



EUROPEAN
SPALLATION
SOURCE



The European Spallation Source

John Womersley, Director General

September 2017

Neutron science



Energy

Environment and climate

Medicine and health

Electronics and IT

Manufacturing and industry

Natural world

Heritage science



Hydrogen-fueled society

Sub-zero survival

Disease resistant crops

Tackling chemical waste in the pharmaceutical industry



Flexible plastic solar cells

Tracking cholesterol

Enhanced oil recovery

Infection sensors

Stress relief in the air

Vision, Mission and Values



ESS Vision

Our vision is to build and operate the world's most powerful neutron source, enabling scientific breakthroughs in research related to materials, energy, health and the environment, and addressing some of the most important societal challenges of our time.

Mission

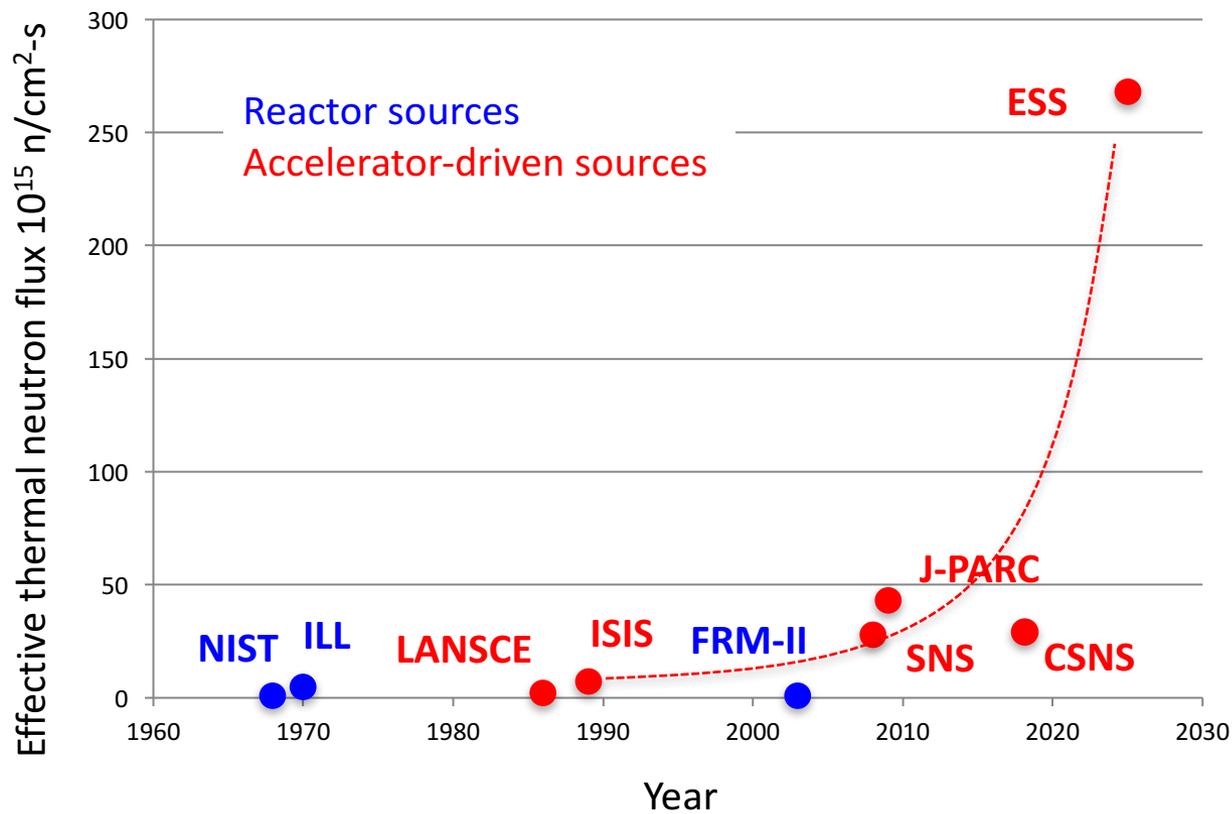
To do this, we commit to deliver ESS as a facility that:

- Is built safely, on time and on budget
- Produces research outputs that are best-in-class both in terms of scientific quality and in terms of socioeconomic impact
- Supports and develops its user community, fosters a scientific culture of excellence and acts as an international scientific hub
- Operates safely, efficiently and economically, and responds to the needs of its stakeholders, its host states and member states
- Develops innovative ways of working, new technologies, and upgrades to capabilities needed to remain at the cutting edge

