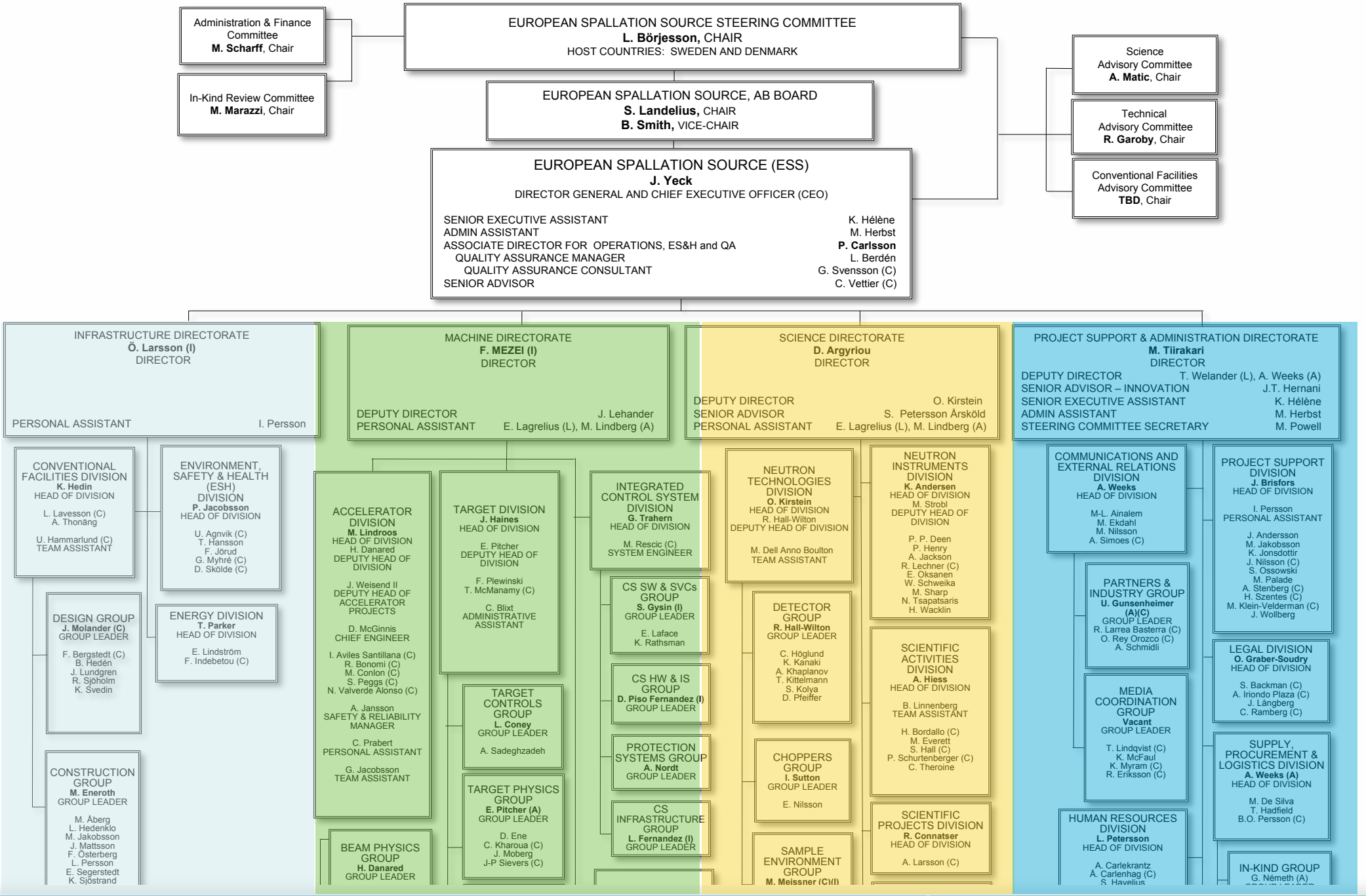
Largest European science project

EUROPEAN SPALLATION SOURCE



Sweden,
Denmark and Norway:
50% of construction
15-20% of operations

European partners:
50% of construction


Administration & Finance Committee
M. Scharff, Chair
In-Kind Review Committee
M. Marazzi, Chair
EUROPEAN SPALLATION SOURCE STEERING COMMITTEE
L. Börjesson, CHAIR
HOST COUNTRIES: SWEDEN AND DENMARK
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B. Smith, VICE-CHAIR
Science Advisory Committee
A. Matic, Chair
Technical Advisory Committee
R. Garoby, Chair
Conventional Facilities Advisory Committee
TBD, Chair
EUROPEAN SPALLATION SOURCE (ESS)
J. Yeck
DIRECTOR GENERAL AND CHIEF EXECUTIVE OFFICER (CEO)
SENIOR EXECUTIVE ASSISTANT K. Hélène
ADMIN ASSISTANT M. Herbst
ASSOCIATE DIRECTOR FOR OPERATIONS, ES&H and QA P. Carlsson
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QUALITY ASSURANCE CONSULTANT G. Svensson (C)
SENIOR ADVISOR C. Vettier (C)
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Ö. Larsson (I)
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A. Thonäng
U. Hammarlund (C)
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F. Jörud
G. Myhré (C)
D. Sköld (C)
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GROUP LEADER
F. Bergstedt (C)
B. Hedén
J. Lundgren
R. Sjöholm
K. Svedin
ENERGY DIVISION
T. Parker
HEAD OF DIVISION
E. Lindström
F. Indebetou (C)
CONSTRUCTION GROUP
M. Eneroth
GROUP LEADER
M. Åberg
L. Hedenklo
M. Jakobsson
J. Mattsson
F. Österberg
L. Persson
E. Segerstedt
K. Sjöstrand
MACHINE DIRECTORATE
F. MEZEI (I)
DIRECTOR
DEPUTY DIRECTOR J. Lehander
PERSONAL ASSISTANT E. Lagrelius (L), M. Lindberg (A)
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M. Lindroos
HEAD OF DIVISION
H. Danared
DEPUTY HEAD OF DIVISION
J. Weisend II
DEPUTY HEAD OF ACCELERATOR PROJECTS
D. McGinnis
CHIEF ENGINEER
I. Aviles Santillana (C)
R. Bonomi (C)
M. Conlon (C)
S. Peggs (C)
N. Valverde Alonso (C)
A. Jansson
SAFETY & RELIABILITY MANAGER
C. Prabert
PERSONAL ASSISTANT
G. Jacobsson
TEAM ASSISTANT
BEAM PHYSICS GROUP
H. Danared
GROUP LEADER
TARGET DIVISION
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HEAD OF DIVISION
E. Pitcher
DEPUTY HEAD OF DIVISION
F. Plewinski
T. McManamy (C)
C. Blixt
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TARGET CONTROLS GROUP
L. Coney
GROUP LEADER
A. Sadeghzadeh
TARGET PHYSICS GROUP
E. Pitcher (A)
GROUP LEADER
D. Ene
C. Kharoua (C)
J. Moberg
J-P Sievers (C)
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HEAD OF DIVISION
M. Rescic (C)
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CS SW & SVCs GROUP
S. Gysin (I)
GROUP LEADER
E. Laface
K. Rathsman
CS HW & IS GROUP
D. Piso Fernandez (I)
GROUP LEADER
PROTECTION SYSTEMS GROUP
A. Nordt
GROUP LEADER
CS INFRASTRUCTURE GROUP
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DEPUTY DIRECTOR O. Kirstein
SENIOR ADVISOR S. Petersson Årsköld
PERSONAL ASSISTANT E. Lagrelius (L), M. Lindberg (A)
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O. Kirstein
HEAD OF DIVISION
R. Hall-Wilton
DEPUTY HEAD OF DIVISION
M. Dell Anno Boulton
TEAM ASSISTANT
DETECTOR GROUP
R. Hall-Wilton
GROUP LEADER
C. Höglund
K. Kanaki
A. Khaplanov
T. Kittelmann
S. Kolya
D. Pfeiffer
CHOPPERS GROUP
I. Sutton
GROUP LEADER
E. Nilsson
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M. Meissner (C)(I)
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HEAD OF DIVISION
M. Strobl
DEPUTY HEAD OF DIVISION
P. P. Deen
P. Henry
A. Jackson
R. Lechner (C)
E. Oksanen
W. Schweika
M. Sharp
N. Tsapatsaris
H. Wacklin
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HEAD OF DIVISION
B. Linnenberg
TEAM ASSISTANT
H. Bordallo (C)
M. Everett
S. Hall (C)
P. Schurtenberger (C)
C. Theroine
SCIENTIFIC PROJECTS DIVISION
R. Connatser
HEAD OF DIVISION
A. Larsson (C)
PROJECT SUPPORT & ADMINISTRATION DIRECTORATE
M. Tiirakari
DIRECTOR
DEPUTY DIRECTOR T. Welander (L), A. Weeks (A)
SENIOR ADVISOR – INNOVATION J.T. Hernani
SENIOR EXECUTIVE ASSISTANT K. Hélène
ADMIN ASSISTANT M. Herbst
STEERING COMMITTEE SECRETARY M. Powell
COMMUNICATIONS AND EXTERNAL RELATIONS DIVISION
A. Weeks
HEAD OF DIVISION
M-L. Ainalem
M. Ekdahl
M. Nilsson
A. Simoes (C)
PARTNERS & INDUSTRY GROUP
U. Gunsenheimer (A)(C)
GROUP LEADER
R. Larrea Basterra (C)
O. Rey Orozco (C)
A. Schmidli
MEDIA COORDINATION GROUP
Vacant
GROUP LEADER
T. Lindqvist (C)
K. McFaul
K. Myram (C)
R. Eriksson (C)
HUMAN RESOURCES DIVISION
L. Petersson
HEAD OF DIVISION
A. Carlekrantz
A. Carlenhag (C)
S. Havelius
PROJECT SUPPORT DIVISION
J. Brisfors
HEAD OF DIVISION
I. Persson
PERSONAL ASSISTANT
J. Andersson
M. Jakobsson
K. Jonsdottir
J. Nilsson (C)
S. Ossowski
M. Palade
A. Stenberg (C)
H. Szentes (C)
M. Klein-Velderman (C)
J. Wollberg
LEGAL DIVISION
O. Graber-Soudry
HEAD OF DIVISION
S. Backman (C)
A. Iriondo Plaza (C)
J. Långberg
C. Ramberg (C)
SUPPLY, PROCUREMENT & LOGISTICS DIVISION
A. Weeks (A)
HEAD OF DIVISION
M. De Silva
T. Hadfield
B.O. Persson (C)
IN-KIND GROUP
G. Németh (A)

You are here !

Administration & Finance Committee
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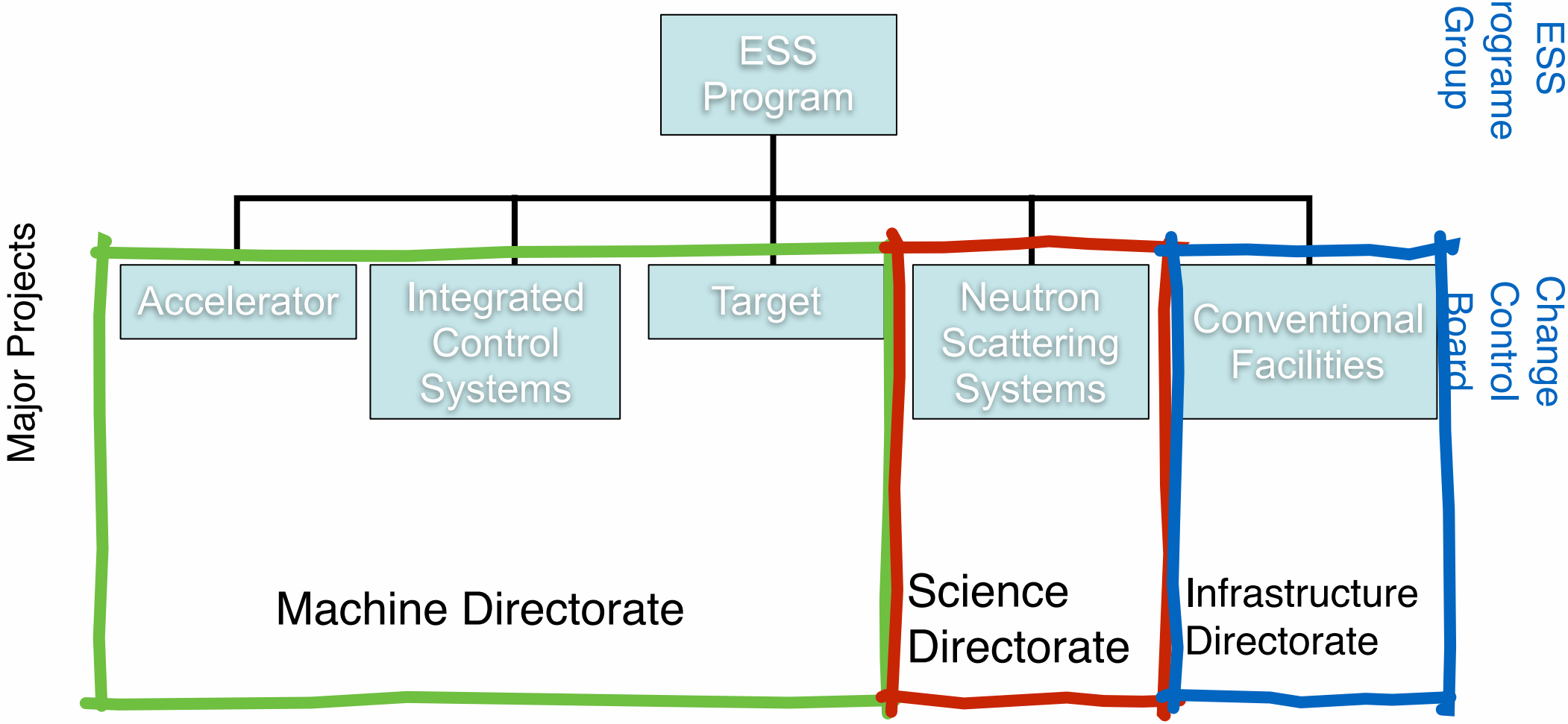
ESS Project Structure



Charge to Science Advisory Council

Terms of reference of the European Spallation Source Science Advisory Committee

Committee Charge

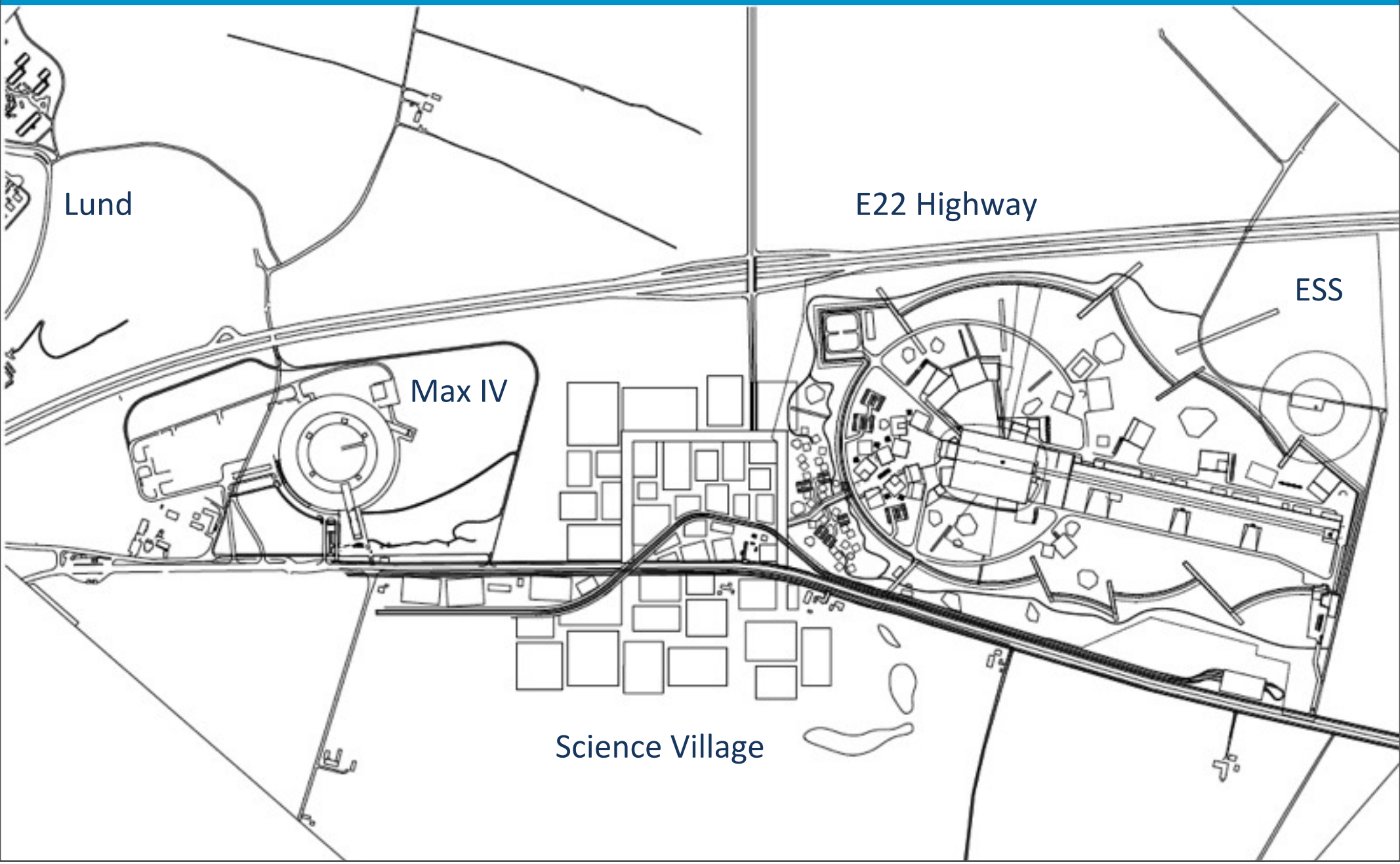
The Scientific Advisory Committee (SAC) will independently assess the scientific goals and the overall layout of the ESS as presented by ESS AB. The Science Advisory Committee (SAC) will advice on the scientific objectives and ensure that they are adhered to. It will provide independent advice, in particular, on all relevant scientific and technical issues related to the instrument suite and the desired characteristics of the neutron beams and the accelerator performance, as well as facilities for scientific support and the scientific operation of the facility.

SAC will monitor the costs for the construction and operation of ESS within it's area of expertise.

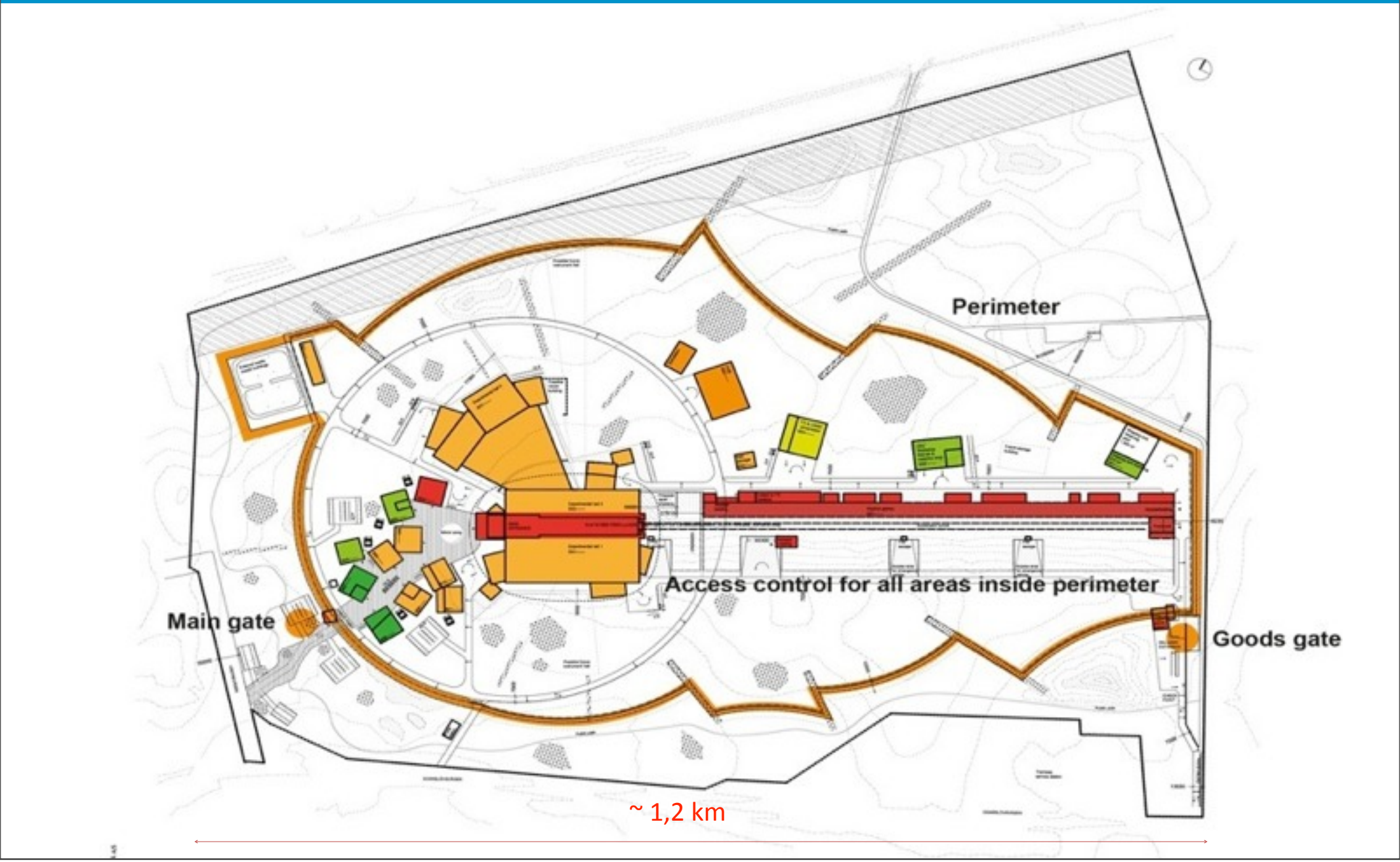
The SAC will advise ESS AB and report it's advise to the Steering Committee (STC).