Core Values

Excellence • Collaboration • Openness • Sustainability

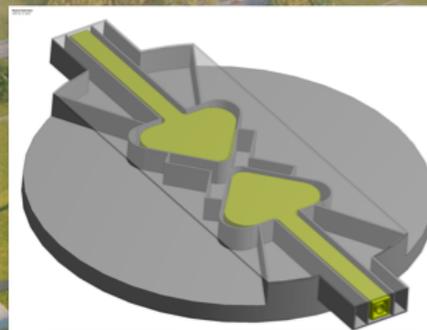
Neutron facilities



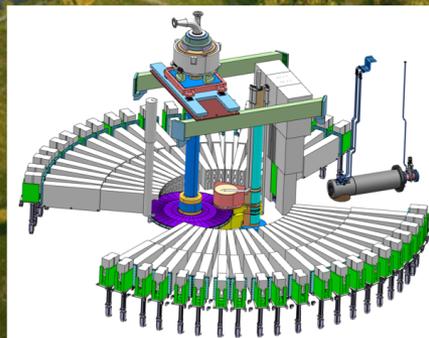
ESS High level design

High Power
Accelerator means
more neutrons

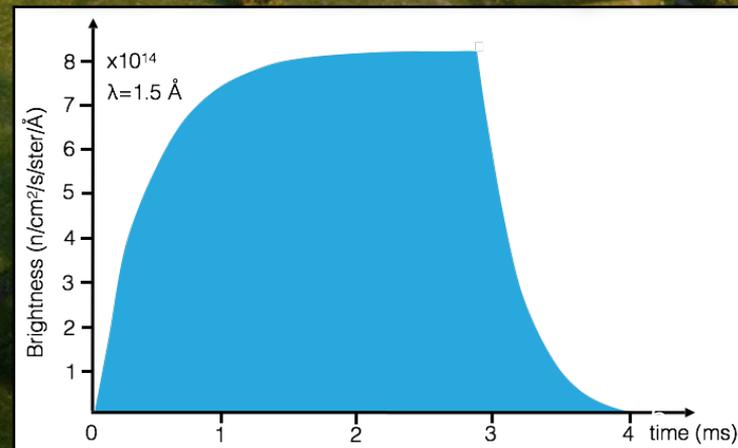
Flat moderator delivering smaller and
brighter neutron beams

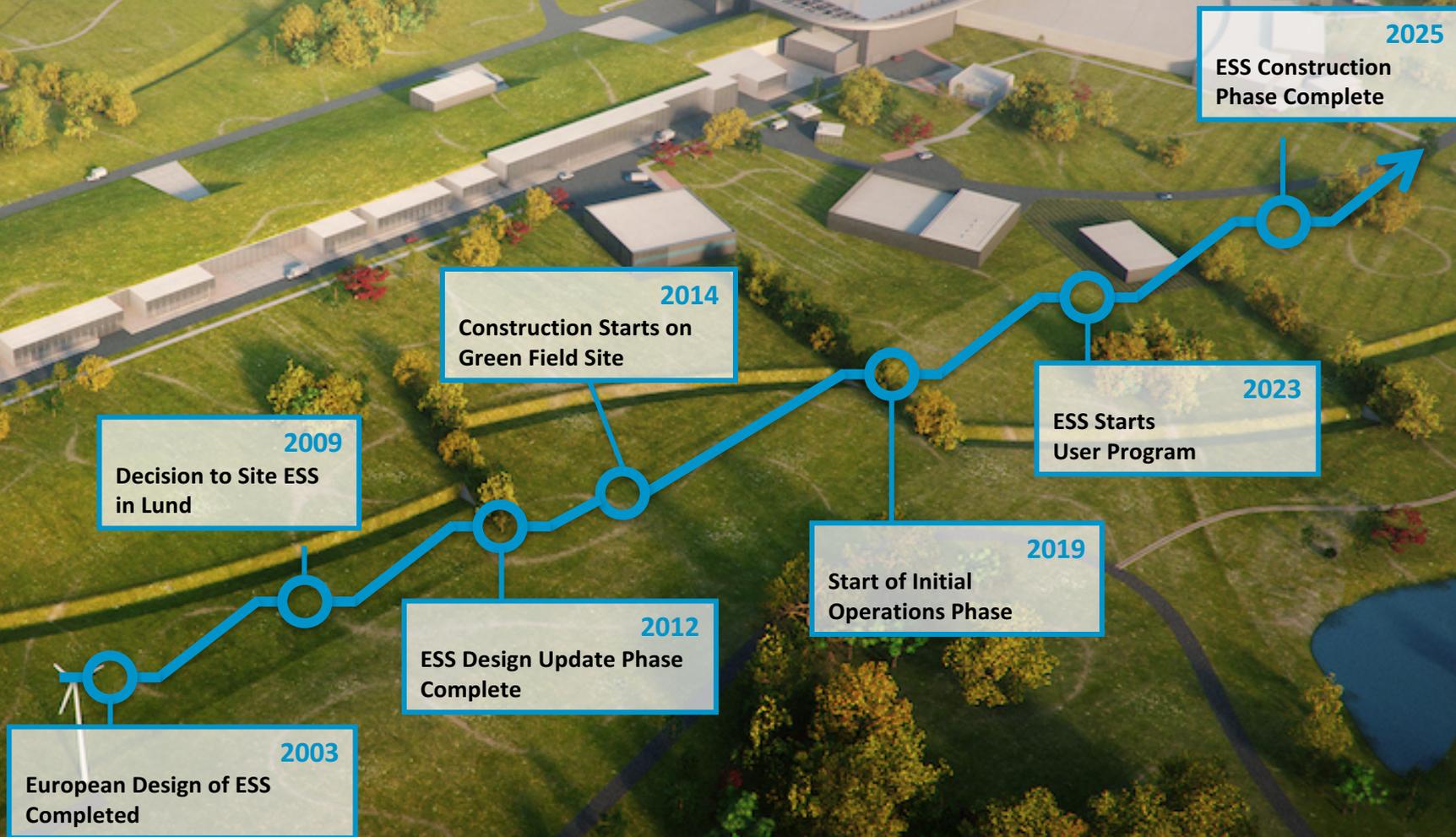


High brightness and tuneable resolution
makes new measurements possible



An Innovative Target Station that
can host >30 instruments





Organisation and People

COMMUNICATIONS AND EXTERNAL RELATIONS DIVISION (4070)
A. Weiskopf
HEAD OF DIVISION
M.-L. Ainalam (L)
J. Barneto Hamneby
C. Bocchetta
F. Möberg
J. Franko
D. Sittler
J. Tierney
J. Oberg
C. Hølgerson
PERSONAL ASSISTANT

**EUROPEAN SPALLATION SOURCE
EUROPEAN RESEARCH INFRASTRUCTURE CONSORTIUM (1000)**

L. Börjesson Council Chair
C. Petrillo Council Vice Chair

J. Womersley
Director General

SENIOR EXECUTIVE ASSISTANT
STRATEGIC PROJECT MANAGER
PROJECT MANAGER
TECHNICAL COORDINATOR

K. Hélène
P. Kinhult
H. Haines
M. Kennedy
S. Jones

ADMINISTRATION & FINANCE COMMITTEE
B. Dormy, Chair
N. Pratt, Vice-Chair
SCIENCE ADVISORY COMMITTEE
A. Meyer, Chair
S. McClain, Co-Chair
TECHNICAL ADVISORY COMMITTEE
P. Lebrun, Chair
P. Ferguson, Co-Chair
J. Galambos, Co-Chair

IN-KIND REVIEW COMMITTEE
M. Marazzi, Chair
COMMITTEE ON EMPLOYMENT CONDITIONS
L. Börjesson, Chair
ES&H ADVISORY COMMITTEE
P. Berkvens, Chair
CONVENTIONAL FACILITIES COMMITTEE