Conventional Facilities

ESS is co-located with Max IV and Science Village in close proximity to Lund

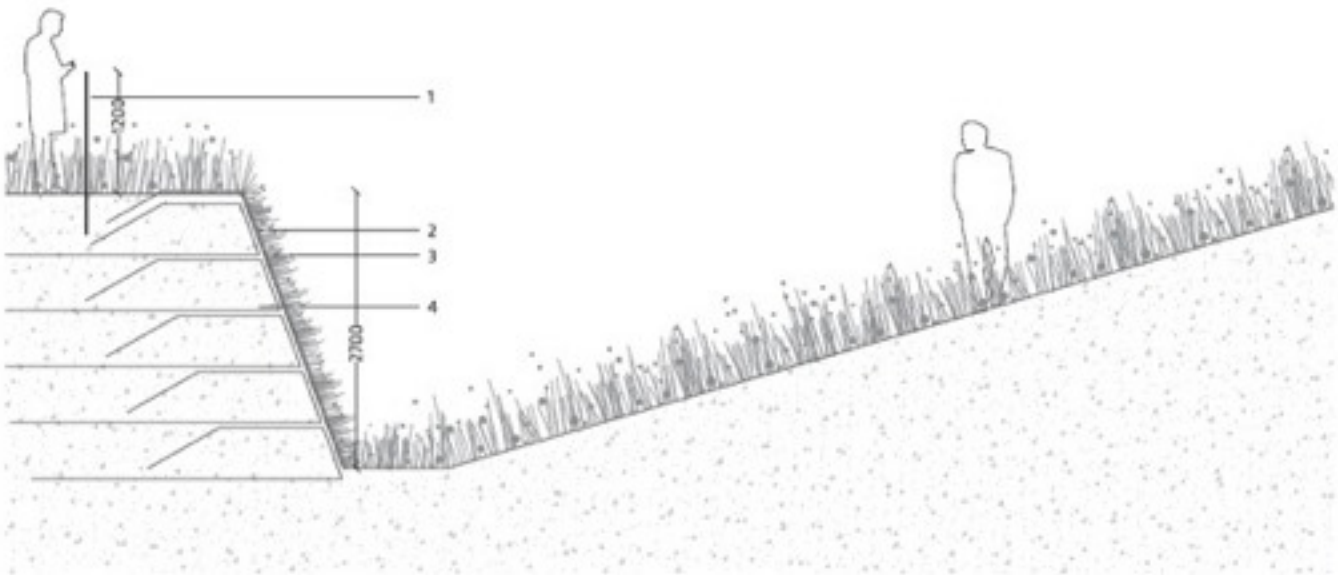


The ESS Site covers 75 hectares

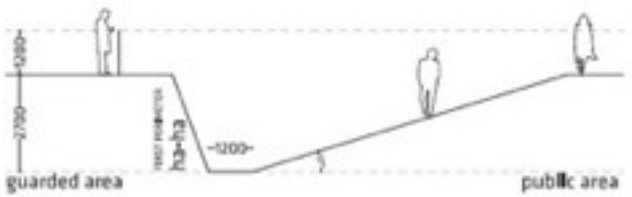


Perimeter detail 2013-10-25

C) 3.42 perimeter
ha-ha detail

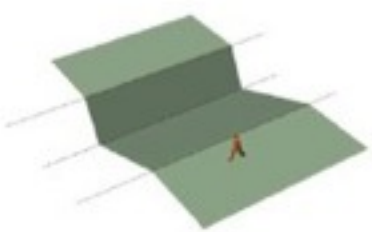


Ha-ha with green retaining wall
height: 2,7 m
wall slope: 70-80°



1 animal fence
2 erosion protection mat
3 geogrid
4 filled ground

cross section 1:50



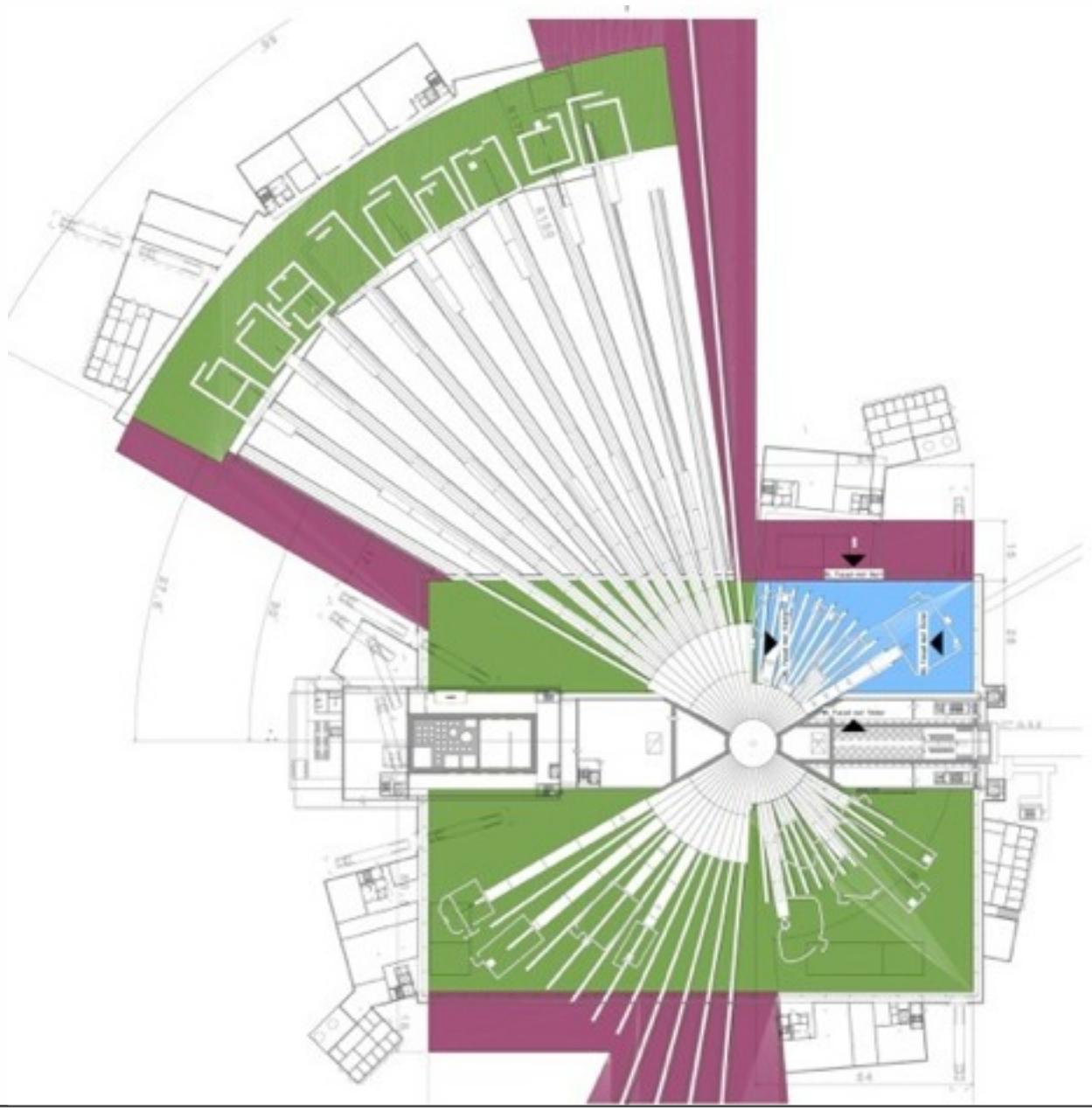
standard ha-ha

meeting between ha-ha and tree line

ha-ha with concrete or steel plates

access over ha-ha into the perimeter

Target and Instruments



Introduction to Science Directorate

Science Directorate

Dimitri Argyriou
Director for Science

Oliver Kirstein
Deputy and Project Lead

Sindra Petersson
Senior Advisor

Science and Technology Advisory Panels

Science Advisory Council

User support facilities, sample enviroment, scientific activities and community interactions

Data Management and Software Centre

Mark Hagen

Data management, analysis, visualisation and modelling

Scientific Activities Division

Arno Hiess

Instruments Technology Division

Oliver Kirstein

Choppers, detectors, electronics, shielding and neutron optics

Scientific Projects Division

Robert Connatser

instrument construction and upgrades projects

Instruments Division

Ken Andersen

Instrument Scientists, methods & techniques and scientific user support

Neutron Scattering Systems Project Scope

The scope:

Construct the 22 “public” instrument suite of ESS together with a technical and scientific support infrastructure that enables scientific excellence and high quality scientific user service with reliable and sustainable operations.

22 Instruments

+

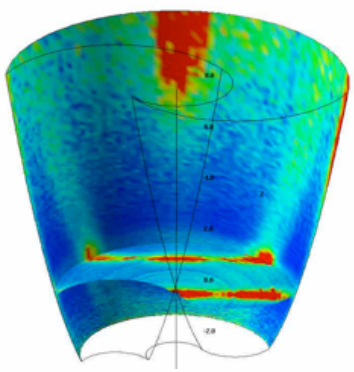
Sample Environment

+

Science Support Laboratories

+

Analysis and Visualisation Software



Pre-Construction Phase

Teams Around Europe are Exploring Novel Instrument Concepts for ESS

Manag. IC1	SANS IC2	Reflectometers IC3	Macromol. Diffraction IC4	Single Crystal Diffraction IC5	Powder Diffraction IC6	Materials Engin. Diffraction IC7	Imaging IC8	Direct Geom. Spectroscopy IC9	Indirect Geom Spectroscopy IC10	Spin-Echo IC11	Fundam. Physics IC12
	Conventional SANS Full DU for fast conv. ext. q-range SANS, SD004DE/ab	Reflectometer for liquid surfaces and soft matter Full DU for wide q and add-ons, SD083DE/a	Macromol. Diffractom. Full DU, potent. farm SD036ESS	Single Crystal Mag. Diffractom. Full DU SD060ESS	Bispectral Powder Diffractometer Full DU, wfm, gen. purp., SD005DE/a	Engineering Diffraction SPEED full DU plus prototyping tests, SD005DE/b	Multi-Purpose High-Res Imaging Full DU in close collab. with CH, dark-field, Bragg edge, polarized SD006DE	Cold Chopper Spectrometer Full DU, high res., RRM and pol. cap., SD081DE/a	Phase Space Transformers Full DU, incl. feasibility studies, focussing, SD087DE/a	High Resolution NSE Full DU, small sample, SD002DE/a	Fund. Physics Full DU Not covered
	Small-sample SANS Full DU SANS, SD094DE/c	Reflectometer for magnetic layers Full DU, focus. pol., SD003DE/b		Single Crystal Mag. Diffractom. Full DU French collaboration	Multi Purp. Extreme Environ.Diffr. Full DU, tests, SD008DE	CEED Full DU, tests, PM, SD033CZ	Larmor Label. Full DU, TOF DF imaging SD056NL	Bispectral Chopper Spectrometer Full DU, RRM pol., SD003DE/b	CAMEA Full DU plus tests and prototyping, SD018DC	Wide Angle NSE Full DU, SD002DE/b	UCN full DU Not covered
	Pol. SANS Full DU, incl. SE devices SD054NL	Vertical focusing reflectometer Full DU, SELENE „plus prototype tests, design full instrument, SD017DE/a			Hybrid Diffractometer potent. including SANS and imaging Full DU, SD019DC	Hi Flex. Mat. & Engin. Diff. Full DU, WFM, flex .res., SPEED, Fourier, POLDI SD059ESS	Multi-Purpose High-Res Imaging Full DU in close collab. GER, phase, fast, high res., SD029CH	Thermal Chopper Spectrometer Full DU, RRM and pol. cap. SD038ESS/a	Backscatt. Spectrometer Full DU, variable 1 to 20 micro eV resolution SD039ESS Danish in-kind	NRSE Resonant NSE, SD007DE/b	
	Compact SANS Full DU, incl. Monochr. mode, SD018DC	Horizontal focusing reflectometer Full DU, SELENE „plus prototype tests, design full instrument, SD017DE/b			Thermal Powder Diffr. Full DU, variable to high res. SD035ESS		Multi-Purpose High-Res Imaging TOF conceptual design SD040ESS	Cold Chopper Spectrometer Full DU, RRM and pol. cap. SD064ESS	Vibrational Spectrometer Full DU, SD061ESS, Italian collaboration	Focussing optics Full DU, SD007DE/c	
	Broadband SANS Full DU, SD062ESS	Freia Reflectometer Full DU, broad simultaneous q-range, SD034ESS			Pulsed Monochr. Powder Diffr. multi monochromators or chop.; concept. design SD037ESS			Crystal Monochr. Spectrometer Full DU Italian collaboration	Q – TAS Farm Full DU, SD062ESS Not covered		
	VSANS/ GSANS Full DU French collaboration	Spin-Echo label. in Pol. Reflectom. SD055NL			Larmor label. in diffr. (TOFLAR) SD057NL						
Simulation software development, general simulations, supporting GER simulations, VITESS SD015DE											
General simulations, in-house supporting simulations, interface moderator-beam extraction, McStas SD022DK											

EUROPEAN SPALLATION SOURCE

SAC Orientation

Dimitri Argyriou

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	Small-sample SANS Full DU SANS, SD094DE/c	Reflectometer for magnetic layers Full DU, focus. pol., SD003DE/b		Single Crystal Mag. Diffractom. Full DU French collaboration	Multi Purp. Extreme Environ.Diffr. Full DU, tests, SD008DE	CEED Full DU, tests, PM, SD033CZ	Larmor Label. Full DU, TOF DF imaging SD056NL	Bispectral Chopper Spectrometer Full DU, RRM pol., SD003DE/b	CAMEA Full DU plus tests and prototyping, SD018DC	Wide Angle NSE Full DU, SD002DE/b	UCN full DU Not covered
	Pol. SANS Full DU, incl. SE devices SD054NL	Vertical focusing reflectometer Full DU, SELENE „plus prototype tests, design full instrument, SD017DC/a			Hybrid Diffractometer potent. including SANS and imaging Full DU, SD019DC	Hi Flex. Mat. & Engin. Diff. Full DU, WFM, flex .res., SPEED, Fourier, POLDI SD059ESS	Multi-Purpose High-Res Imaging Full DU in close collab. GER, phase, fast, high res., SD029CH	Thermal Chopper Spectrometer Full DU, RRM and pol. cap. SD038ESS/a	Backscatt. Spectrometer Full DU, variable 1 to 20 micro eV resolution SD039ESS Danish In-kind	NRSE Resonant NSE, SD007DE/b	
	Compact SANS Full DU, incl. Monochr. mode, SD018DC	Horizontal focusing reflectometer Full DU, SELENE „plus prototype tests, design full instrument, SD017DC/b			Thermal Powder Diffr. Full DU, variable to high res. SD035ESS		Multi-Purpose High-Res Imaging TOF conceptual design SD040ESS	Cold Chopper Spectrometer Full DU, RRM and pol. cap. SD064ESS	Vibrational Spectrometer Full DU, SD061ESS, Italian collaboration	Focussing optics Full DU, SD007DE/c	
	Broadband SANS Full DU, SD062ESS	Freia Reflectometer Full DU, broad simultaneous q-range, SD034ESS			Pulsed Monochr. Powder Diffr. multi monochromators or chop.; concept. design SD037ESS			Crystal Monochr. Spectrometer Full DU Italian collaboration	Q – TAS Farm Full DU, SD062ESS Not covered		
	VSANS/ GSANS Full DU French collaboration	Spin-Echo label. in Pol. Reflectom. SD055NL			Larmor label. in diffr. (TOFLAR) SD057NL						
Simulation software development, general simulations, supporting GER simulations, VITESS SD015DE											
General simulations, in-house supporting simulations, interface moderator-beam extraction, McStas SD022DK											

Pre-Construction Phase

Teams Around Europe are Exploring Novel Instrument Concepts for ESS

Manag. IC1	SANS IC2	Reflectometers IC3	Macromol. Diffraction IC4	Single Crystal Diffraction IC5	Powder Diffraction IC6	Materials Engin. Diffraction IC7	Imaging IC8	Direct Geom. Spectroscopy IC9	Indirect Geom Spectroscopy IC10	Spin-Echo IC11	Fundam. Physics IC12
	Conventional SANS Full DU for fast conv. ext. q-range SANS, SD004DE/ab	Reflectometer for liquid surfaces and soft matter Full DU for wide q and add-ons, SD083DE/a	Macromol. Diffractom. Full DU, potent. farm SD036ESS	Single Crystal Mag. Diffractom. Full DU SD060ESS	Bispectral Powder Diffractometer Full DU, wlm, gen. purp., SD005DE/a	Engineering Diffraction SPEED full DU plus prototyping tests, SD005DE/b	Multi-Purpose High-Res Imaging Full DU in close collab. with CH, dark-field, Bragg edge, polarized SD006DE	Cold Chopper Spectrometer Full DU, high res., RRM and pol. cap., SD001DE/a	Phase Space Transformers Full DU, incl. feasibility studies, focussing, SD087DE/a	High Resolution NSE Full DU, small sample, SD002DE/a	Fund. Physics Full DU Not covered
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	Pol. SANS Full DU, incl. SE devices SD054NL	Vertical focusing reflectometer Full DU, SELENE „plus prototype tests, design full instrument, SD017DC/a			Hybrid Diffractometer potent. including SANS and imaging Full DU, SD019DC	Hi Flex. Mat. & Engin. Diff. Full DU, WPM, flex .res., SPEED, Fourier, POLDI SD059ESS	Multi-Purpose High-Res Imaging Full DU in close collab. GER, phase, fast, high res., SD029CH	Thermal Chopper Spectrometer Full DU, RRM and pol. cap. SD038ESS/a	Backscatt. Spectrometer Full DU, variable 1 to 20 micro eV resolution SD039ESS Danish In-kind	NRSE Resonant NSE, SD007DE/b	
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	Broadband SANS Full DU, SD062ESS	Freia Reflectometer Full DU, broad simultaneous q-range, SD03HESS			Pulsed Monochr. Powder Diffr. multi monochromators or chop.; concept. design SD037ESS			Crystal Monochr. Spectrometer Full DU Italian collaboration	Q – TAS Farm Full DU, SD062ESS Not covered		
	VSANS/ GSANS Full DU French collaboration	Spin-Echo label. in Pol. Reflectom. SD055NL			Larmor label. in diffr. (TOFLAR) SD057NL						

Simulation software development, general simulations, supporting GER simulations, VITESS SD015DE

General simulations, in-house supporting simulations, interface moderator-beam extraction, McStas SD022DK

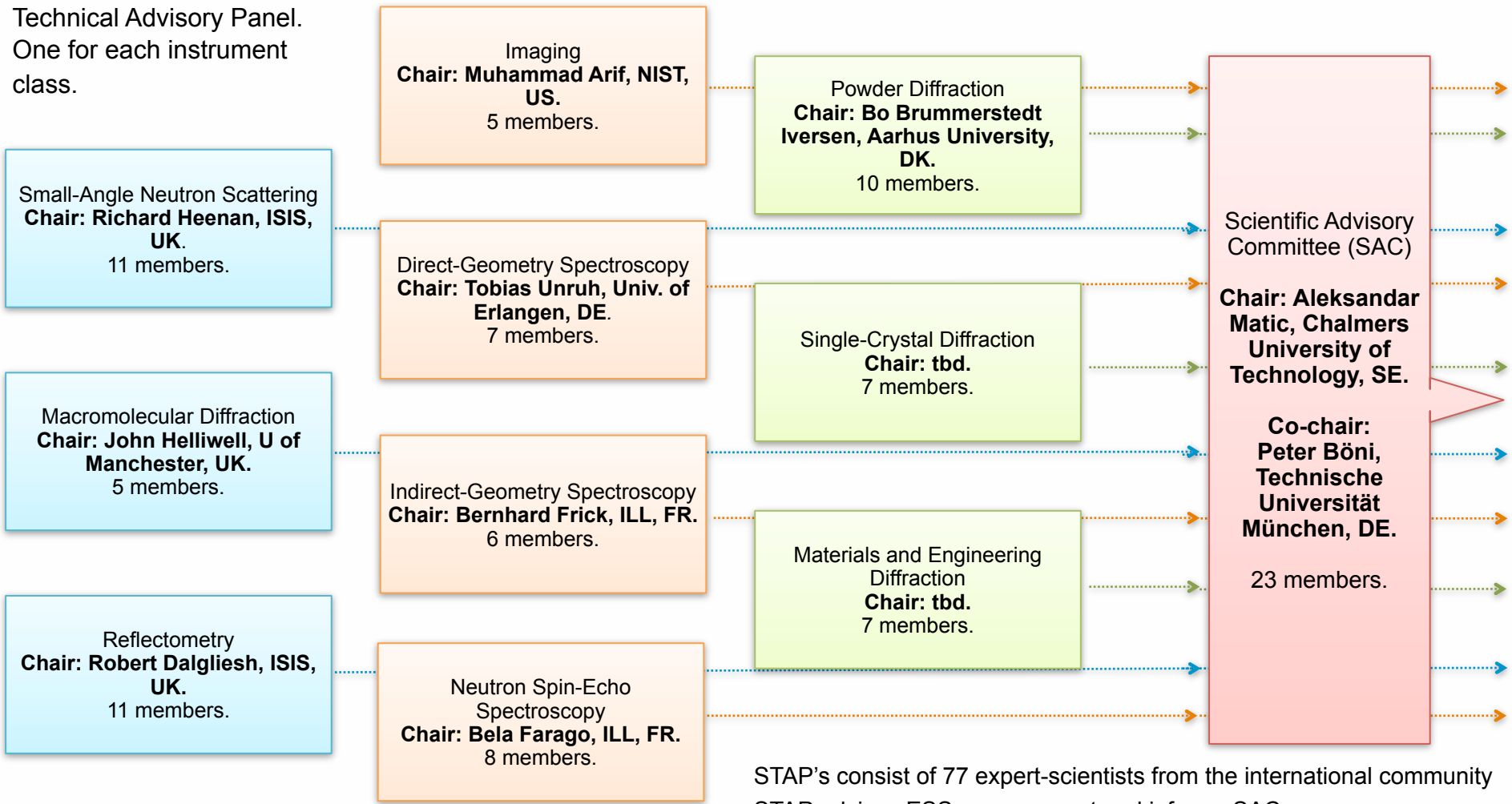
EUROPEAN SPALLATION SOURCE

SAC Orientation

Dimitri Argyriou

The Community Advises ESS on Instruments through the STAPs and SAC

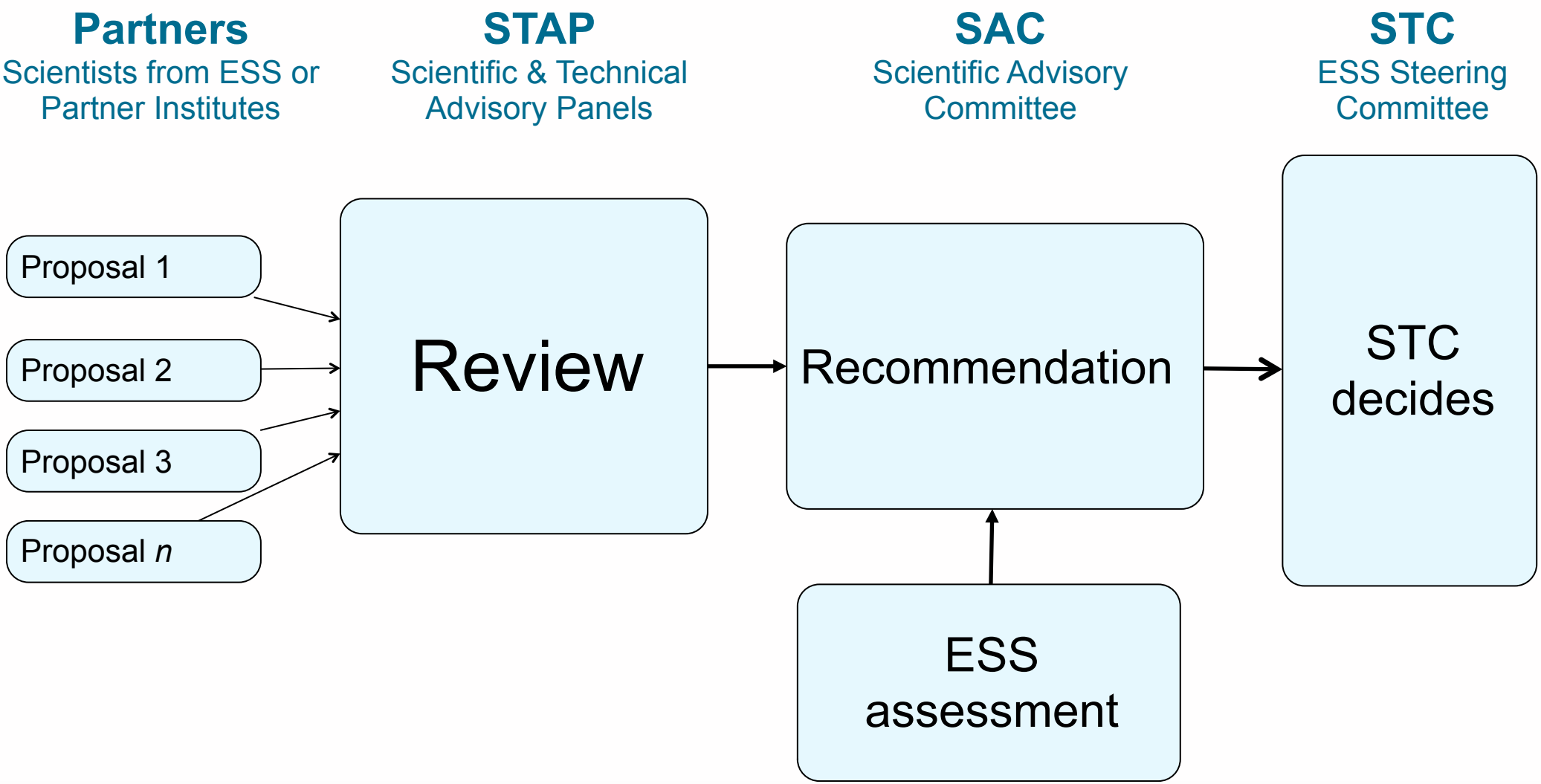
STAP: Scientific and Technical Advisory Panel. One for each instrument class.



STAP's consist of 77 expert-scientists from the international community
STAP advises ESS management and informs SAC.
SAC advises ESS management, who proposes to STC.