409

Employees



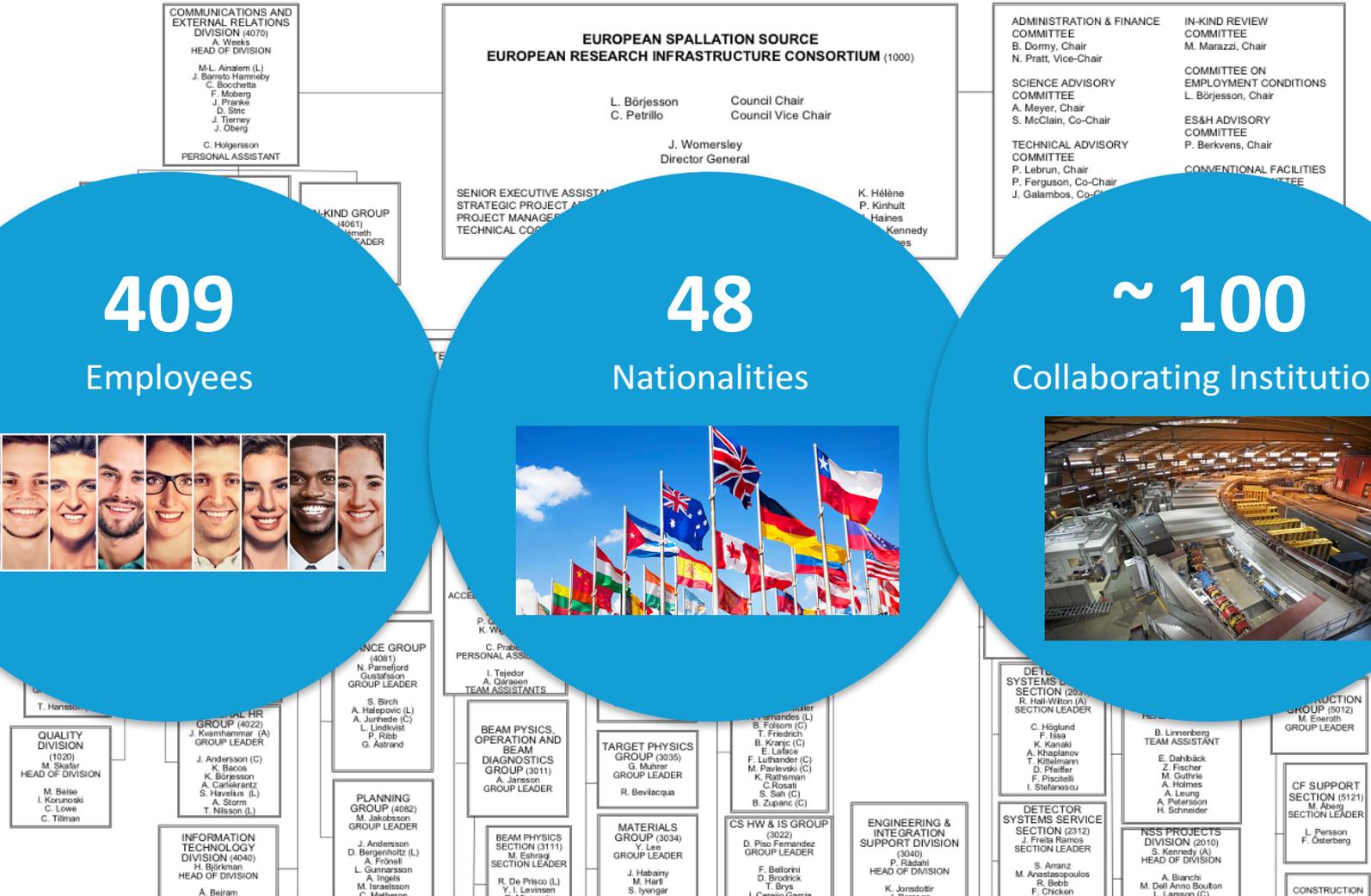
48

Nationalities



~ 100

Collaborating Institutions



Financing includes cash and deliverables

The European Spallation Source ERIC established in 2015