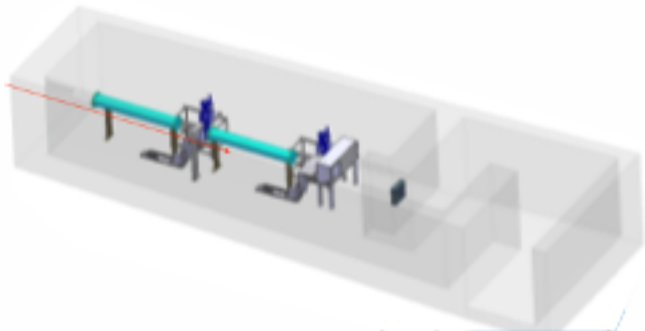
Europe's Spallation Source

From Idea to Construction via an Open Process

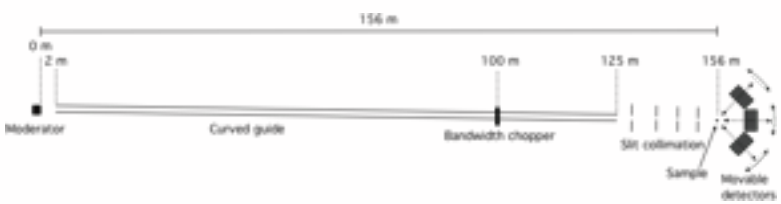


First Instruments Selected

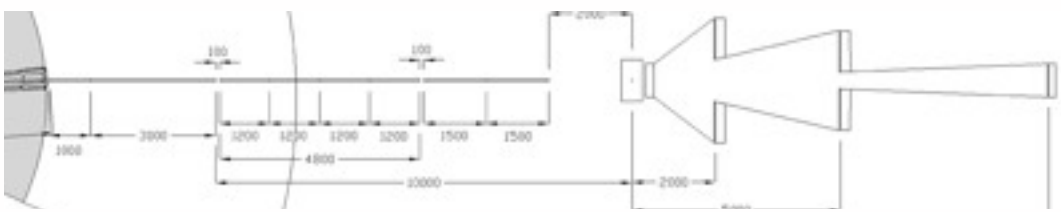
ODIN - Optical and Diffraction Imaging with Neutrons



NMX Macromolecular Diffractometer



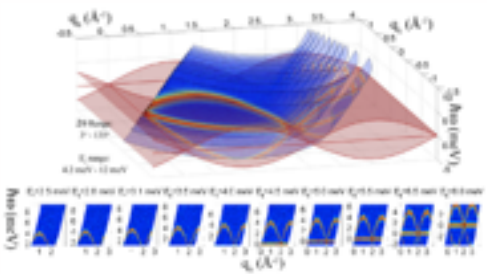
LoKI - A Broad-Band SANS Instrument



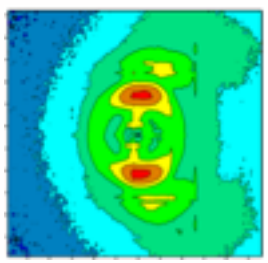
Geo & engineering
Heritage
Magnetism
Soft matter
Life science
Chemistry

16 Instrument Concepts were Presented at IKON5

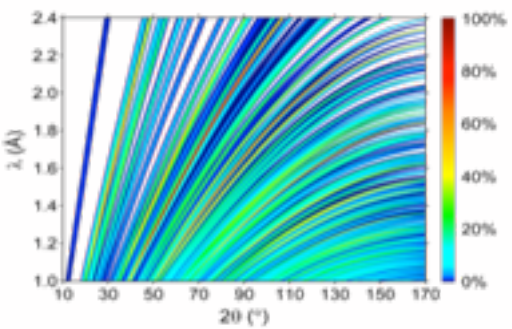
Spectroscopy



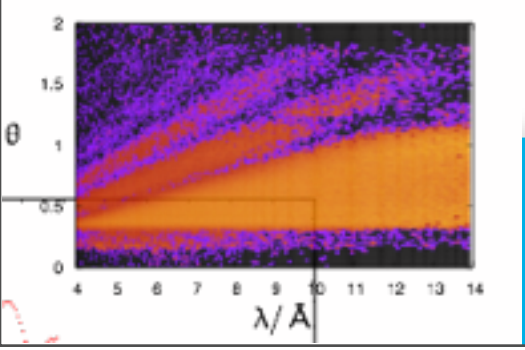
SANS



Diffraction



Reflectometry

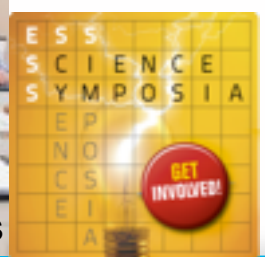


VOR		Wide Bandwidth Spectrometer
T-REX		Bi-Spectral Spectrometer
ESS-CCS		Cold Chopper Spectrometer
Tempus Fugit		Time-Focusing Spectrometer
CAMEA		Indirect Geometry Spectrometer
ESS-NSE		Spin Echo Spectrometer
SKADI		High Intensity SANS
Compact-SANS		SANS Biology & Materials Science
ESS-ENG		Engineering Diffractometer
MODI		Monochromatic Diffractometer
HEIMDAL		Thermal Powder Diffractometer
POWHOW		Bi-Spectral Powder Diffractometer
FREIA		Reflectometer for liquid interfaces
THOR		Horizontal Reflectometer
ESS-PAREF		Polarised Reflectometer
ESTIA		Focusing Reflectometer

Active Engagement with Community and Partners

Science

- 20 **Science Symposia** proposed by the community
- More than 400 people participating
- Real Input into the planning of ESS



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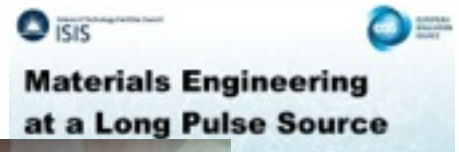

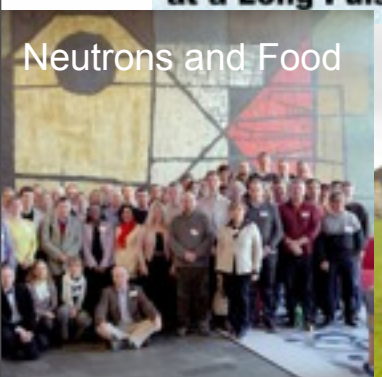

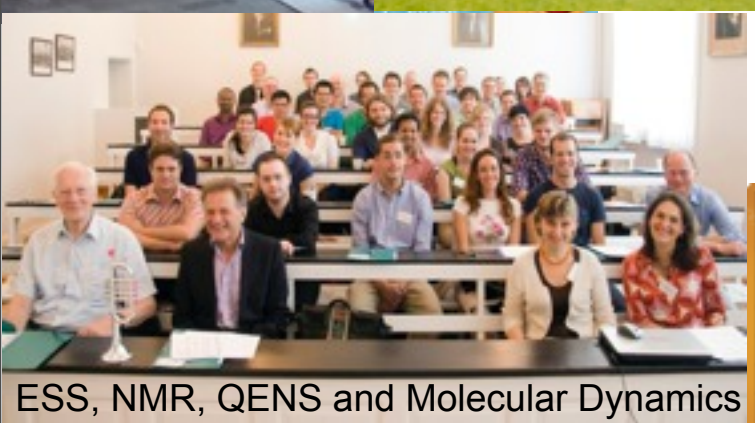

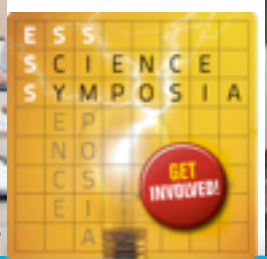

Instruments

- 5 **IKON** Collaboration meetings
- Regular attendance by as much as 160 partners every six months
- Instrument concepts, technologies, STAP mettings

Scenario for Transition of Instruments into User Program

Instrument	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Instrument 1													
Instrument 2													
Instrument 3													
Instrument 4													
Instrument 5													
Instrument 6													
Instrument 7													
Instrument 8													
Instrument 9													
Instrument 10													
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Instrument 13													
Instrument 14													
Instrument 15													
Instrument 16													
Instrument 17													
Instrument 18													
Instrument 19													
Instrument 20													
Instrument 21													
Instrument 22													

Start of Hot Commissioning/instrument

Start of Scientific User Program/instrument

Hot Commissioning/ Demonstration Experiments/Friendly Users

An Early Success Strategy for ESS Prioritisation

- ESS will be judged as a success or failure **early !**
- The first instruments need to:
  - Attract a wide user community.
  - Provide scientific impact.
  - Work as expected
  - High quality user service (Software, sample enviroment, science support)
- Prioritise the right instruments
- Prioritise the support for those instruments

Key Assumptions

- The NSS construction budget is set to 350 Mil €(2013-2025).
  - Budget is ring fenced
  - Inflation corrections will be applied through the construction phase
  - The construction budget is consistent with 16 instruments

- The NSS construction budget alone will not deliver the scope of 22 instruments.
  - Additional support and strategies to supplement the NSS construction investment that extended beyond the boundaries of the capped ESS construction budget.

- The average cost-book value of a “bare” instrument is 12.5 Mil Euro.
  - This price is an explicit price and does not include the additional value that ESS adds on each instruments. Eg. common shielding, ICS, software, instrument technology standards and support.

NSS budget allocation of 350M€

Instrument projects	188.7 M€
Number of instruments	**15 (16)**
Average cost (*)	10.5 M€

Instrument-build programme
Common bunker / shielding for up to 32 instruments

137,6 M€

Management & Administration	7.1 M€
Instrument Concepts	8.8 M€
Science Support Systems	24.3M€
DMSC	26.2 M€
Detector systems	39 M€
Chopper systems	12.1 M€
Neutron Optics & Shielding	8.7 M€
Electrical Engineering	11.4 M€

Administration, concept developments, and supporting scientific infrastructure

Technical platforms that provide added value to instruments by suite wide solutions, standardisation and support

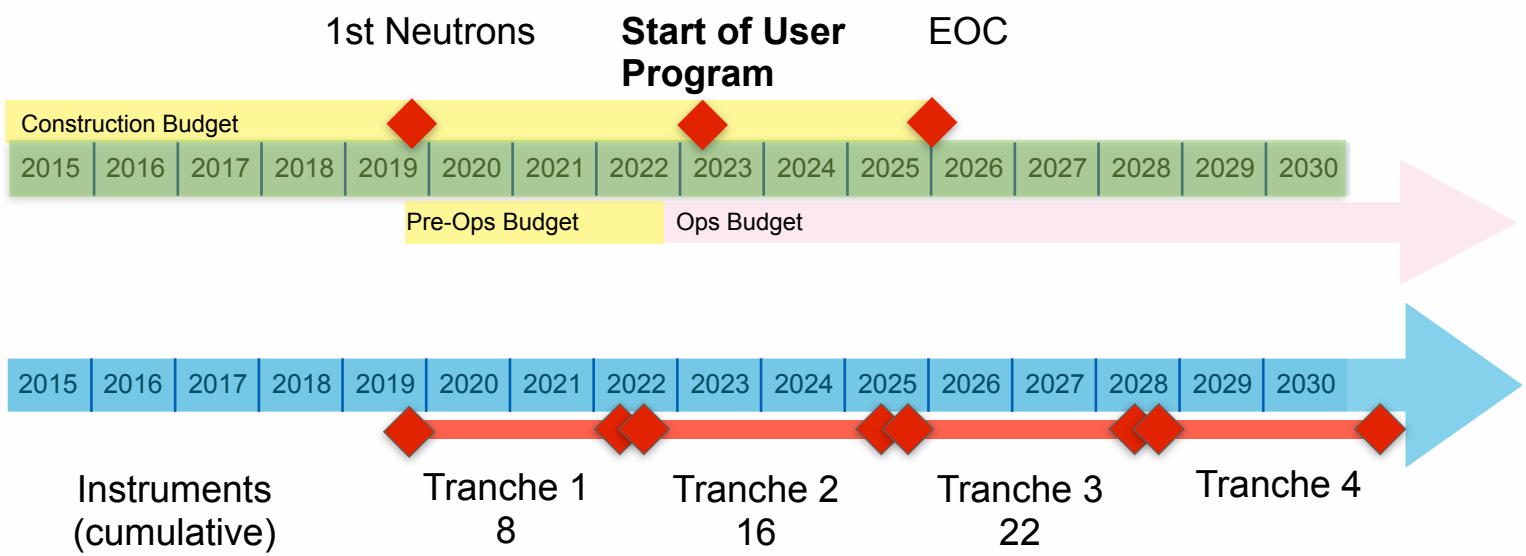
Contingency	15.7M€
Budget plug 2013	8M€
Total	**350 M€**

NSS Contingency

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 €

Key Risks and Mitigations for Science Programme

- Failure to engage or align the priorities of ESS with the priorities and needs of the user community
  - Extensive engagement programme bringing in community and partners in the design and choice of instruments and support facilities
- Construction partners disengagement / Construction partner focus on own interests and priorities / Partner Interfaces
  - Construct a framework of shared ownership of the science programme and bring partners as close as possible into the process of ESS
  - Establish “Resource Board” like structures to manage in-kind contribution between ESS, partners and funders.
  - Establish remote “Competency Centers” to ensure technical integration of partners
- Interfaces with Target and other parts of ESS are vital for Scientific Success
  - Improve and build better inter-directorate relationships and establish better management of interface-controls

Summary

- We are engaging with the community
  - IKON, Science Symposia, STAPs, Science and Scientists Meetings
  - Facility has wide support and interacts broadly with the community
  - Will offer quantum leap in performance opening up scientific new horizons
- We have a plan that delivers the TDR scope of 22 public instruments
  - Construction investments will deliver word-class instrument program
  - Additional investments, leveraged during construction and initial operations, will be used to realise the TDR scope
- We are positioning ESS to deliver the instrument program
  - Community is expecting ESS to lead and direct
  - Continuous engagement with the science community
  - Success is assured by working with our partners using the in-kind framework

EUROPEAN SPALLATION SOURCE

Instrument Concepts WP

Ken Andersen
Head of Neutron Instruments Division

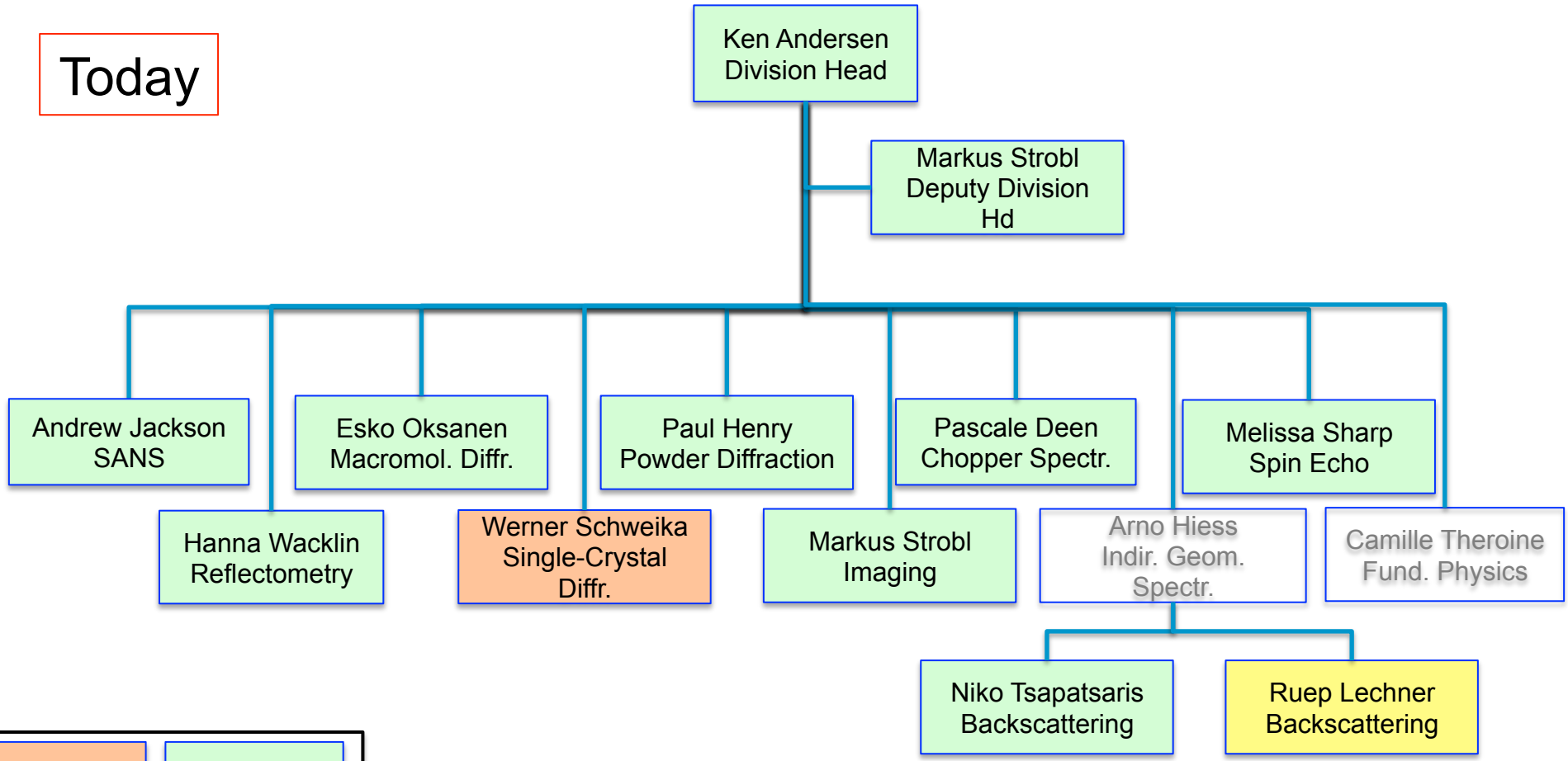
SAC Orientation Day
4 February 2014

Introduction

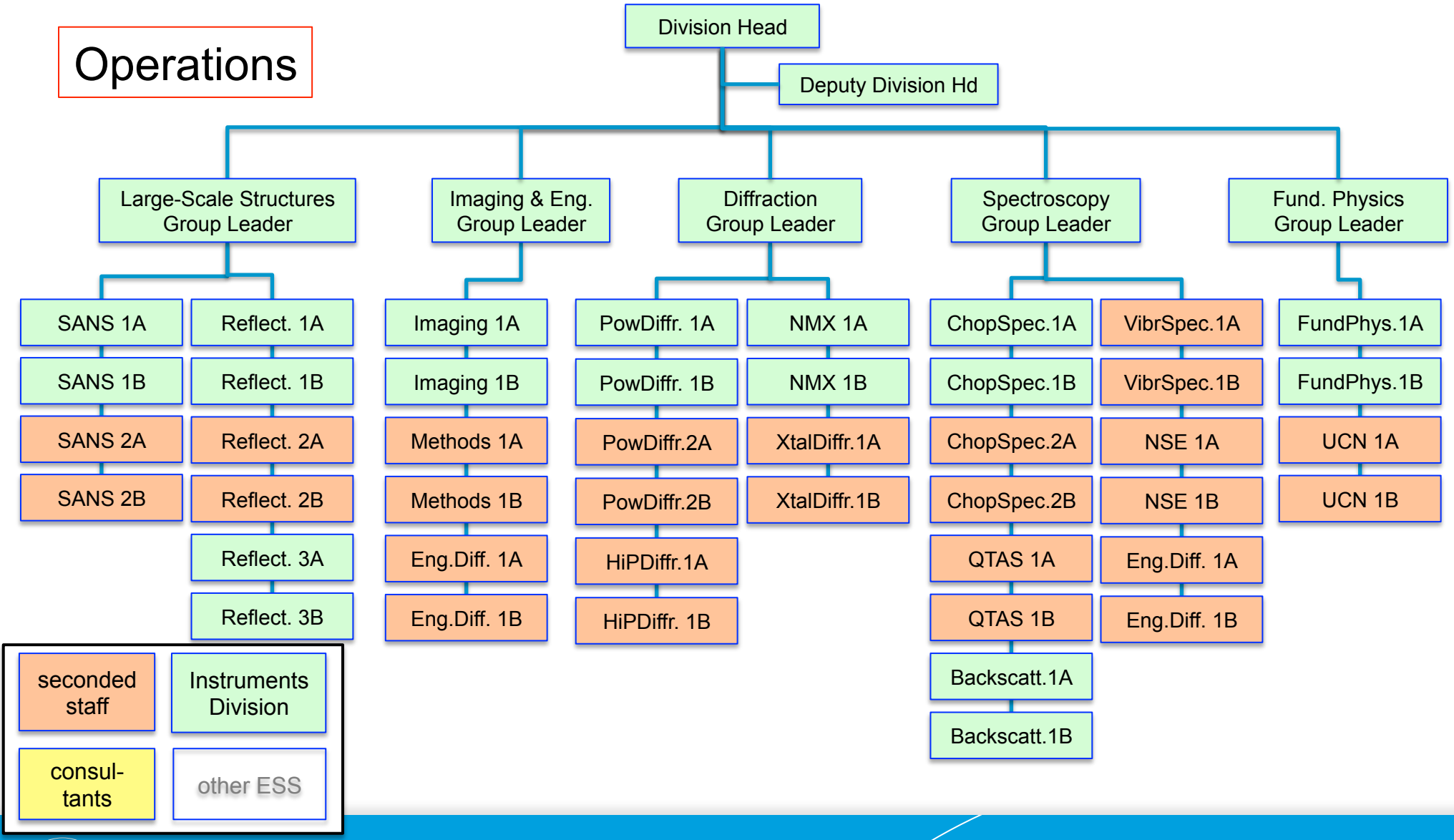
Ken Andersen

- 1988-1992 PhD in Physics on elementary excitations in superfluid ^{4}He from Keele University (UK) with ILL studentshi
- 1992-1994 Post-doc at KENS (Japan) on percolating antiferromagnets
- 1995-1999 ILL Instrument Scientist for D7 diffuse-scattering diffractometer with polarisation analysis
- 1999-2002 ISIS Instrument Scientist for OSIRIS backscattering spectrometer with powder diffraction
- 2002-2010 ILL Head of Neutron Optics Lab
- 2010: ESS Neutron Instruments Division Head, WP leader for the Instrument Concepts WP

Neutron Instruments Division Organization



Neutron Instruments Division Organization



Scope of Instrument Concepts Work Package

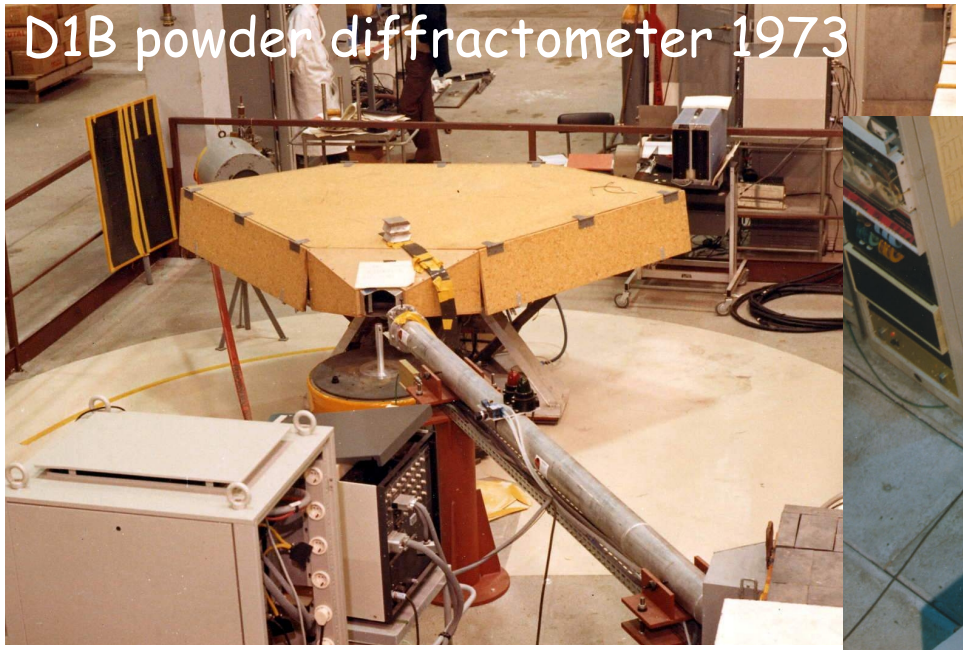
Top-level requirement:

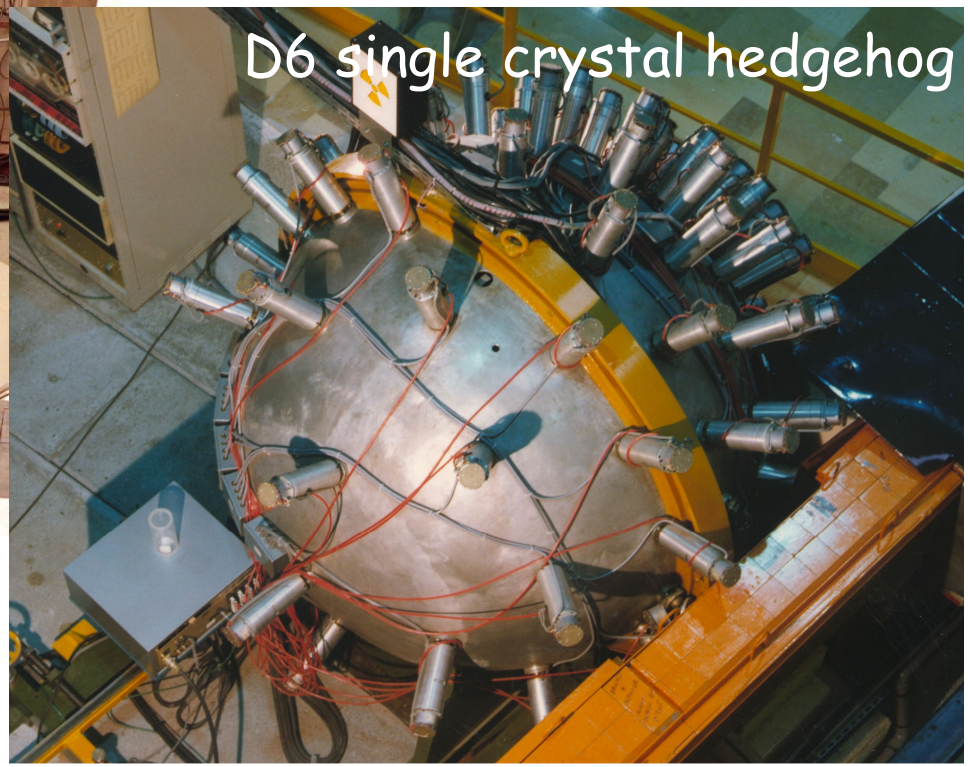
Deliver 22 instrument concepts, ready for construction

- Ensure the ESS instruments can deliver the science programme
  - optimized to provide world-leading performance
  - delivering instrument capabilities for a broad and topical science programme
  - taking full advantage of the long-pulse performance
- Develop and evaluate concepts
  - develop science case, concept and methods
  - management and coordination, e.g. IKON meetings
  - identify instrument opportunities and gaps in scientific capabilities
  - peer-review by Scientific and Technical Advisory Panels (STAPs)
  - annual submission of instrument construction proposals

Workhorses vs Hedgehogs

Workhorses vs Hedgehogs





Scope of Instrument Concepts WP

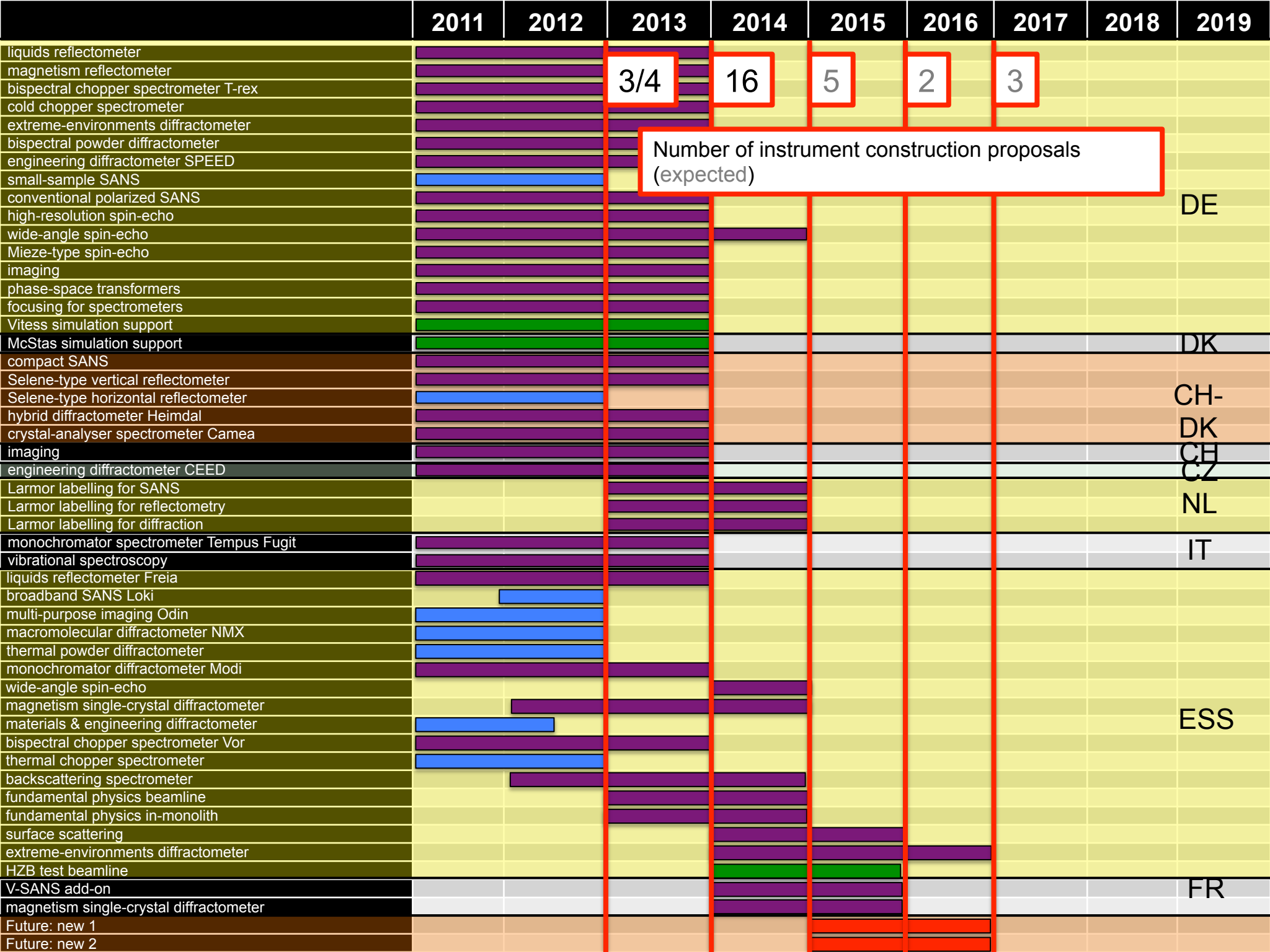
- Develop instrument concepts for 22 instruments
  - adapt present-day concepts to the ESS long pulse
  - evaluate crazy ideas
  - manage peer-review selection process
- Instrument Concepts WP
  - includes exploration of science cases
  - includes method development & instrument-specific prototyping
  - has sufficient resources to allow some concept developments to fail
  - minimise risks for instrument construction projects

Instrument Concepts Overview

SANS	Reflectometry	Macromolecular Crystallography	Single Crystal Diffraction	Powder Diffraction	Mat. & Engin. Diffraction	Imaging	Direct Geometry Spectroscopy	Indirect Geometry Spectroscopy	Spin Echo Spectroscopy	Fundamental & Particle Physics
Conventional SANS Skadi Full Instrument Design SD004DE/ab	Reflectometer for Liquid Surfaces and Soft Matter Thor Full Instrument Design SD003DE/a	Macromolecular Diffractometer Full Instrument Design SD036ESS	Magnetism Single Crystal Diffractom. Half Instrument Design SD060ESS	Bi-spectr. Powder Diffractometer PowHow Full Instrument Design SD005DE/b	Engineering Diffraction Half Instrument Design SD005DE/a	Multi Purp. HR Imaging 1/3 Instrument Design SD006DE	Cold Chopper Spectrom. C-SPEC Full Instrument Design SD001DE/a	Phase Space Transformers Instrument Add-on SD007DE/a	High Resolution Spin-Echo Essense Full Instrument Design SD002DE/a	Fundamental Physics Beamline Full Instrument Design SD069ESS
Small-sample SANS Design stopped SD004DE/c	Reflectometer for Magnetic Layers Full Instrument Design SD003DE/b		Magnetism Single Crystal Diffractom. Half Instrument Design SD066FR	Multi-Purpose Extreme Environ. Diffractometer Full Instrument Design SD008DE	CEED Half Instrument Design SD033CZ	Larmor Labelling in Imaging Instrument Add-on SD056NL	Bispectral Chopper Spectrometer VOR Full Instrument Design SD001DE/b	Crystal-Analys. Spectrometer CAMEA Full Instrument Design SD016DC	Wide Angle Spin-Echo Full Instrument Design SD002DE/b	Fundamental Physics In-Monolith Full Instrument Design SD069ESS
Larmor labelling in SANS Instrument Add-on SD054NL	Selene-Focusing Vertical Reflectom. Estia Full Instrument Design SD017DC/a			Hybrid Diffract. Heimdal Full Instrument Design SD019DC	Hi Flex. Mat. & Engin. Diff. Full Instrument Design SD059ESS	Multi Purp. HR Imaging 1/3 Instrument Design SD028CH	Bispectral Chopper Spectrom. T-REX Full Instrument Design SD064ESS	Backscattering Spectrometer Half Instrument Design SD039ESS	NRSE Full Instrument Design SD007DE/b	N-Nbar Oscillation Beamline Not covered
Compact SANS Full Instrument Design SD018DC	Selene-Focusing Horiz. Reflectom. Design stopped SD017DC/b			Thermal Powder Diffractometer Design stopped SD035ESS	Irradiation Beamline Not covered	Multi Purp. HR Imaging 1/3 Instrument Design SD040ESS	Crystal Monochrom. Spectrometer Tempus Fugit Full Instrument Design SD067IT	Backscattering Spectrometer Half Instrument Design SD068DK	Focusing Optics Instrument Add-on Full DU, SD007DE/c	Neutrino Physics Beamline Not covered
Broadband SANS Loki Full Instrument Design SD062ESS	Freia Horizontal Reflectometer Full Instrument Design SD034ESS			Pulsed Monochr. Powder Diffract. Modi Full Instrument Design SD037ESS			Versatile Multispectral TOF Spectrometer Full Instrument Design SD001/DE	Vibrational Spectrometer Full Instrument Design SD061IT		
VSANS/ GISANS Instrument Add-on SD065FR	Larmor Labelling in Reflectometry Instrument Add-on SD055NL			Larmor Label. in Diffr. (TOFLAR) Instrument Add-on SD057NL			Thermal Chopper Spectrometer Full Instrument Design SD038ESS/a	Q – TAS Farm Full Instrument Design SD062ESS Not covered		
Simulation software development, general simulations, supporting GER simulations, VITESS SD015DE										
General simulations, in-house supporting simulations, interface moderator-beam extraction, McStas SD022DK										

Blue = Stopped
Red = Not Covered

Yellow = Proposed 2013-14


2011
2012
2013
2014
2015
2016
2017
2018
2019
3/4
16
5
2
3
Number of instrument construction proposals
(expected)
liquids reflectometer
magnetism reflectometer
bispectral chopper spectrometer T-rex
cold chopper spectrometer
extreme-environments diffractometer
bispectral powder diffractometer
engineering diffractometer SPEED
small-sample SANS
conventional polarized SANS
high-resolution spin-echo
wide-angle spin-echo
Mieze-type spin-echo
imaging
phase-space transformers
focusing for spectrometers
Vitess simulation support
McStas simulation support
compact SANS
Selene-type vertical reflectometer
Selene-type horizontal reflectometer
hybrid diffractometer Heimdal
crystal-analyser spectrometer Camea
imaging
engineering diffractometer CEED
Larmor labelling for SANS
Larmor labelling for reflectometry
Larmor labelling for diffraction
monochromator spectrometer Tempus Fugit
vibrational spectroscopy
liquids reflectometer Freia
broadband SANS Loki
multi-purpose imaging Odin
macromolecular diffractometer NMX
thermal powder diffractometer
monochromator diffractometer Modi
wide-angle spin-echo
magnetism single-crystal diffractometer
materials & engineering diffractometer
bispectral chopper spectrometer Vor
thermal chopper spectrometer
backscattering spectrometer
fundamental physics beamline
fundamental physics in-monolith
surface scattering
extreme-environments diffractometer
HZB test beamline
V-SANS add-on
magnetism single-crystal diffractometer
Future: new 1
Future: new 2
DE
DK
CH-
DK
CH
CZ
NL
IT
ESS
FR

Science Support Systems

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www.europeanspallationsource.se

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Scope and Requirements

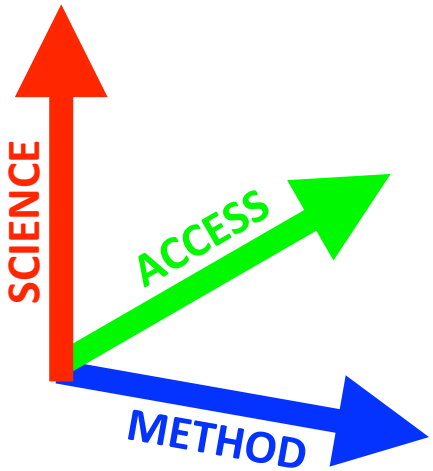
Science Support Systems

- Management Administration
- Science Coord. & User Office
- Sample Environment
- Laboratories and Facilities

ESS will provide experimental possibilities for **research** using **neutrons** to **users** from both academia and industry.

'**Scientific Support Systems**' will deliver the scientific and technical environment supporting the **needs for the user program**. Enabling **research** using **neutrons** adds value to the facility by providing

- '**scientific coordination & user office**'
- '**sample environment**' and
- '**support laboratories**'.



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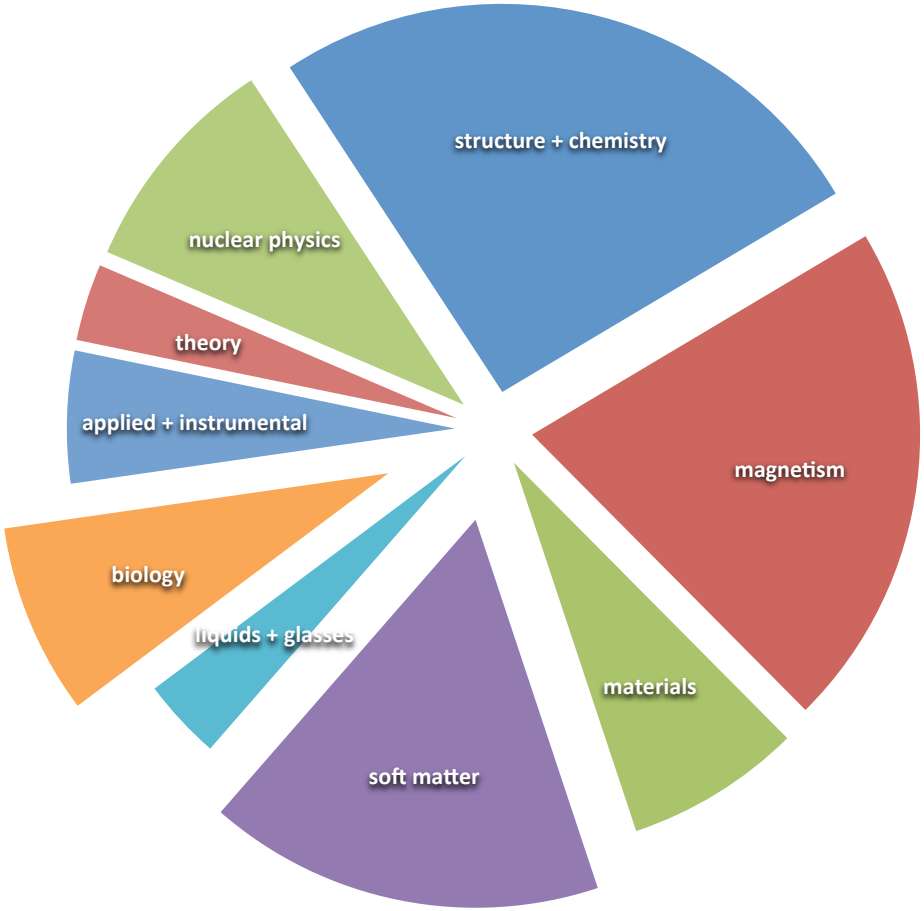

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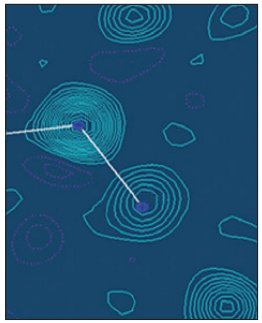

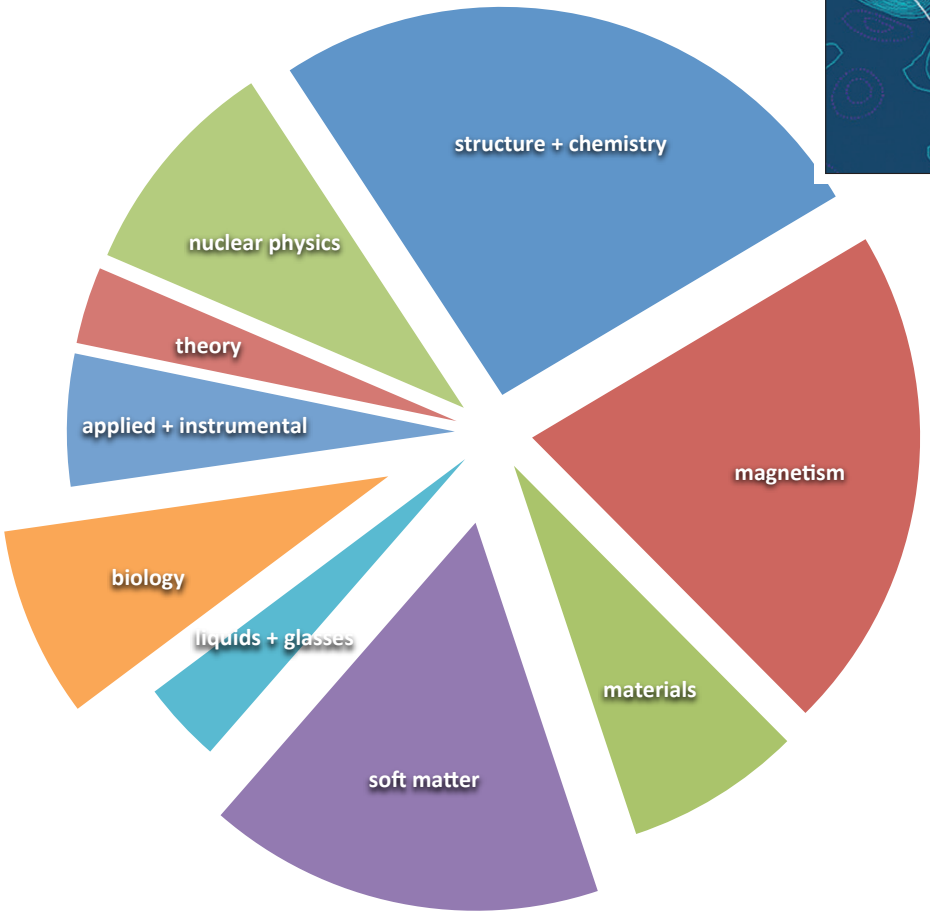

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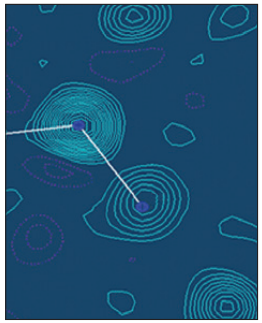

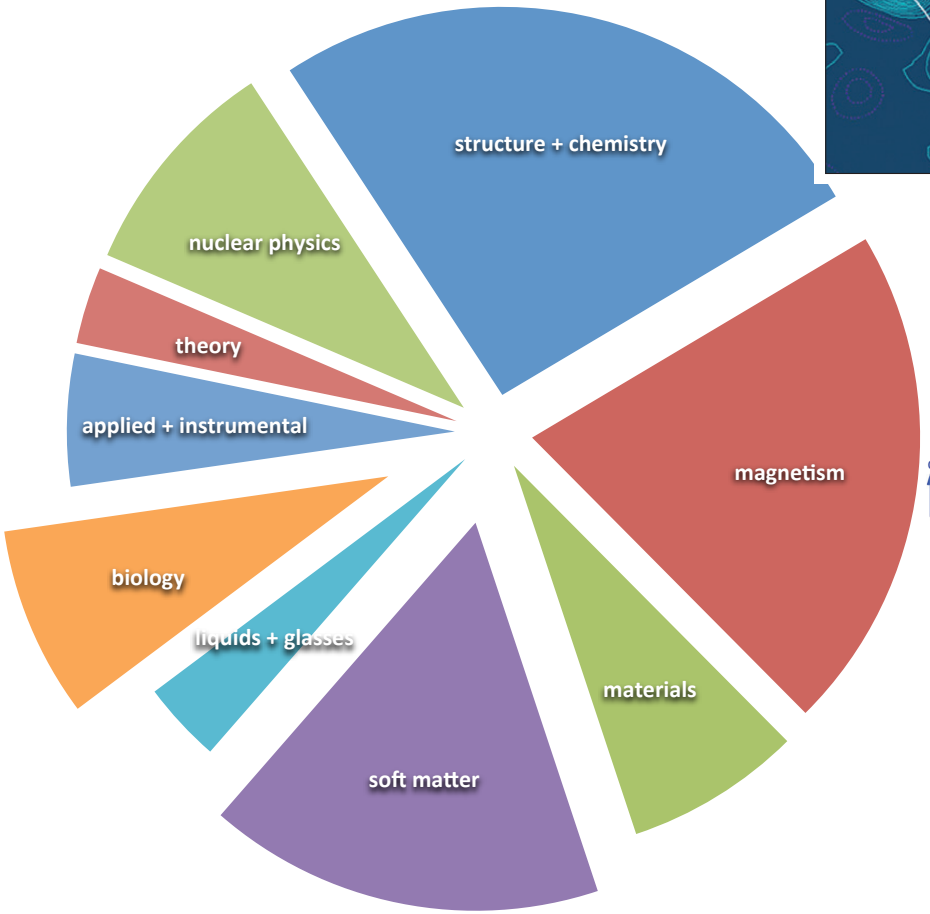

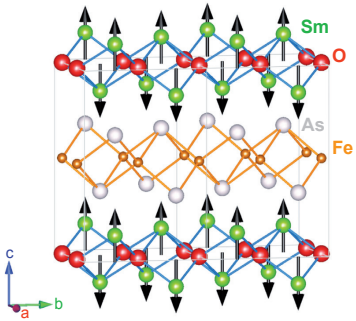

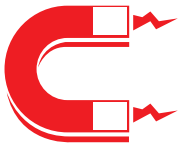

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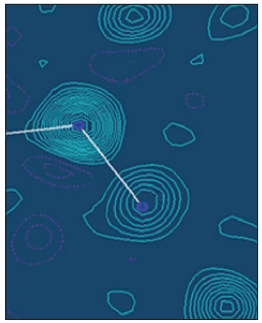

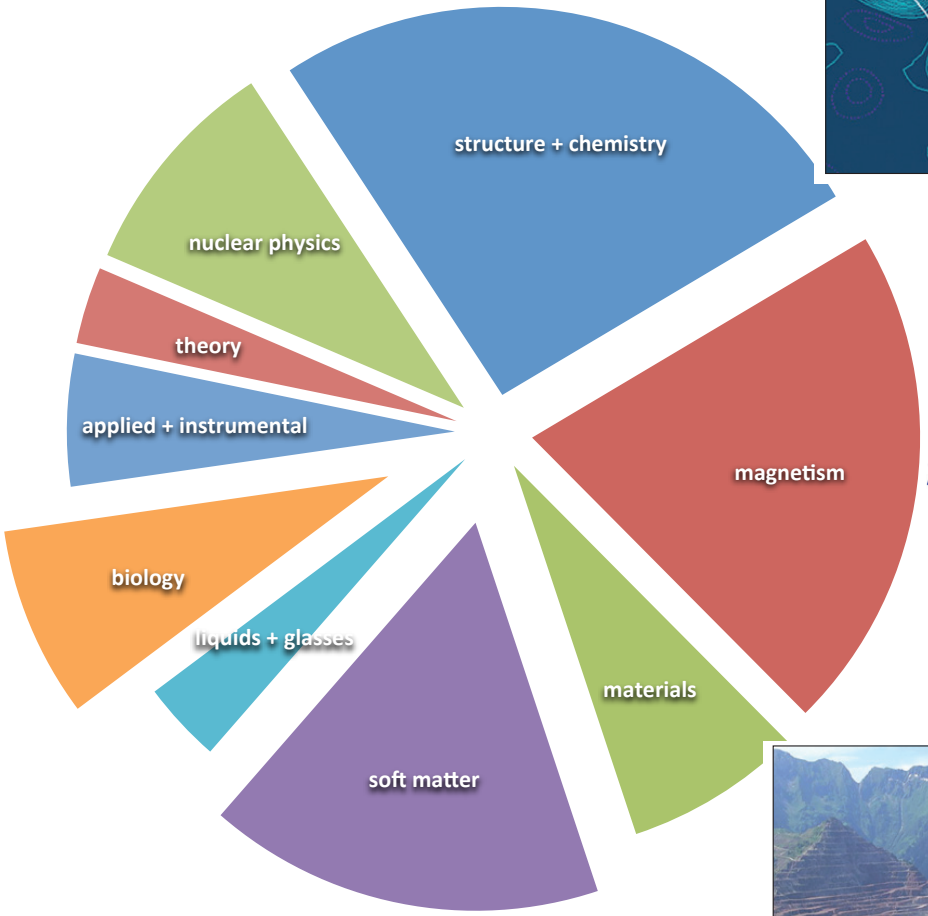

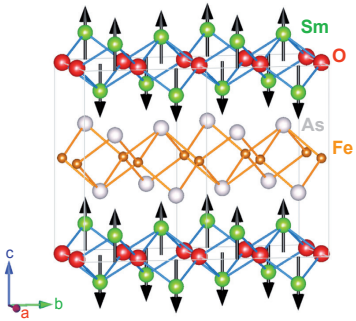

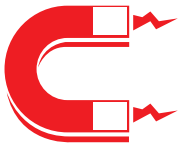

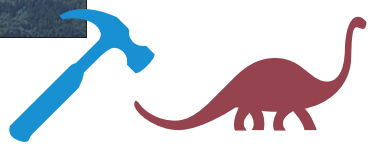

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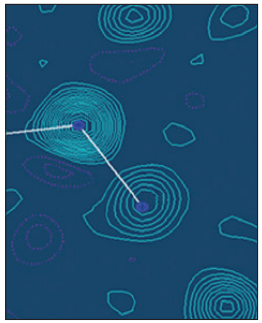