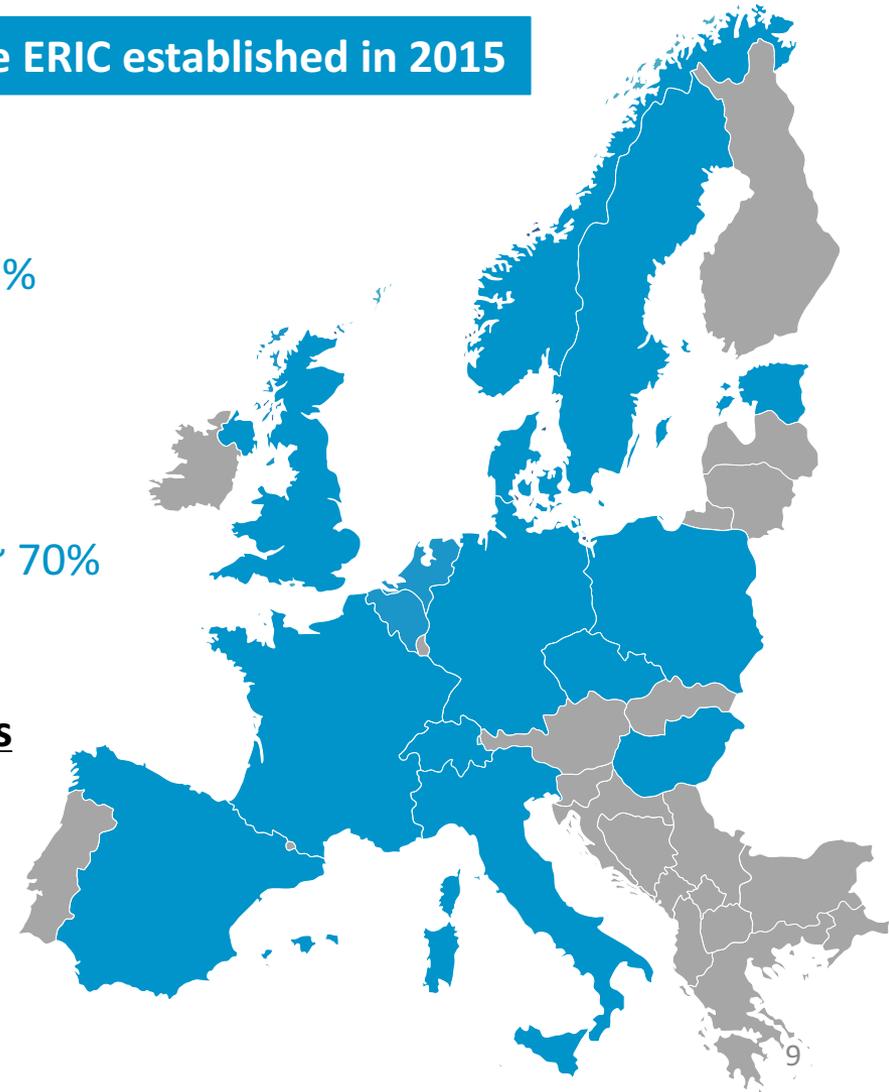
Host Countries Sweden and Denmark

Construction 47.5% Cash Investment ~ 97%
 Operations 15%

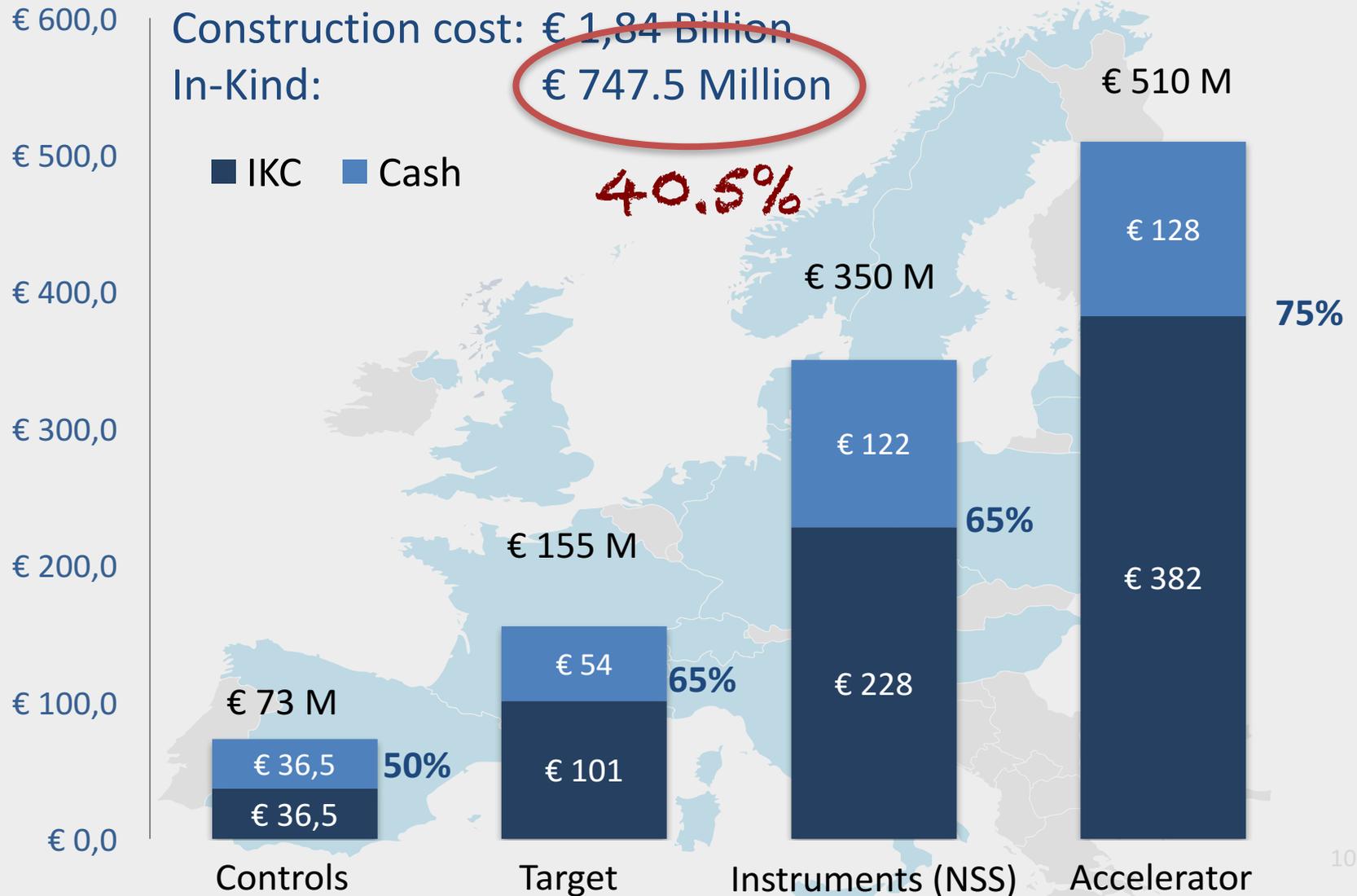
Non Host Member Countries