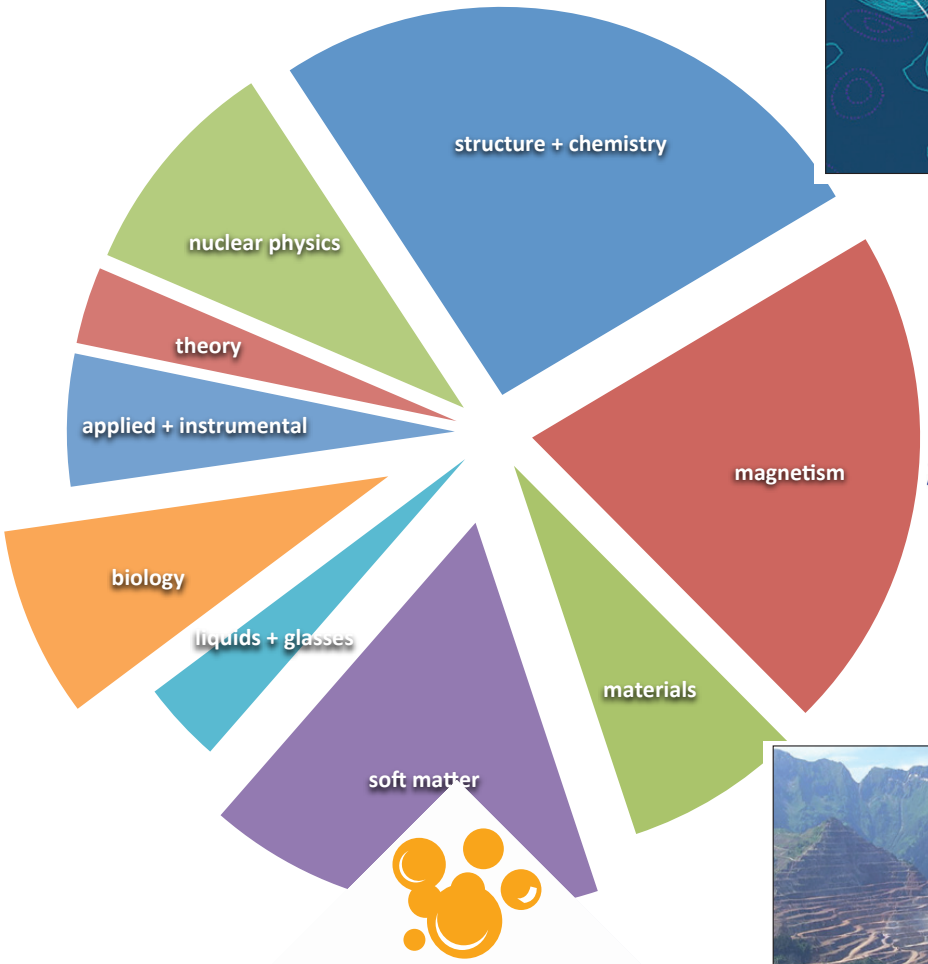

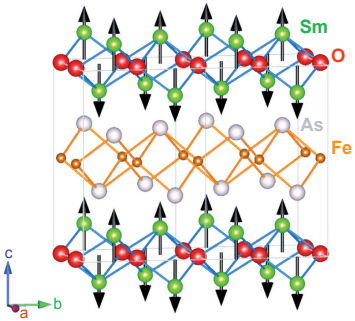

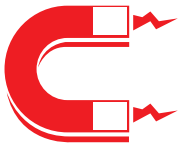

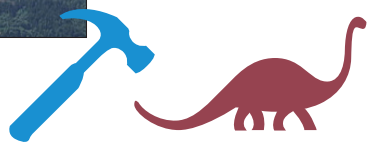

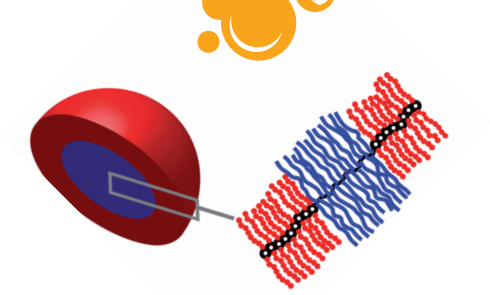

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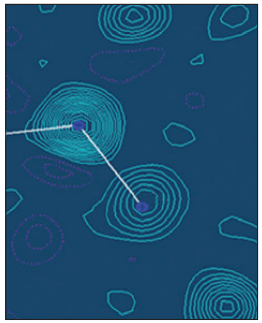

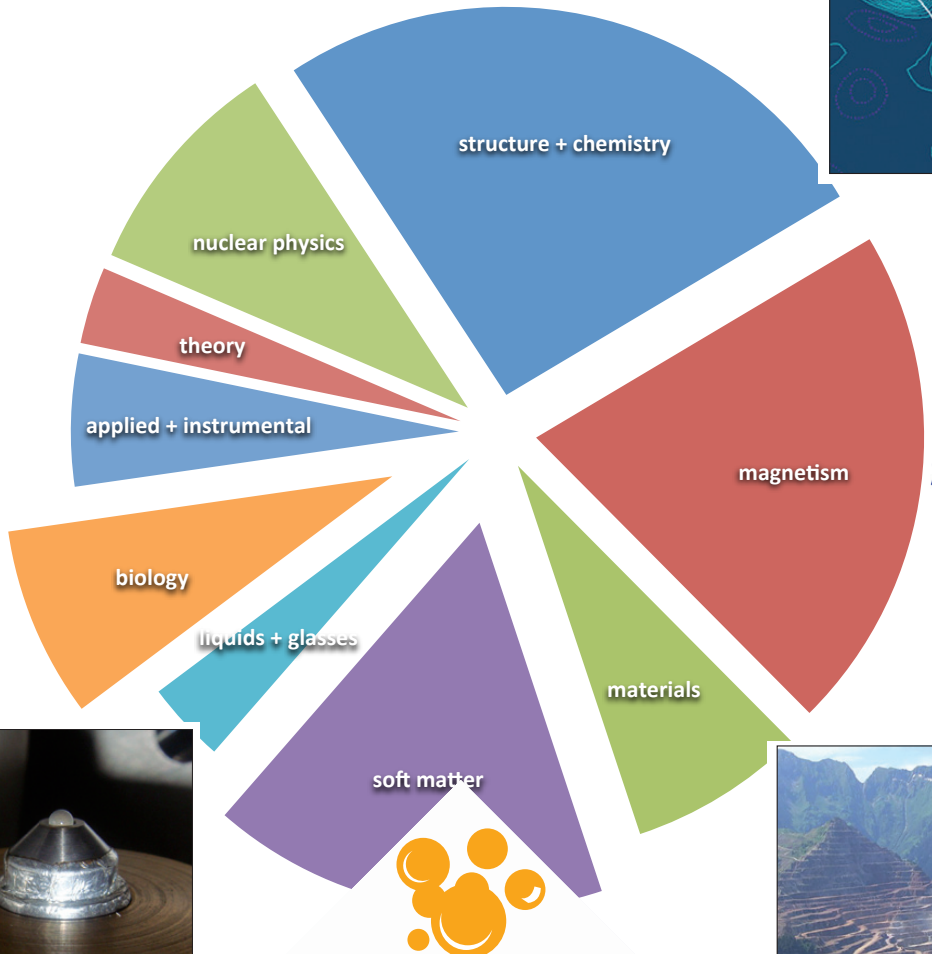

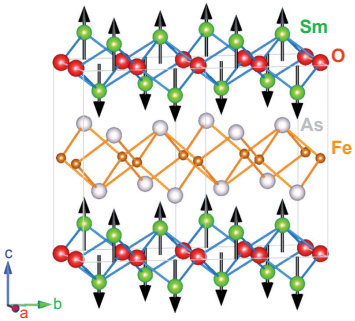

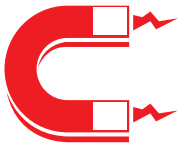

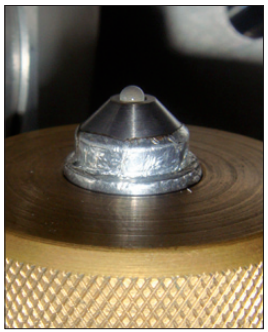

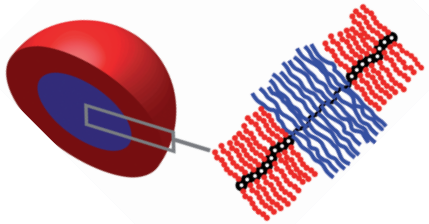

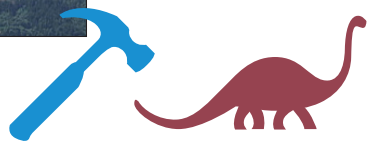

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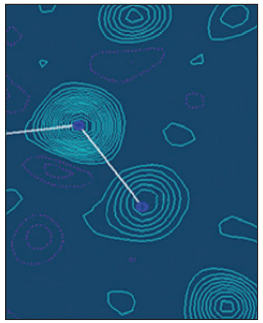

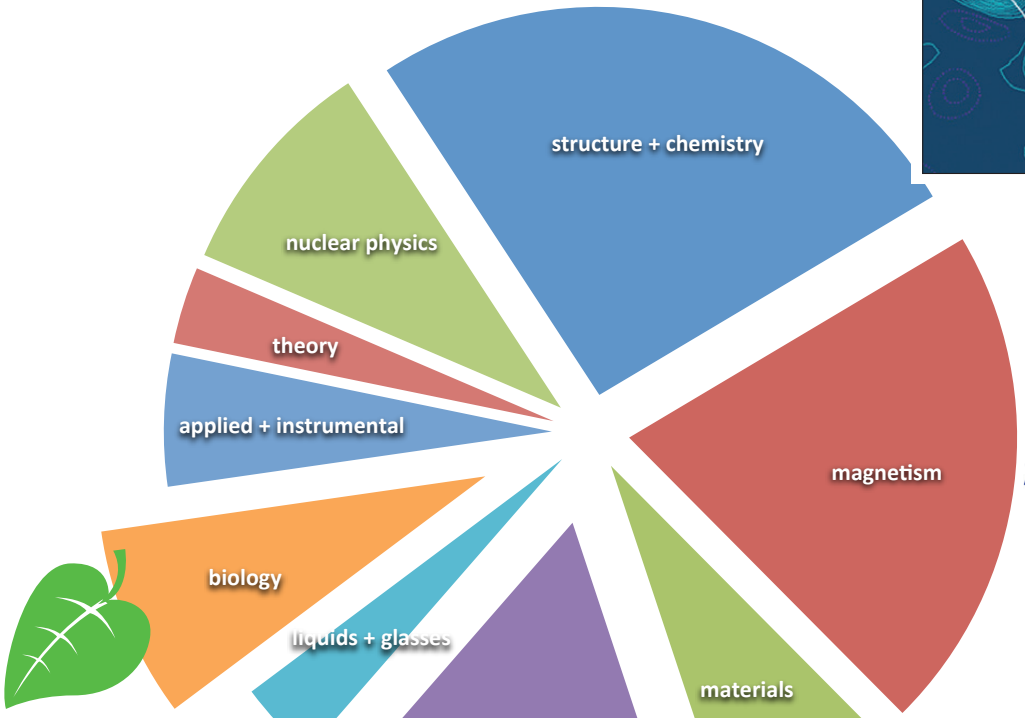

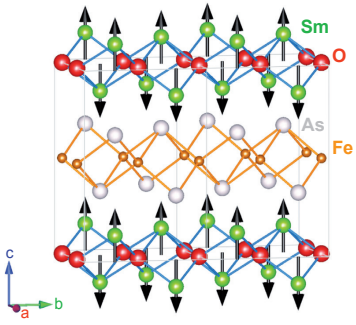

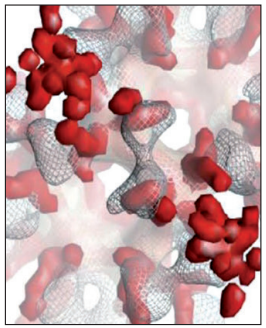

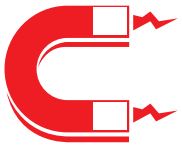

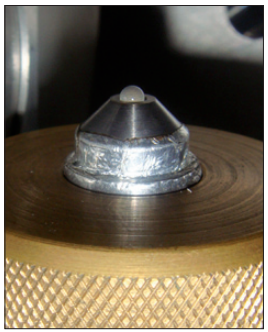

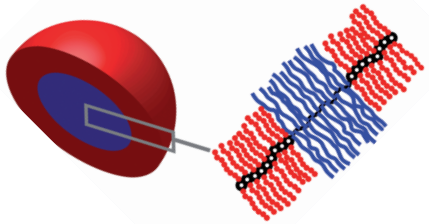

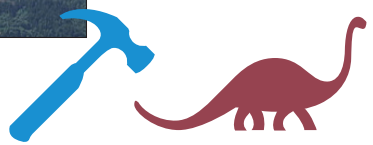

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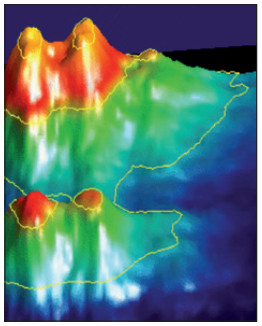

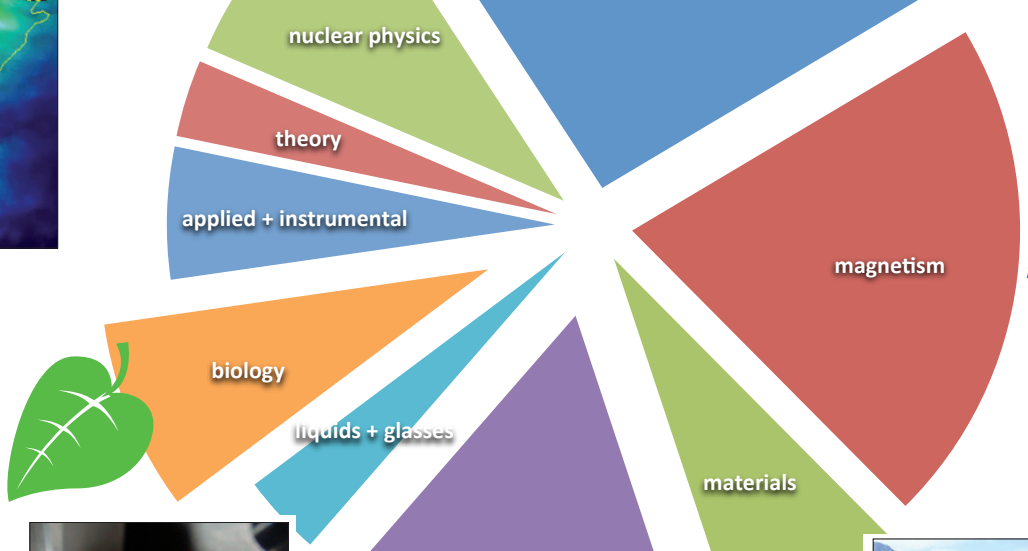

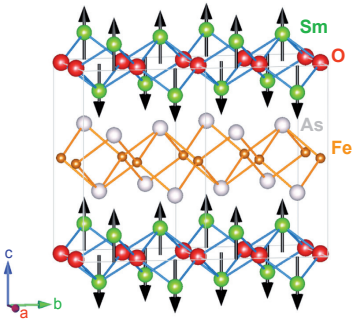

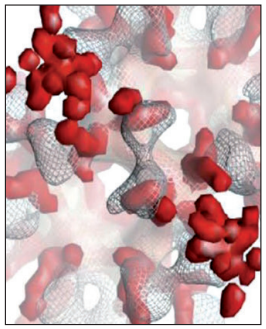

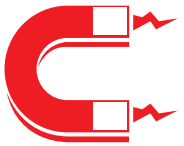

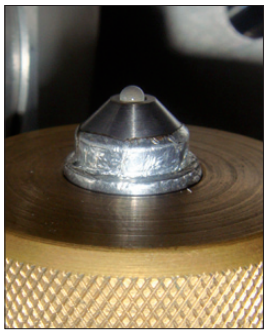

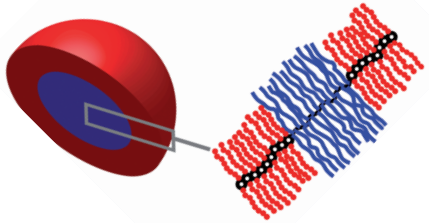

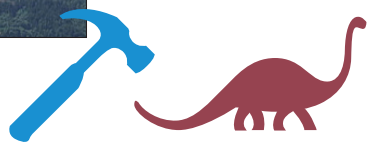

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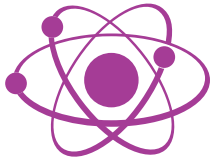

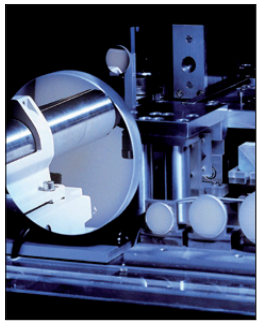

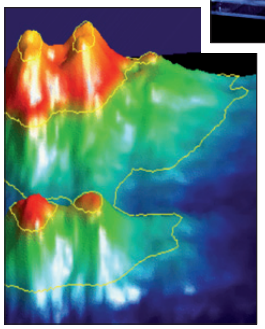

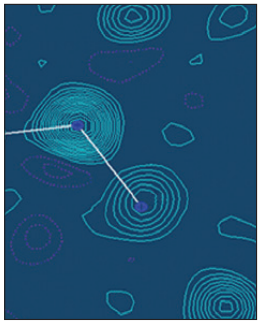

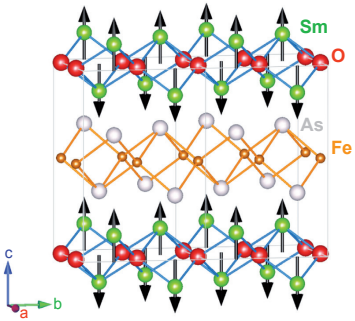

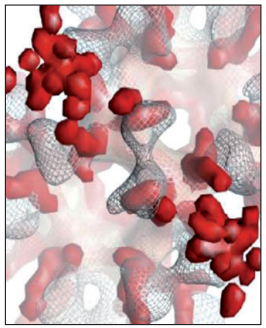

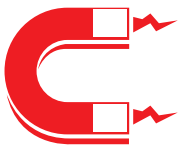

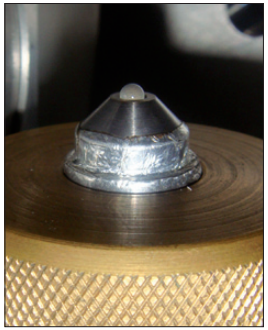

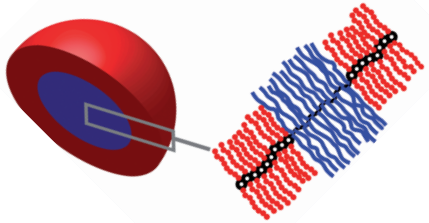

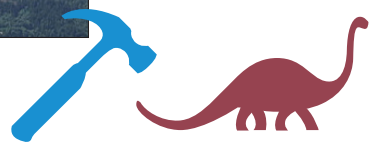

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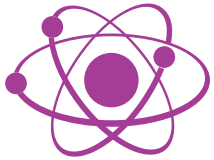
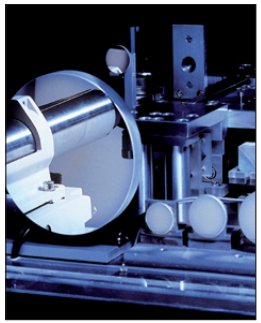
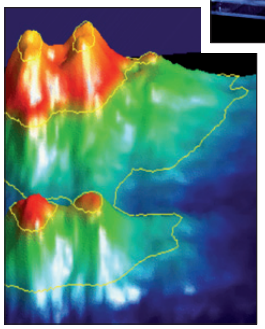
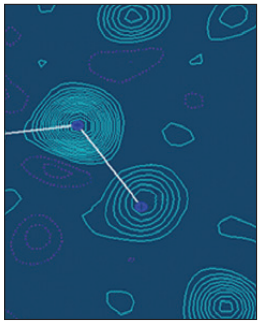
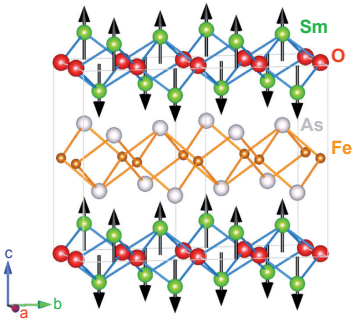
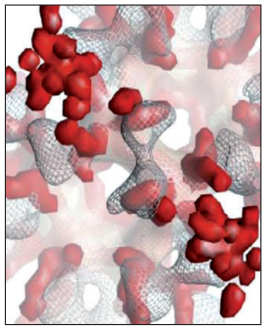


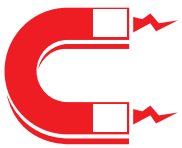


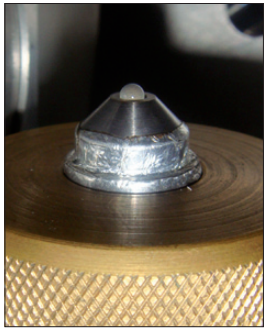


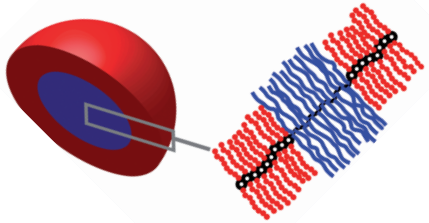


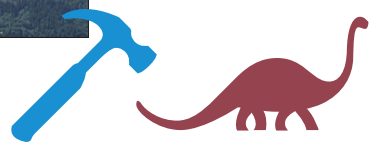










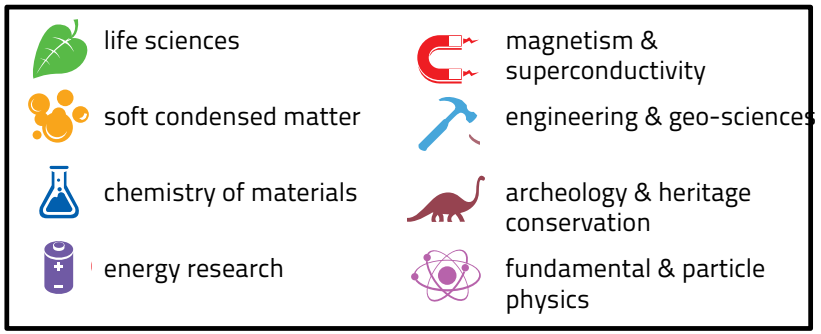


data: ILL

Reference Instrument Suite: Science Drivers

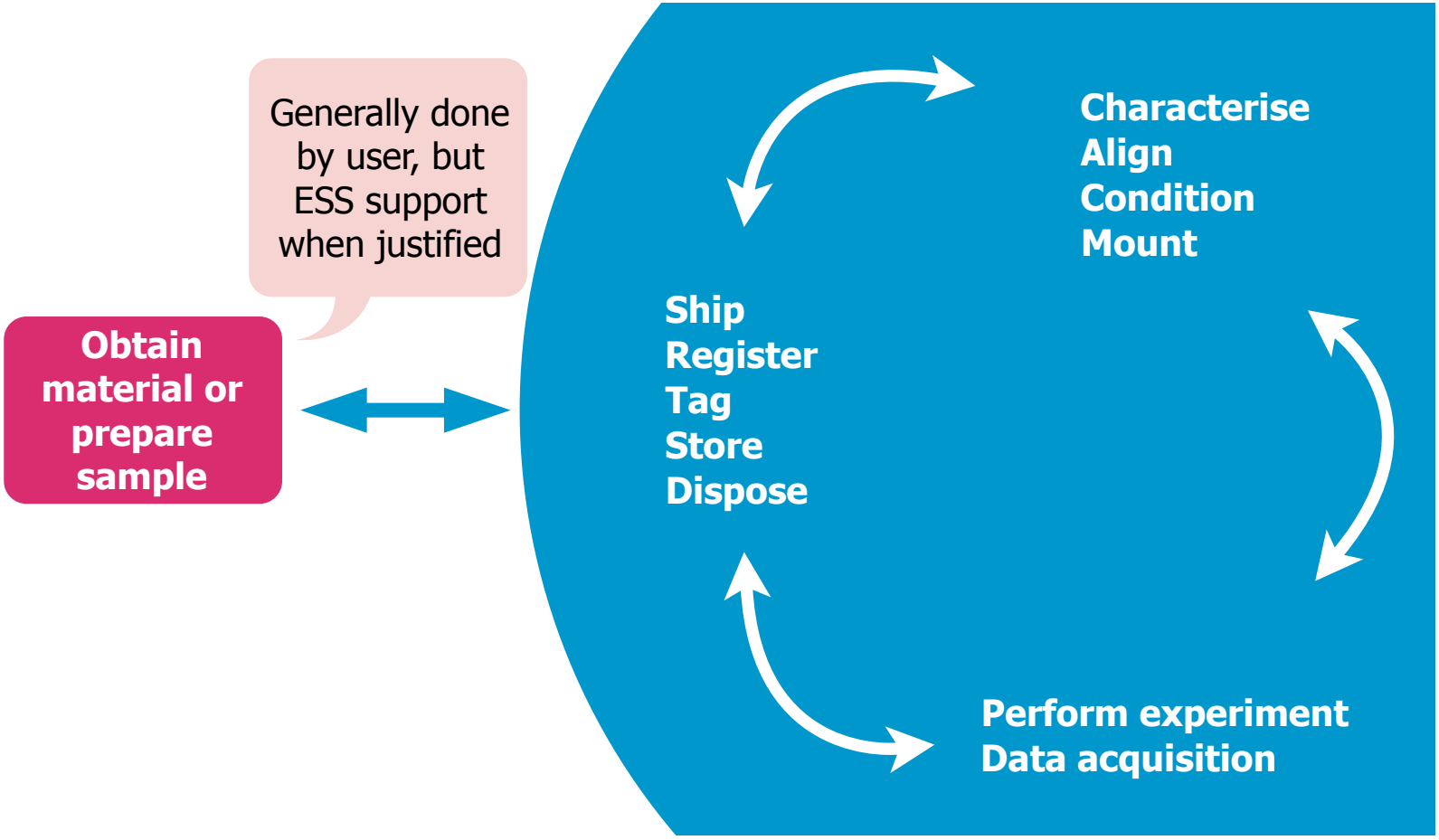
Multi-Purpose Imaging	
General-Purpose SANS	
Broadband SANS	
Surface Scattering	
Horizontal Reflectometer	
Vertical Reflectometer	
Thermal Powder Diffractometer	
Bispectral Power Diffractometer	
Pulsed Monochromatic Powder Diffractometer	
Materials Science Diffractometer	
Extreme Conditions Instrument	
Single-Crystal Magnetism Diffractometer	
Macromolecular Diffractometer	

Cold Chopper Spectrometer	
Bispectral Chopper Spectrometer	
Thermal Chopper Spectrometer	
Cold Crystal-Analyser Spectrometer	
Vibrational Spectroscopy	
Backscattering Spectrometer	
High-Resolution Spin-Echo	
Wide-Angle Spin-Echo	
Fundamental & Particle Physics	



Sample Flow for Successful Experiments

Set-up common support platforms (laboratories and sample environment) to meet the needs for successful experiments. Enable users to perform their science.



Organisation and Staffing (2014)

Science Support Systems

Management Administration

details	Management and administrative support
staff	A. Hiess (HoD), B. Linnenberg (Assist.), *advisors*
timeline	started; to ops in 2020

Science Coord. & User Office

TDR2.6.1	Science focus areas, community, user office,
staff	C. Theroine (PD Fund), *'scientist basket', PhD*
timeline	started; to ops in 2020

Sample Environment

TDR2.7.4	temp, fields, pressure, gas, changer, atm, surf
staff	NNEngineer(mechatronics); NNScientist(T,B)
timeline	start 2014, Phase1 to 2019, Phase2 to 2023

Laboratories and Facilities

TDR2.6.ff	labs 
staff	M. Everett (Lab), Z. Fisher (xtalo), NN (hi-p)
timeline	start 2014, Phase1 to 2019, Phase2 to 2023

Details Science Coordination and User Office

Science Support Systems

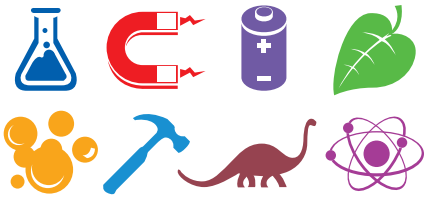
Management Administration

Science Coord. & User Office

Sample Environment

Laboratories and Facilities

Science Focus Areas



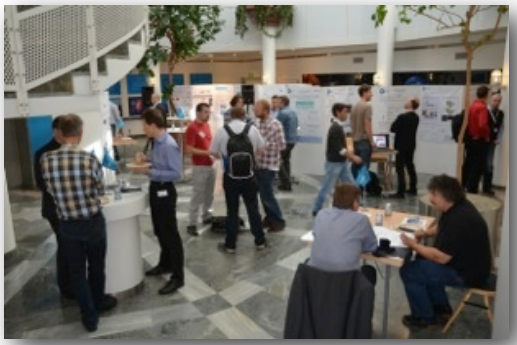
Community Interaction & industrial R&D

User Office

details	environment for ESS scientists local seminars, lectures incl. fund physics with target / acc.
strategy	invited scientists, attract speaker
interface	all Science, Target/Acc (fund)
details	symposia, conferences, seminars schools, lectures, partner days
strategy	exchange ESS scientists, partners
interface	Communications
details	set-up user office, on-site visits
strategy	standardise with other facilities
interface	software by DMSC, Admin.

seminars, workshops, symposia

- IKON: meetings of in-kind collaboration on Instrument Construction
- Science Symposia: 16 symposia exploring the ESS scientific possibilities
- ESS - SFT seminars: internal ESS seminars covering various science topics
- NewScience Seminars: topical seminars organised jointly with LU and MaxIV.



Details Sample Environment

Science Support Systems

Management Administration

Science Coord. & User Office

Sample Environment

Laboratories and Facilities

Temperature & Fields	details	low & high T, magn. & other fields
	strategy	phase 1: dry systems, std. magnet
High Pressure & Gas handling	details	pressure cells, gas handling syst.
	strategy	phase 1: clamp cells, link to labs
SE Systems 	details	changers, gas-vap-liquid, surface...
	strategy	link to Instruments; nmx, loki ...
SE Systems 	details	geo science, cultural heritage
	strategy	link to Instruments; odin
Workshop Development	details	workshops, maintenance equip.
	strategy	link Instrument Technology team

Sample Environment - Temperatures and Fields

- 'Cryogen-free' systems for low temperatures and magnetic fields
  - PTR or GMR from industrial suppliers for T = 2.5K - 600K (phase 1)
  - Re-condensing systems for T < 2.5 K and B > 10T (phase 2)
- Small devices for temperature control (T = 30 K - 800 K) using Peltier coolers, Stirling CCR or gas flow devices integrated and adapted from suppliers. collaborations within SE@NSF FP7 network. (phase 2)
- Follow closely and collaborate for development of pulsed magnets (phase 2) and superconducting hybrids (phase 3)
- Vacuum furnaces (phase 1)
  mirror and levitation furnaces (phase 2)

Sample Environment - Pressure

- Designs for pressure cells for gases, liquids and solids are available.
  - isostatic clamp pressure cells (p < 20 kbar) (phase 1)
  - uni-axial pressure (p > 1 kbar) (phase 2)
  - gas pressure (several kbar) (phase 2)
- Gas handling including Hydrogen (phase 1)
- High pressure cells (PE) require collaboration with expert groups (phase 2)
- Multi-anvil systems (phase 3)

Sample Environment - In-situ equip, Automatisation, Life Science / Soft Matter

- In-house development of liquid handling, robotic and linear changers, surface preparation and growth, humidity control (phase 1)
- Gas/Vapor/Liquid interfaces, chemical reactions, stress strain analysis, pump-probe, kinetics, shear (phase 2)
- Load frame for engineering and geosciences with geo lab (phase 2)
- Requires integration of commercial components and SE data acquisition and processing within Instrument Control; collaboration DMSC and ICS.

Details Laboratories and Facilities

Science Support Systems

Management Administration

Science Coord. & User Office

Sample Environment

Laboratories and Facilities

Sample Handl. Lab Coord.

Deuteration Crystallisation

Labs

Labs

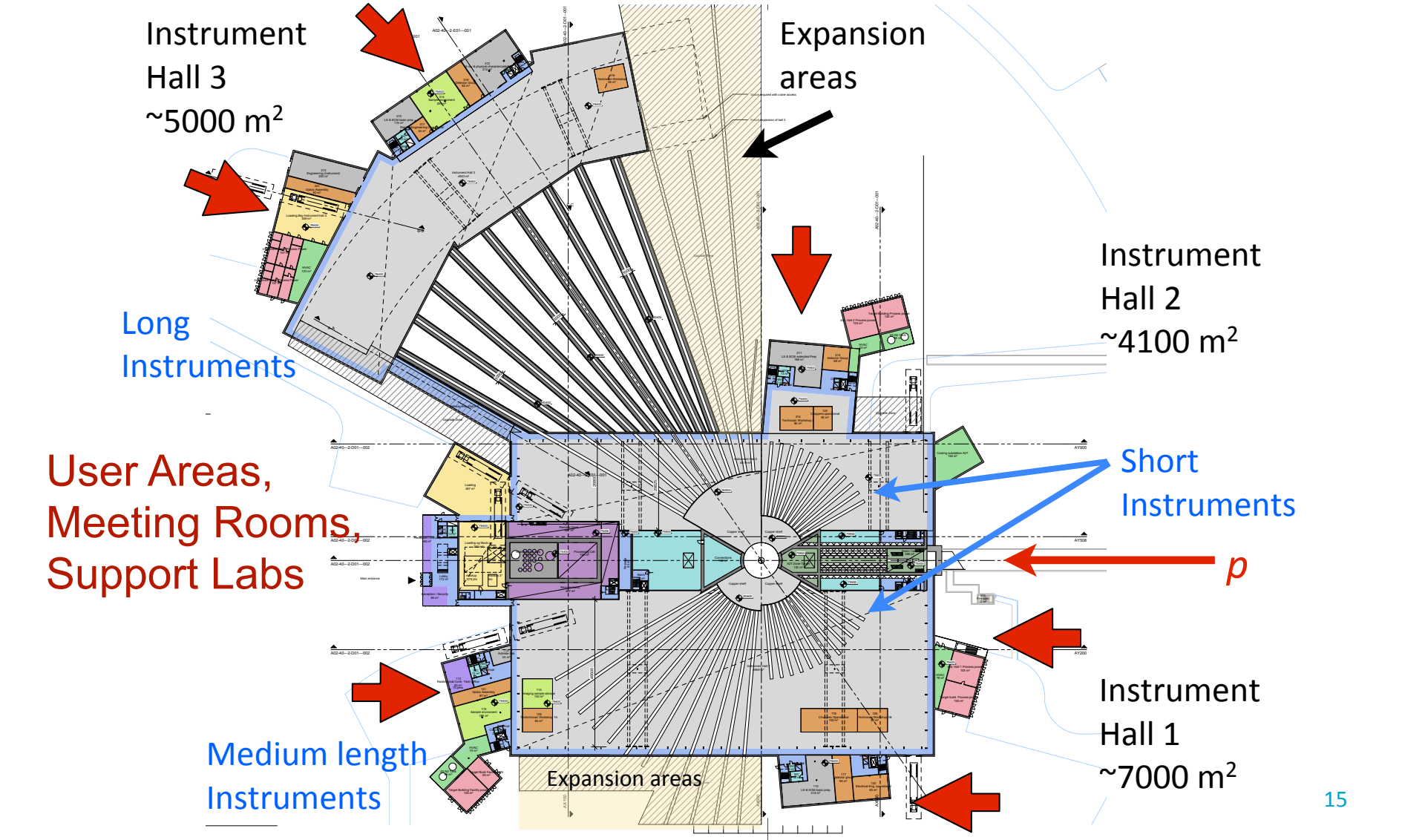
Labs

details	coordinate MV, define on-site lab
strategy	health & safety, facilities, MAX IV
details	process macromolecular xtalo
strategy	link to LU deuteration platform
details	changers, gas-vap-liquid, surface...
strategy	link to instr., std. lab fitting only ...
details	charact. & pressure platf.; powder
strategy	link to instr., std. lab fitting only ...
details	metrology, cultural heritage
strategy	link Instrument Technology team

User Laboratories and Facilities around Experimental Halls

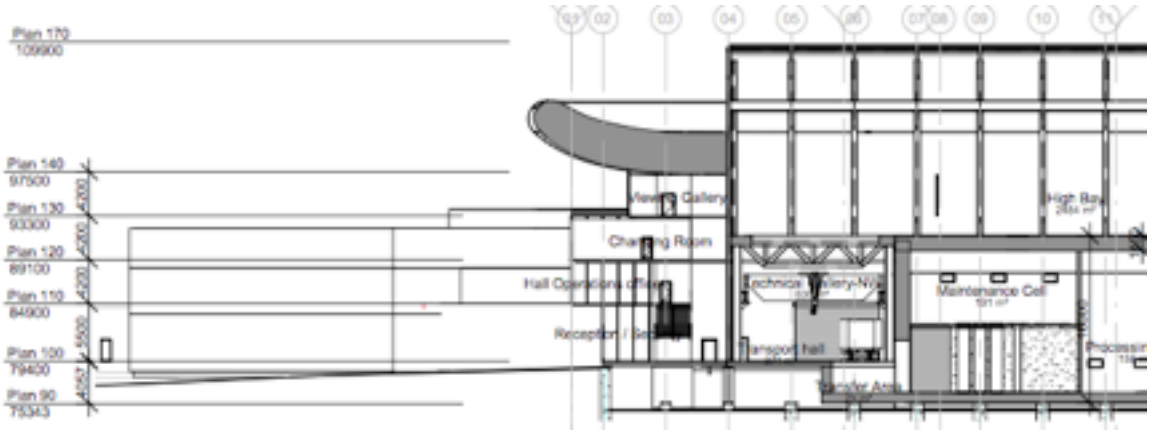
- 3 Life Science and Soft Condensed Matter Labs
- 3 Basic Chemistry Labs
- Extended Chemistry including glass sealing, furnaces, and thin film prep
- Engineering
- Imaging
- X-ray and Physical Characterization
- Actinide
- Coffee rooms and user lounges in each quadrant

User Areas and Support Labs in the Experimental Halls



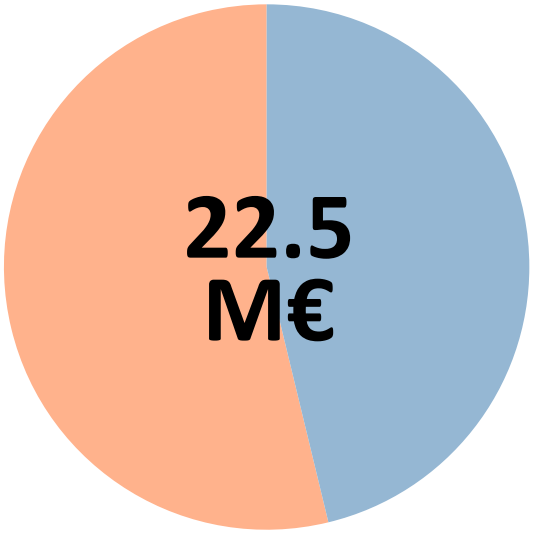
A few construction facts

- Level 100 throughout has 5.5 m of total space leaving ~4 m of free space
- All other levels have 4.2 m of total space
- Instrument hall floor in Halls 1 and 2 is 2 m below target center line
- Instrument hall floor in Hall 3 is 3 m below target center line where most of our top loaders will be
- Crane hook height is planned to be 8.9 m in Halls 1 and 2
- Crane hook height is planned to be 6.5 m in Hall 3



Cost Estimate

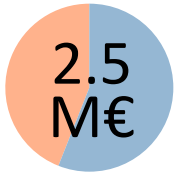
Science Support Systems



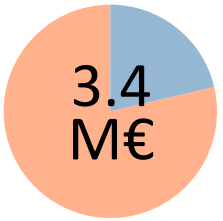
labor

non-labor

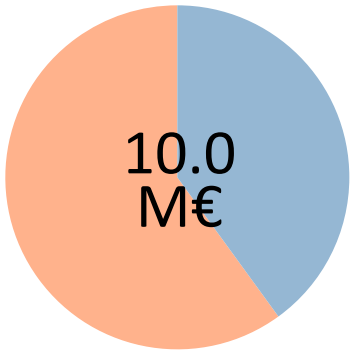
Management Administration



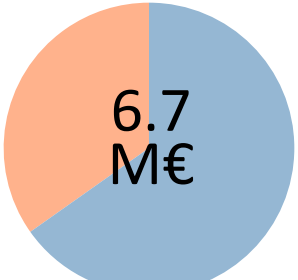
Science Coord. & User Office



Sample Environment

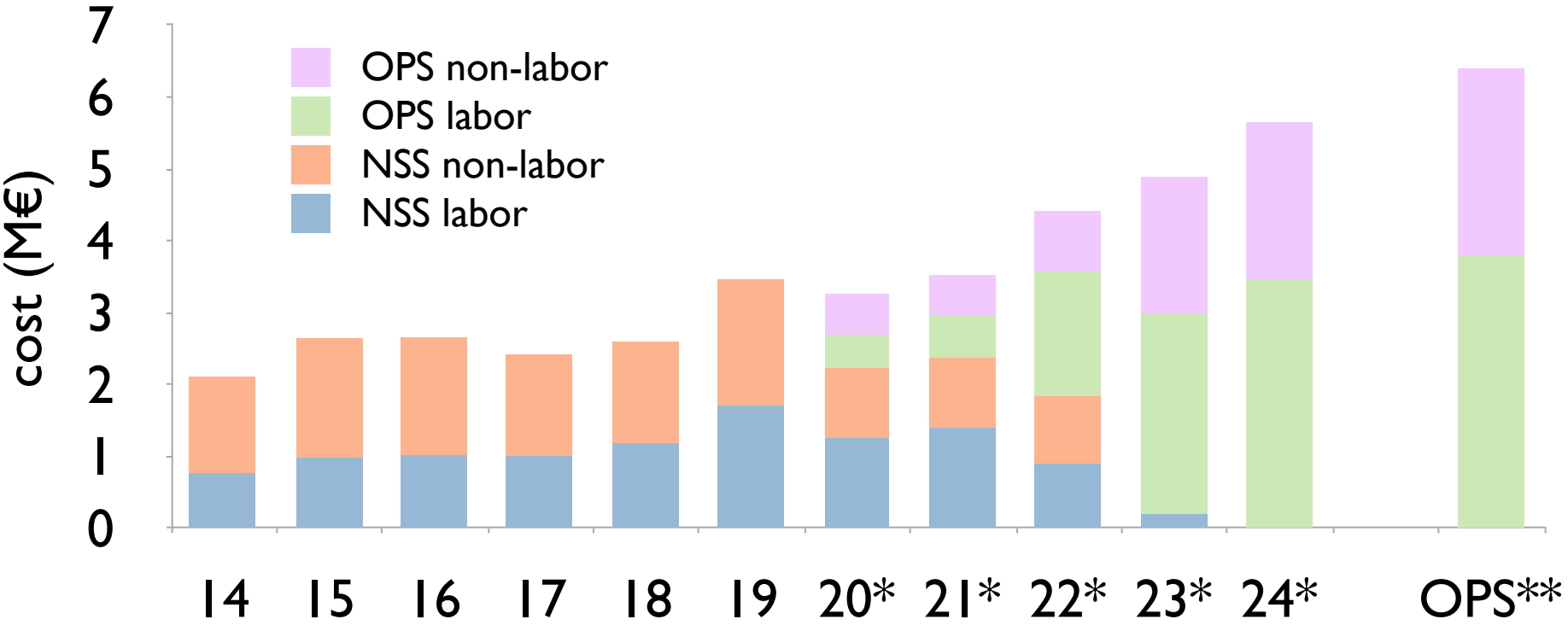


Laboratories and Facilities



Cost Estimate and Schedule

- Only core functionalities for first neutrons ensured by construction budget.
- Ramp up follows selected instrument (nmx, loki, odin) construction schedule.
- Additional functions for operation require external funding sources.



* requires operational funds

** without user reimbursement and PhD prg (~ 5 M€/y)

Strategy for in-kind and additional funding

- Only core functionalities ensured by ESS NSS construction budget.
- Standard sample environment equipment and laboratory fitting potentially provided in-kind. Could involve university partners with restricted budget.
- Additional functionalities require funding outside in-kind framework. Permits leverage of budget risks during construction and operation.
- Added value for instruments and user programme by enabling users to come with their resources during operation phase.

Summary

- Illustrated path to adequate science support during operations adding value to the instruments and ESS as a (materials) science-driven facility.
- Priorities ensuring core functionality in-line with instrument construction.
- Current team covers scientific coordination (science focus areas, community interaction and lab coordination).
- Build up core team for sample environment and support platforms to timely start in-kind partner involvement and additional funding.
- Refine interfaces to profit from opportunities.

EUROPEAN SPALLATION SOURCE

Data Management and Software Centre

Mark Hagen
Head of DMSC

www.europeanspallationsource.se

SAC Orientation February 4^{4h} 2014

What is DMSC ?

EUROPEAN SPALLATION SOURCE

- Data Management and Software Centre (DMSC)

- A Division of ESS Science Directorate…
  - Just like Instrument Technologies, Neutron Instruments etc.
  - Two campuses: ESS Lund & ESS Copenhagen
    (Universitetsparken, Københavns Universitet)
  - DMSC building to be constructed in Copenhagen

- Responsibility: design, develop & implement for the ESS instruments:
  - Software (user control interfaces, data acquisition, reduction & analysis)
  - Hardware (servers, networks, workstations, clusters, disks, pfs etc.)

Data Acquisition, Reduction & Control

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Generic Framework

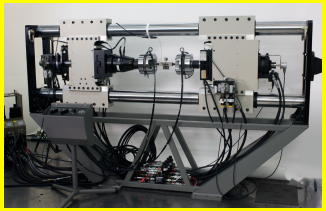
- Instrument Control
- Data Acquisition
- Data Reduction & Visualization

NEUTRON TECHNOLOGIES

Choppers

Motion Control

Sample Environment



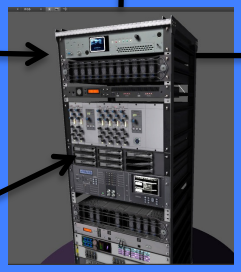
Fast Sample Environment

Detectors & Monitors

INTEGRATED CONTROL SYSTEMS

Timing

EPICS



Control Box

Bulk Data Readout (Detector Group)

DATA MANAGEMENT & SOFTWARE CENTRE

Data Aggregator & Streamer (ADARA)

Instrument Control Room

User Control Interface

Mantid
Live, Local & Remote Data Reduction

Data Analysis Interfaces

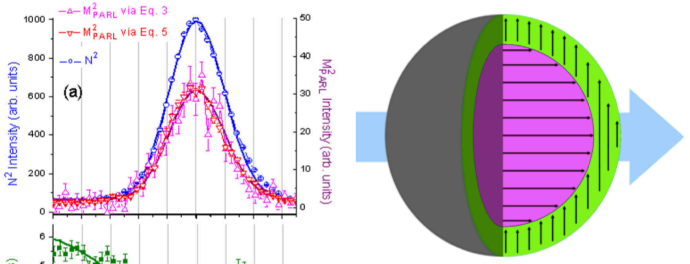
Automated Data Reduction
Mantid
Lund Server Room

Automated Data Reduction
Mantid
Copenhagen Server Room

Data Analysis

- Data on disk is useless!
  - It is published *results* from the data that makes progress
- Need to ensure that ESS users have access to
  - appropriate software packages for data analysis
  - the necessary computational resources to exploit the software to obtain those results
  - analysis software during experiment to influence the data taking strategies
- Roll out in-sync with instruments

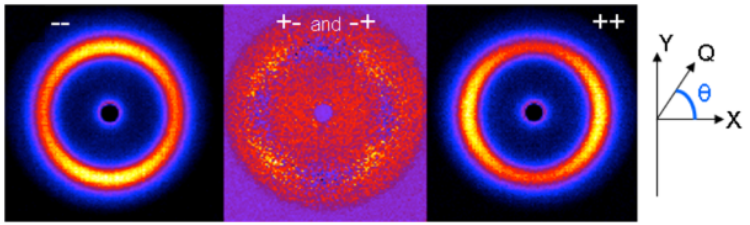
Structure of Nanomaterials



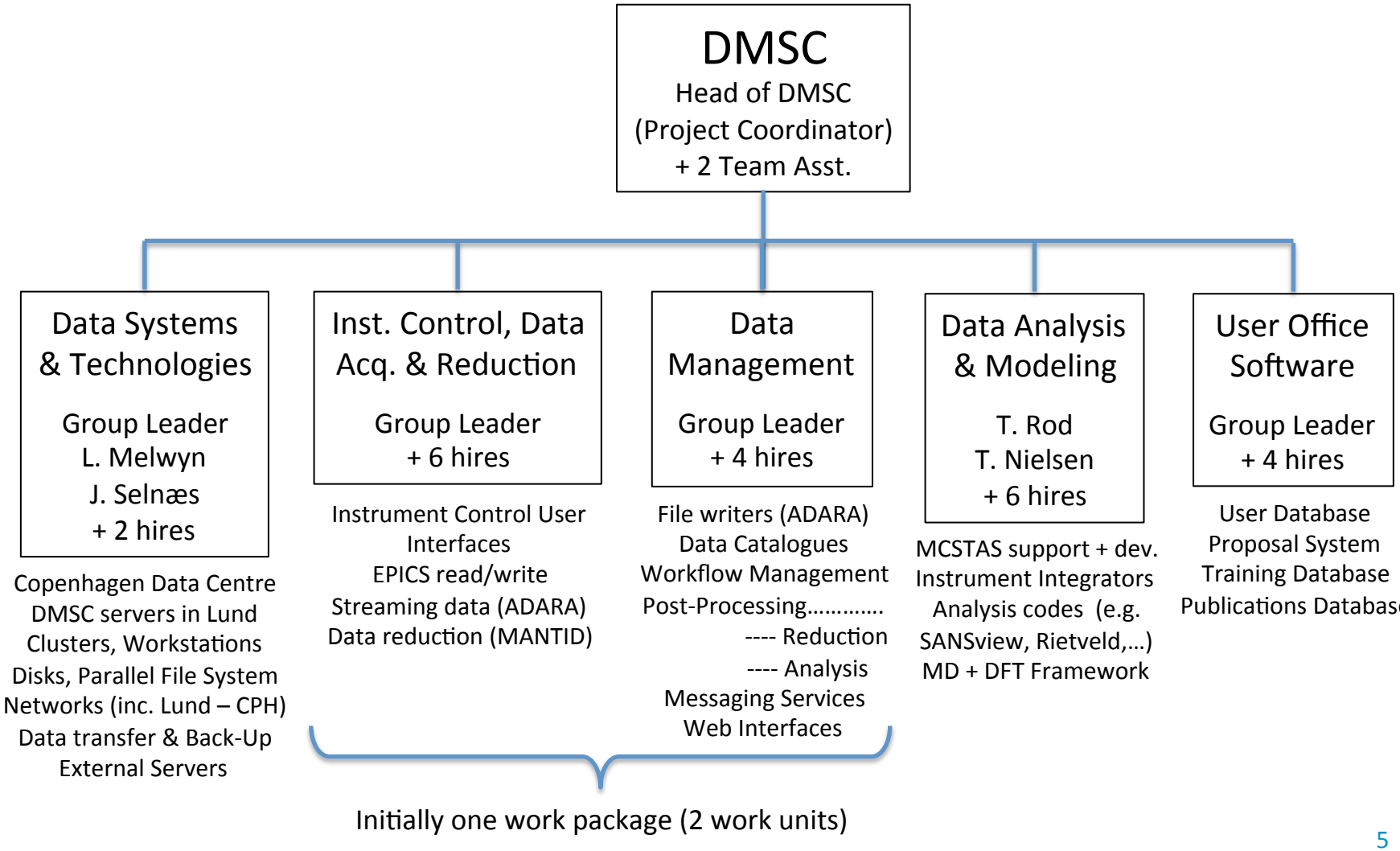
K. L. Krycka et al. **Core Shell Magnetic Morphology of Structurally Uniform Magnetite Nanoparticles** *PRL* **104**, 207203 (2010)

Polarized SANS demonstrated that these nanoparticles have uniform nuclear structure but core-shell magnetic structure.

Required development of both data reduction and data analysis methods and tools.



Organization



Mark Hagen

EUROPEAN SPALLATION SOURCE

Head of DMSC since Oct. 21 2013

Spallation Neutron Source, USA (2004 – 2013)
HYSPEC Inst. Scientist/Project Manager (2004 – 2011)
Inelastic Group Leader (2007 – 2011)
Data Analysis Group Leader (2010 – 2013)

ANSTO, Australia (2002 – 2004)
Wombat High Intensity Powder Diff. Inst. Scientist/Project Manager
(Echidna High Res. Pow. Diff., Taipan TAS)

ISIS Spallation Neutron Source & Keele Univ., U.K. (1987 – 2001)
Physics Dept. Staff at Keele
PRISMA instrument scientist at ISIS

Ph.D & Post-doc
Ph.D – University of Edinburgh (1980 – 83)
Post-docs – ILL (1984) HFIR, ORNL, USA (1985-86)

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QUESTIONS

EUROPEAN SPALLATION SOURCE

Instrument Technologies Division

Oliver Kirstein

www.europeanspallationsource.se

February 4, 2014

Who am I?

EUROPEAN SPALLATION SOURCE

Education

1997 - PhD in Physics from Kiel University, Germany
2007 - Diploma of Business/Frontline Management, Swinburne University, Australia
2012 - Guest researcher at Uppsala University, Sweden
2013 - C/Prof at School of Engineering, Univ. Newcastle, Australia

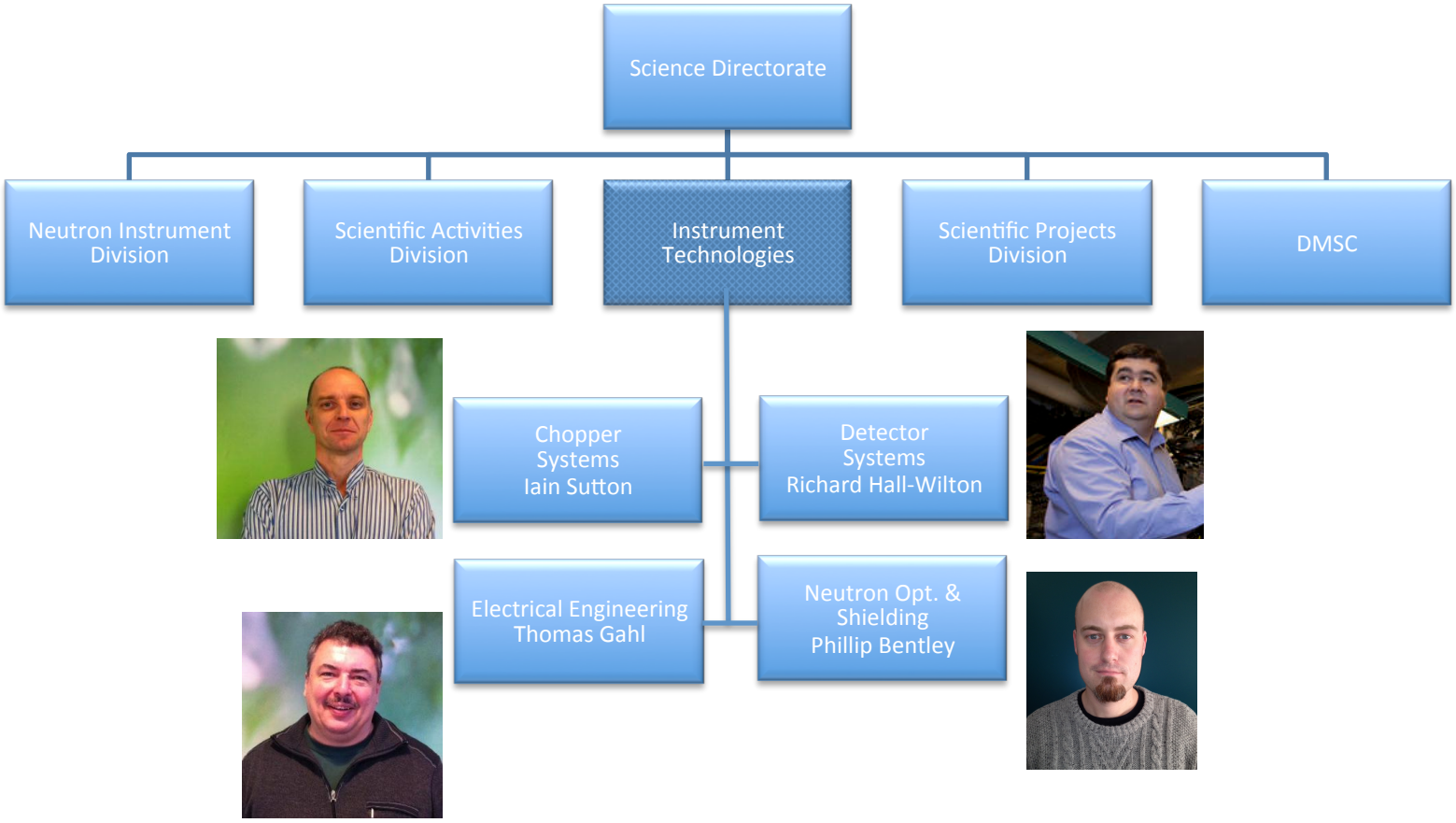
Scientific projects; user operation

1998 - Instrument scientist & project leader for SPHERES backscattering spectrometer at FRM-II reactor, Garching, Germany
2002 - Instrument scientist and project leader for the residual stress diffractometer KOWARI at the OPAL reactor at ANSTO, Sydney, Australia

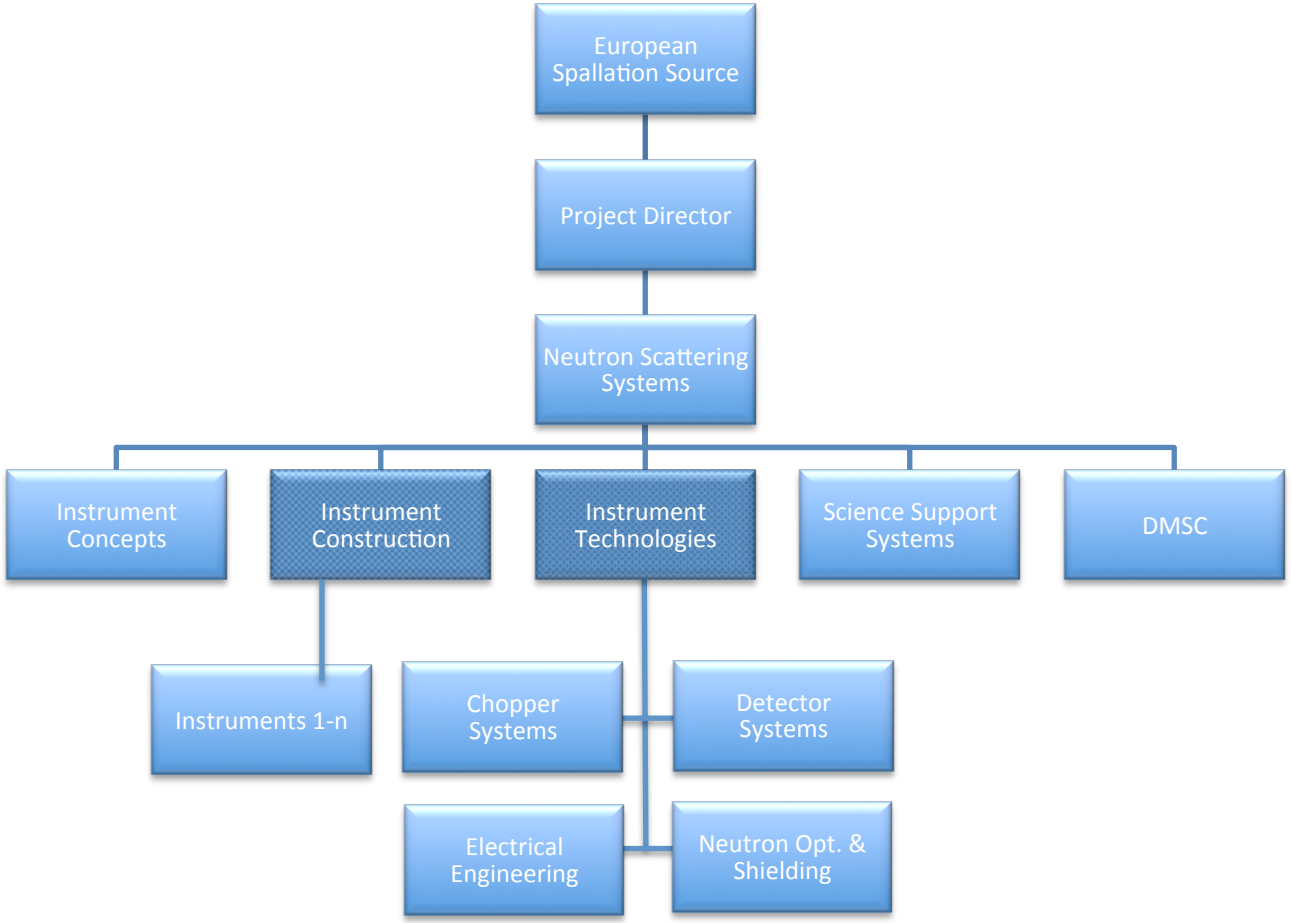
European Spallation Source

2002 - Member of ESS 'Indirect Geometry Instruments Group'
2011 - May; Head of Instrument Technologies Division - Science Directorate
Detector systems, Chopper systems, Neutron Optics & shielding, Electrical Engineering
2012 - April; Project leader of Neutron Scattering Systems (NSS)

Organisation - Line



Organisation - Project



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Instrument Construction

Rob Connatser

Head, Scientific Projects Division

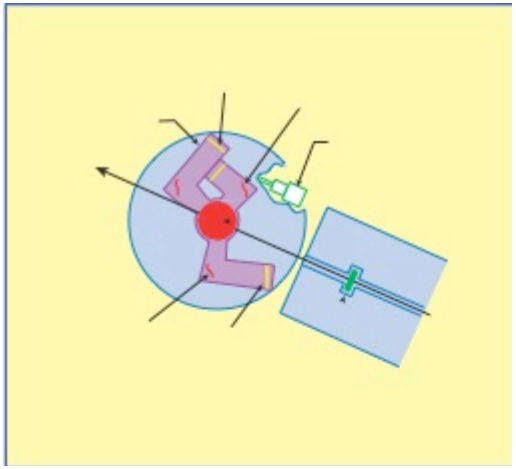
www.europeanspallationsource.se

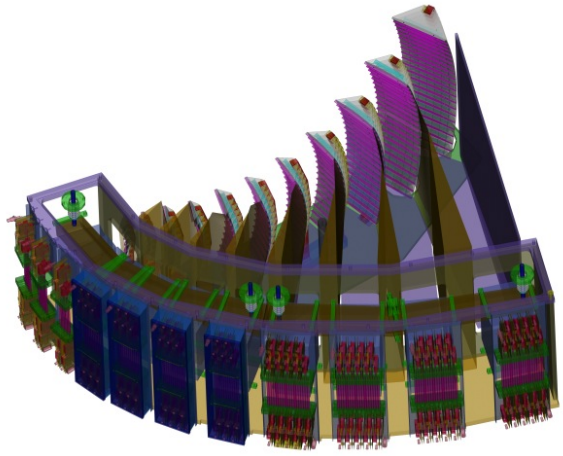
November 12, 2013

Background, Intense Pulsed Neutron Source

EUROPEAN SPALLATION SOURCE

- Neutrons since 1998
  - Scientific Assistant on QENS at IPNS
- Managed the QENS Upgrade project
  - From three rotating analyzer arms to 22 stationary arms
- Supported users & experiments





Background, Spallation Neutron Source

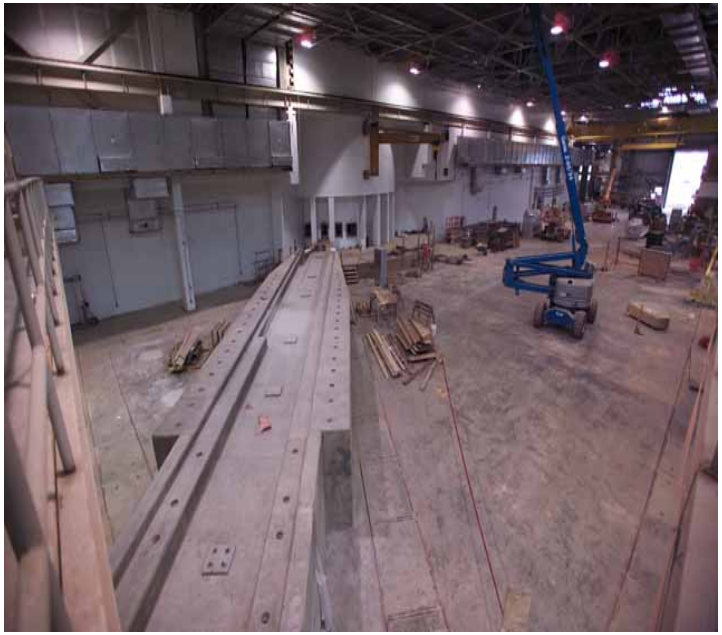
EUROPEAN SPALLATION SOURCE

- 2004-2012
- Instrument Construction & Installation

Background, Spallation Neutron Source

EUROPEAN SPALLATION SOURCE

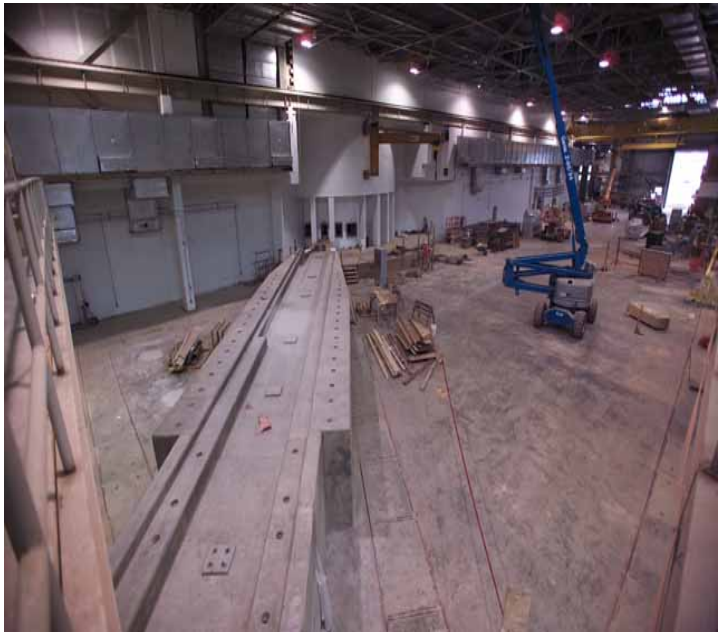
- 2004-2012
- Instrument Construction & Installation



Background, Spallation Neutron Source

EUROPEAN SPALLATION SOURCE

- 2004-2012
- Instrument Construction & Installation

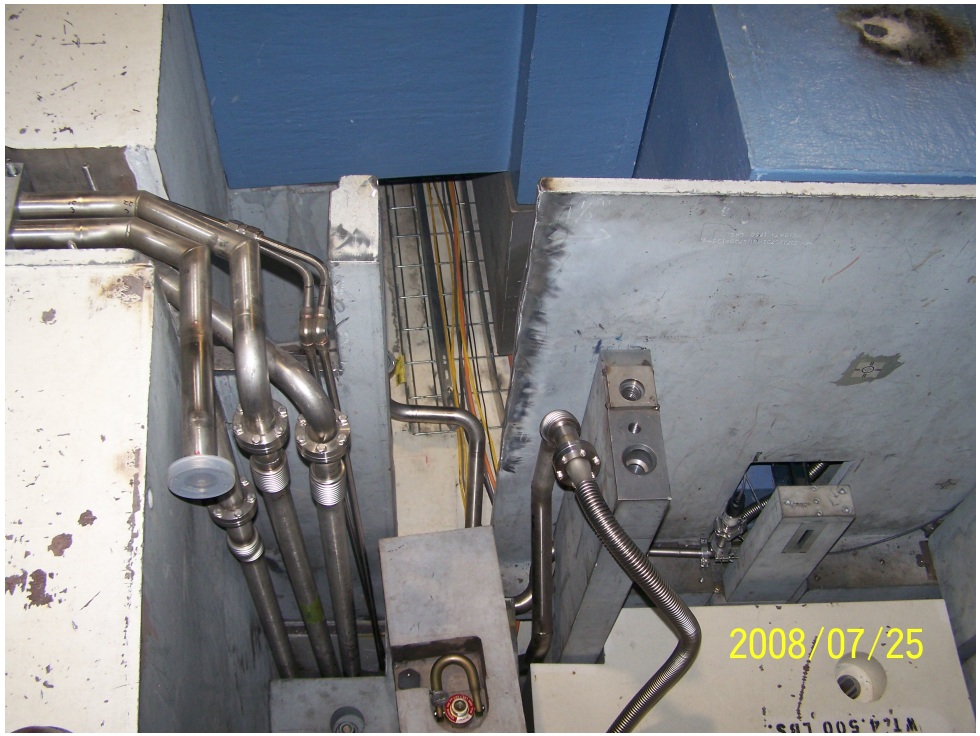


Action

- Developed reality based installation schedules, working with scientists and engineers.
- Integrated schedule of all beamline installation and construction activities.
- Learned the mechanics and organization of the T&M installation contract used for technical installation activities at SNS.
- Worked with instrument teams and technical teams to install the instruments.

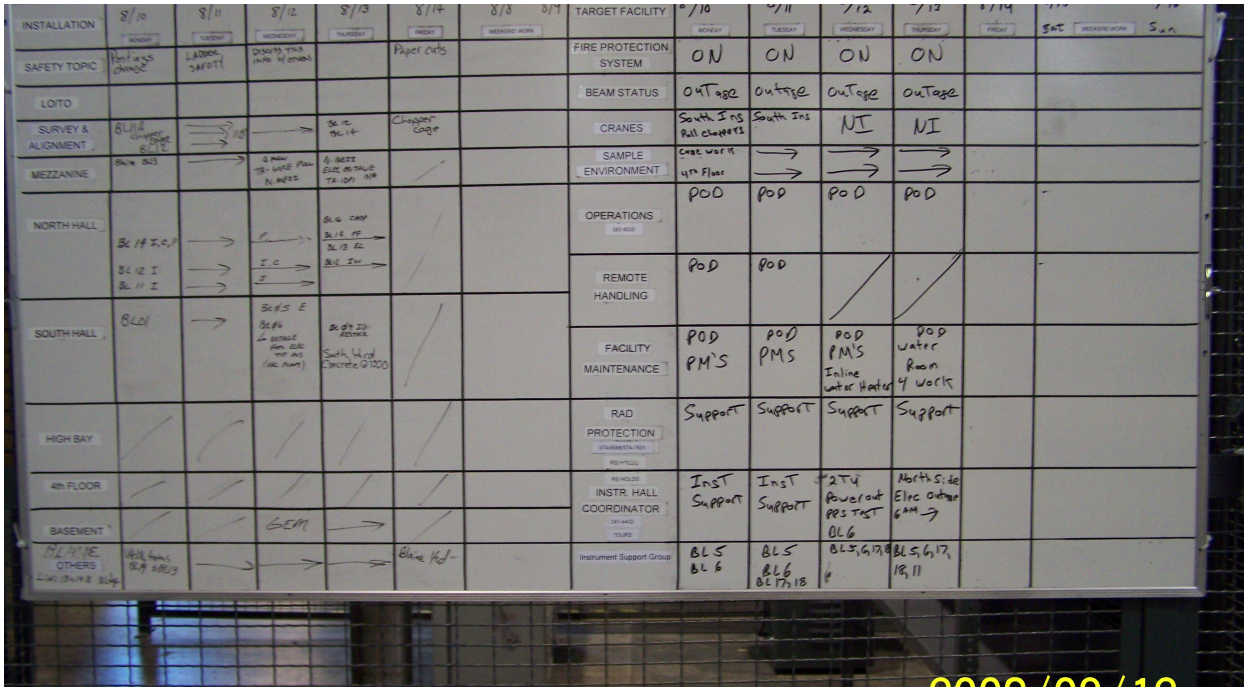
Practical Lessons

- The majority of the “installation” activities more closely resemble a slightly non-standard civil construction effort.



Practical Lessons

- Close coordination is required not just within the different projects but also among all of the parties working in the experiment hall.

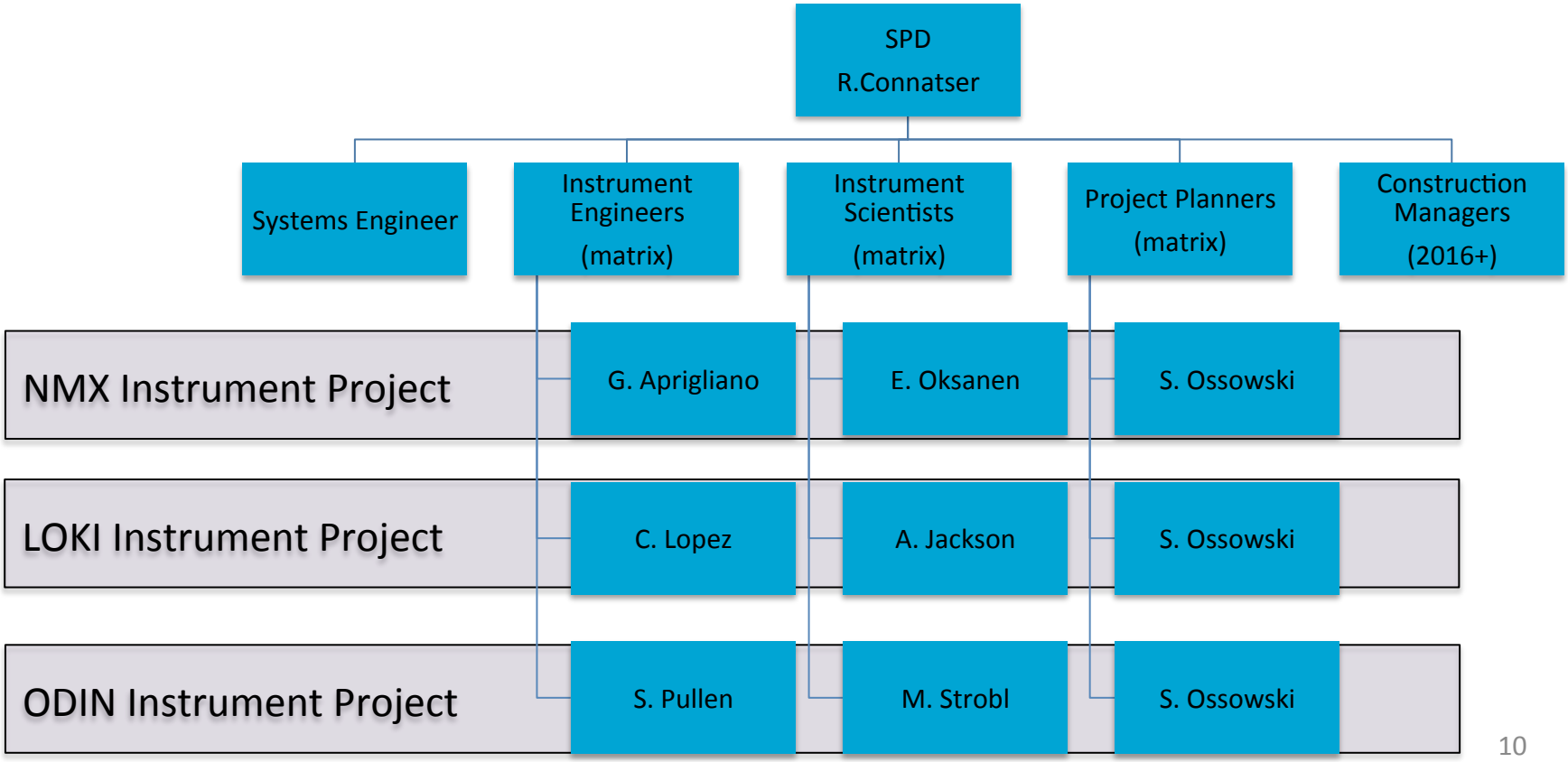


ESS Responsibilities

- Responsible for the budget of the instrument projects
  - Sub-project manager for Instrument Construction within the Neutron Scattering Systems Project

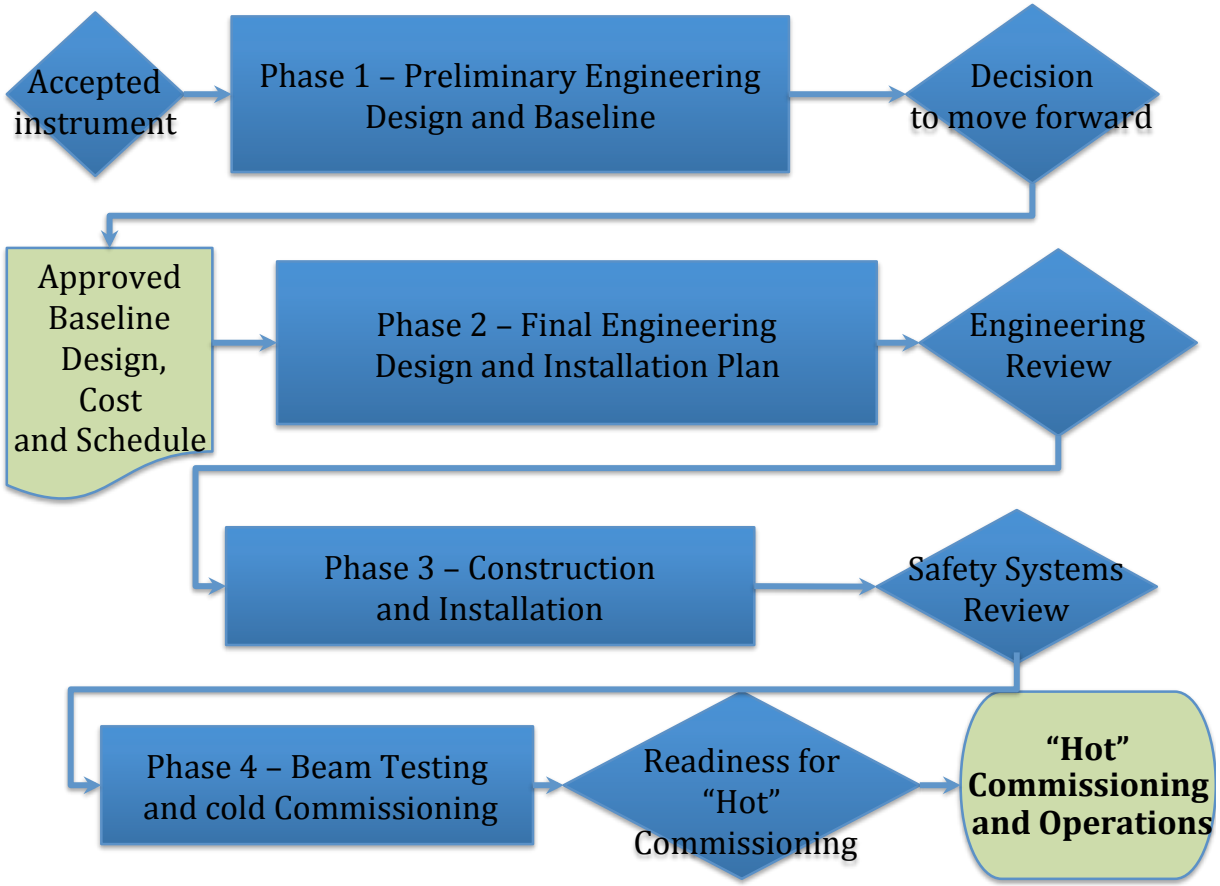
ESS Responsibilities

- Organize and develop the resources (people, tools, & space)



ESS Responsibilities

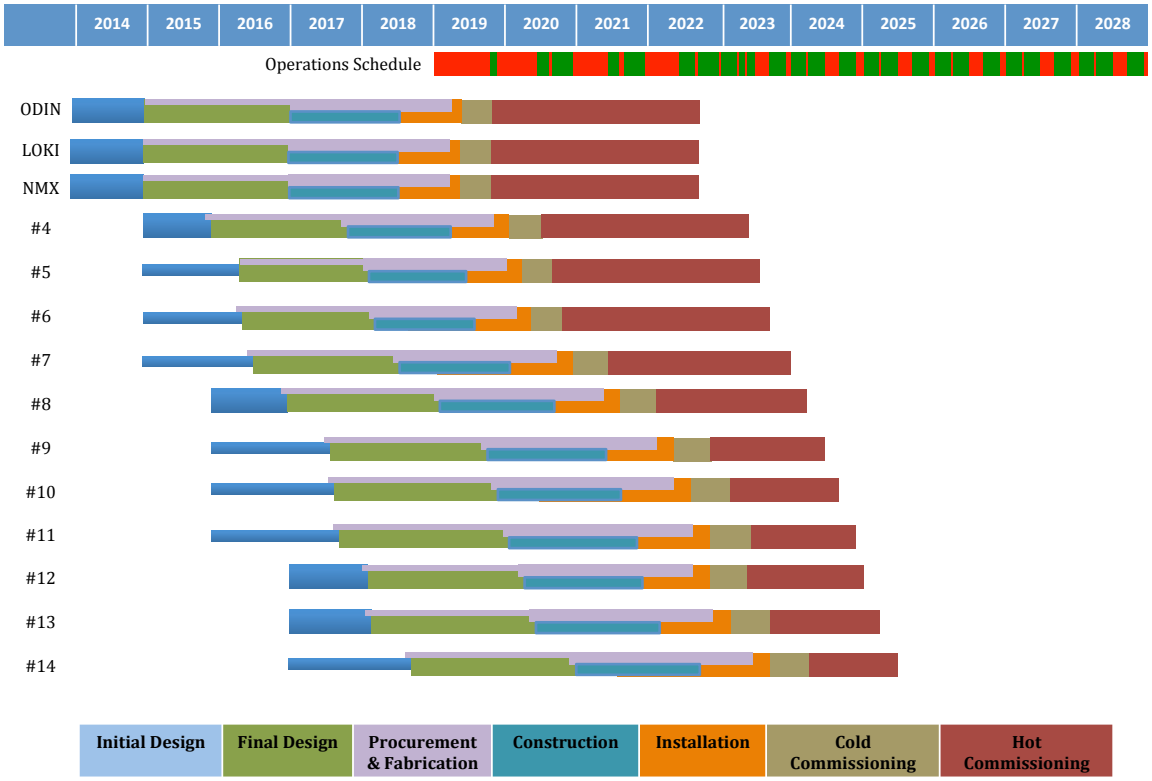
- Develop processes and make the plans needed



ESS Responsibilities

- Develop processes and make the plans needed

Instrument Installation



ESS Responsibilities

- Coordinate with partners
- Manage and track the work being performed

EUROPEAN SPALLATION SOURCE

Community Interactions

ESS SAC Orientation Day

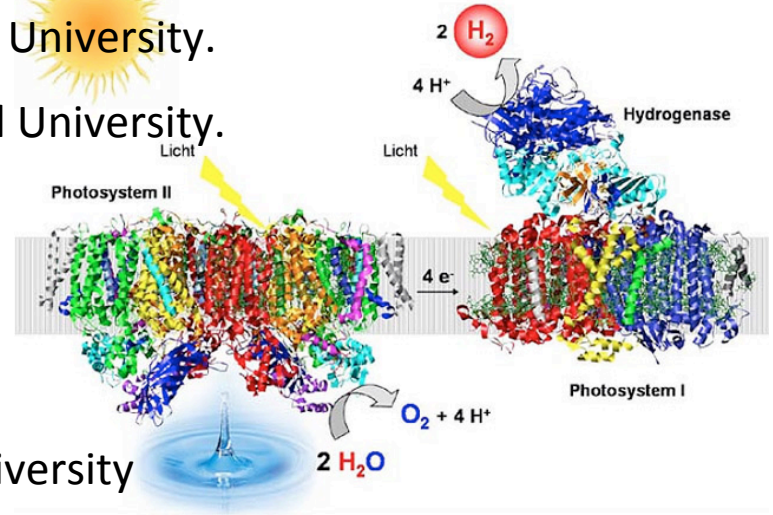
Sindra Petersson Årsköld

www.europeanspallationsource.se

February 4, 2014

Introduction
Sindra Petersson Årsköld

1996	M.Sc. Physics, Stockholm University.
2000	Ph.D. Biochemistry, Lund University.
2001-2003	Postdoctoral Research Fellow, The Australian National University.
2003-2010	Assistant Professor, Biochemistry, Lund University.
2010-2011	Associate Professor, Biochemistry, Lund University.
Now	**Senior Advisor, ESS** ***Science strategy*** ***Policy*** ***Outreach & community interactions***
Also	Vice Chairman of the Board, Malmö University Board member & co-founder, Probation Labs AB.



Built by the Community, for the Community

EUROPEAN SPALLATION SOURCE

Exploring the scientific potential of ESS together

ESS Science Symposia

Science & Scientists at ESS

Expanding the science case and the user base

Scientific outreach

Conference participation

Developing the facility together: instruments, neutron technologies, support facilities, sample environment, data management & analysis

NSS Project Collaborations

IKON meetings

Advice on the scientific and technical development

Scientific and Technical Advisory Panels

Scientific Advisory Committee

Governance

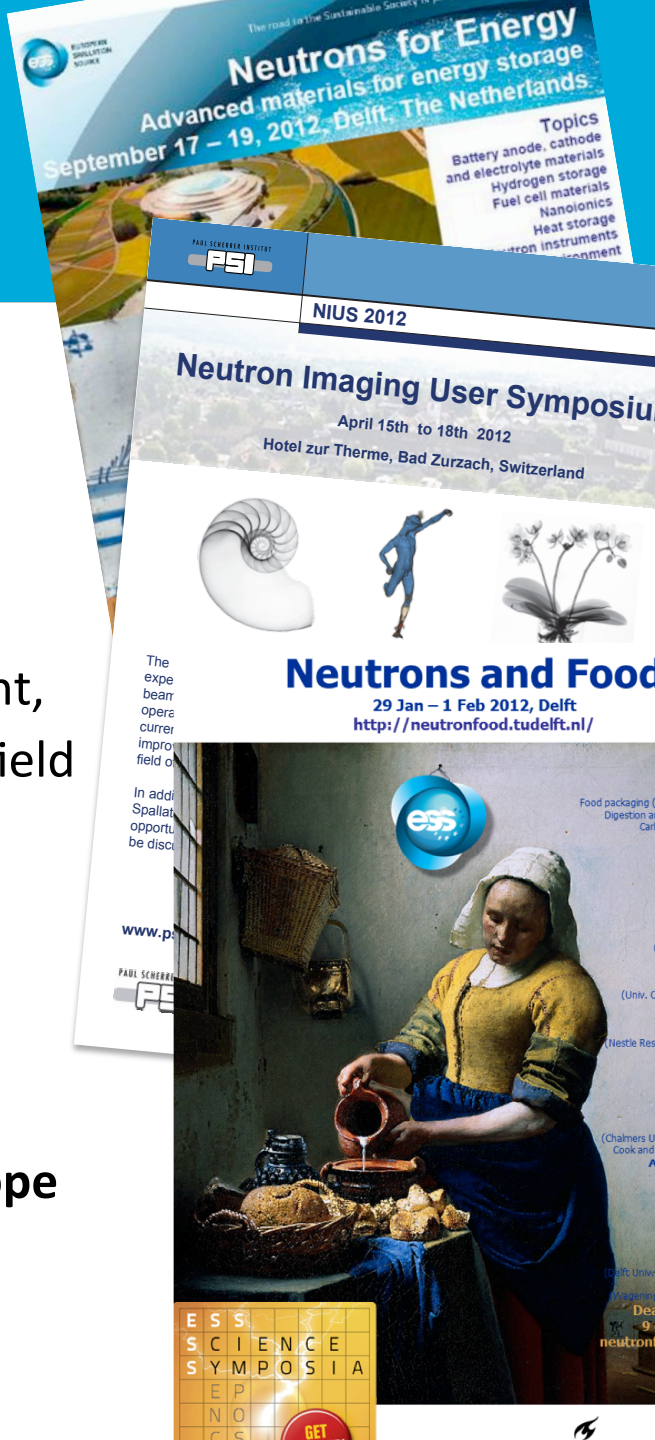
Steering Committee

Collaboration is Key to Success

- Competence & experience
- Technology transfer between labs
- Training of the next generation
- Community engagement & buy-in
- Third-party funding opportunities, **H2020**

- Seconded personnel
- Joint postdocs & PhD students
- Technical & scientific collaborations

Exploring Scientific Potential at the *ESS Science Symposia*



Organized by scientists on their topic of choice.
Sponsored by ESS.
Attended by ESS staff.

Aim of each symposium: To discuss future development, neutron possibilities and challenges in that particular field of science.
Report to us afterwards: requirements on the next-generation neutron source, “wish list”.
These reports feed our science strategy.

18 ESS Science Symposia have been held around Europe since 2011.
The call is open for more.

Exploring Scientific Potential at the *ESS Science Symposia*

EUROPEAN SPALLATION SOURCE

Surface and Interface Reconstruction, TUM 2014	In-situ Chemistry, 2012 Gothenburg
Neutrons for future energy strategies, 2013 PSI	NUIS, 2012 PSI
New Generation Green Construction Materials, 2013 Stockholm	Correlated Electron Systems, 2012 UK
NS at Extreme Conditions, 2013 Edinburgh	The Future of Soft-Matter SANS, 2012 Lund
Neutron Particle Physics at LPS, 2013 Grenoble	Neutrons and Food, 2012 Delft
Protein Crystallography, 2013 Aarhus	Off-Specular NS workshop, 2012 Brussels
Neutrons and Life Sciences, 2013 Lund	NBI ESS Symposium, 2011 Nils Bohr Institute
Phys. Sim. of Processes in Engineering Materials, 2012 Prague	Topological Materials, 2011 ILL
Materials for Energy Storage, 2012 Delft	Materials Engineering at a Long-Pulse Source, 2011 UK

Reports from each symposium at esss.se!

Science & Scientists at ESS and *IKON*

EUROPEAN SPALLATION SOURCE

IKON meetings

For discussing the development of instruments, technologies and support facilities in the NSS project.
Every 6 months in Lund.
Up to 160 participants from all partner countries.

IKON1 Sep 2011
IKON2 Feb 2012
IKON3 Sep 2012
IKON4 Feb 2013
IKON5 Sep 2013
IKON6 Feb 2014

Science & Scientists at ESS meetings

For discussing the science to be enabled by ESS, across the various scientific disciplines.

2011 in Prague (ECNS satellite)
2012 in Berlin
336 participants from 19 countries
2013 in Edinburgh (ICNS satellite)
130 participants from 17 countries

Regional Rooting for a Vibrant Scientific Environment

EUROPEAN SPALLATION SOURCE

Why is this Important?

A prerequisite for a thriving, resilient science facility.

An academic home for ESS staff.

Enhanced user experience through a strong local environment.

Added value in support facilities through collaborations.

Adjunct Positions for ESS Science Staff

Lund University: Chemistry, Physics, LTH
Copenhagen University: Niels Bohr Institute
Chalmers Institute of Technology
Uppsala University
Mid-Sweden University

Joint Senior Positions/Advisors

Lund University, Copenhagen University

Activities

Seminar Series with MAX IV & LU
Exhibition at LTH Science Centre

Collaborations

MAX IV: joint detector lab and much more
Linköping University: detectors
Lund Protein Production Platform
LTH: Accelerator

Other Bridges

Lund University: Legal, Astronomy, Pufendorf Institute of Advanced Studies
Copenhagen University: Legal

Mittuniversitetet MID SWEDEN UNIVERSITY
UPPSALA UNIVERSITET
CHALMERS
LUND UNIVERSITY
MAX IV LABORATORY
UNIVERSITY OF COPENHAGEN
Linköping University

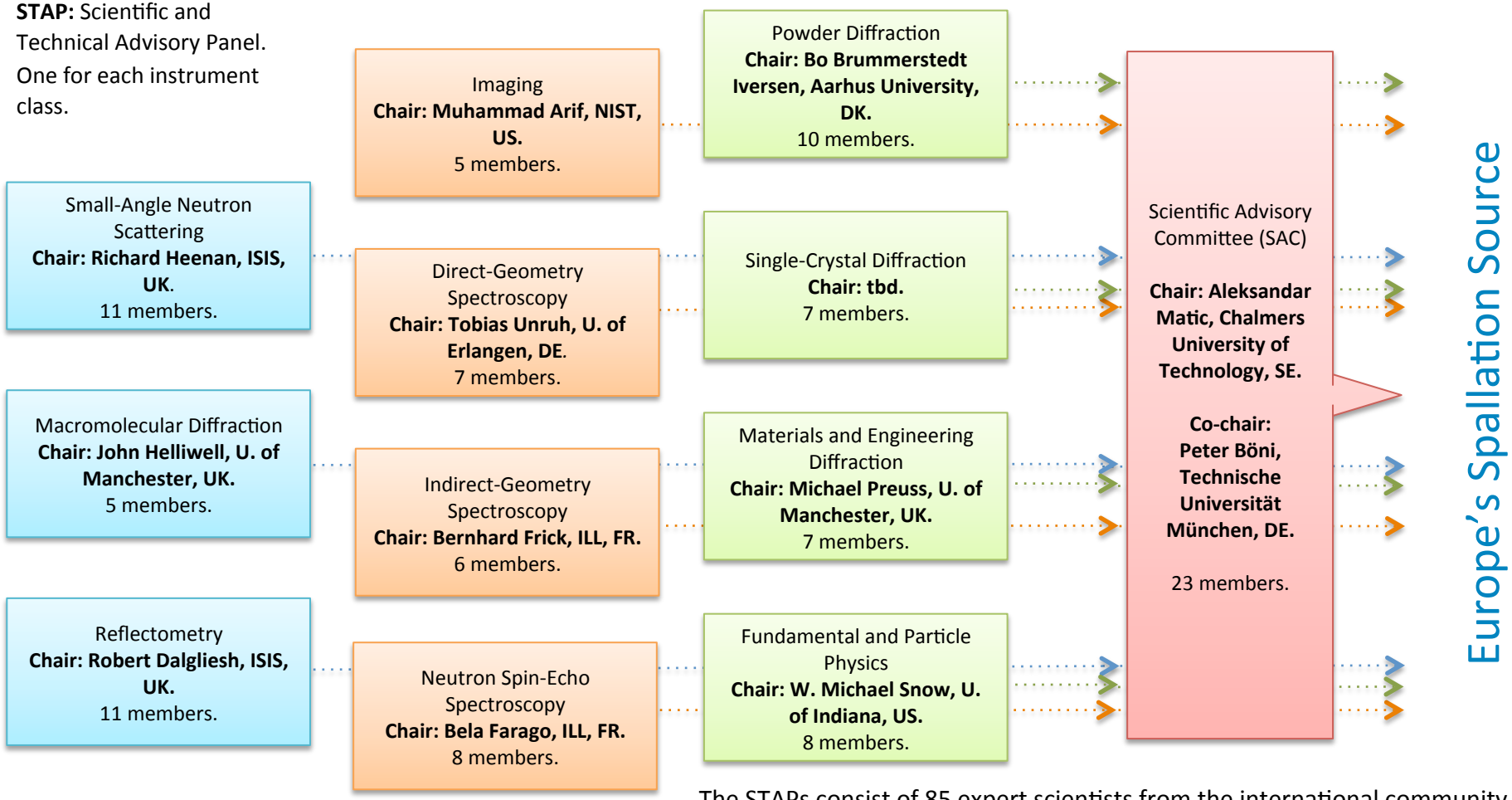
Communications at ESS

Target group	*Subgroup*	Main responsibility
Scientific community	***European & regional***	**Science Dir.**
	Current & potential neutron users	**Science Dir.**
Funding bodies	*Science & facility*	Communications Div.
Decision makers	*European & regional*	Communications Div.
Regional actors	*Scientific & societal*	Science Dir. & Communications Div.
General public	*European & regional*	Communications Div.

>100 External Experts Have Advisory Roles in the Development of ESS

EUROPEAN SPALLATION SOURCE

STAP: Scientific and Technical Advisory Panel. One for each instrument class.



The STAPs consist of 85 expert scientists from the international community
Each STAP advises ESS management and informs SAC.
SAC advises ESS management, who proposes to STC.

Welcome to the ESS team!

EUROPEAN SPALLATION SOURCE