Construction 52.5% In-kind Deliverables ~ 70%
 Operations 85%

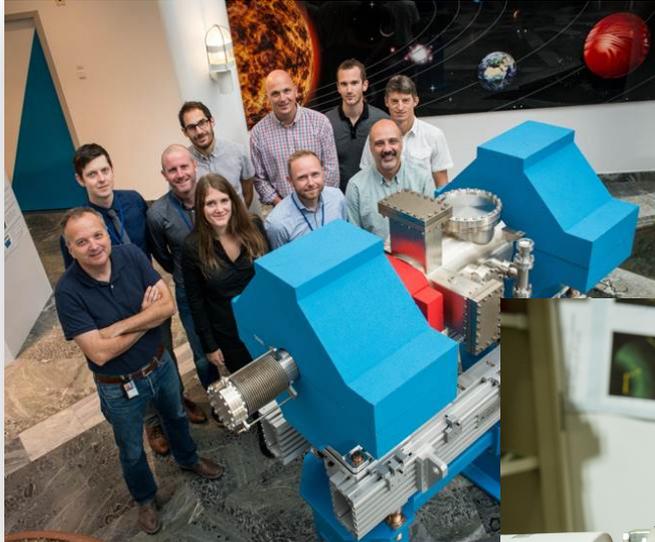
15 European Member and Observer Countries



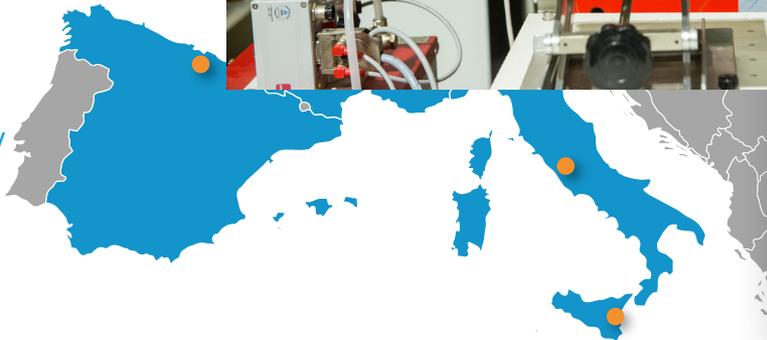
ESS In-Kind Goals



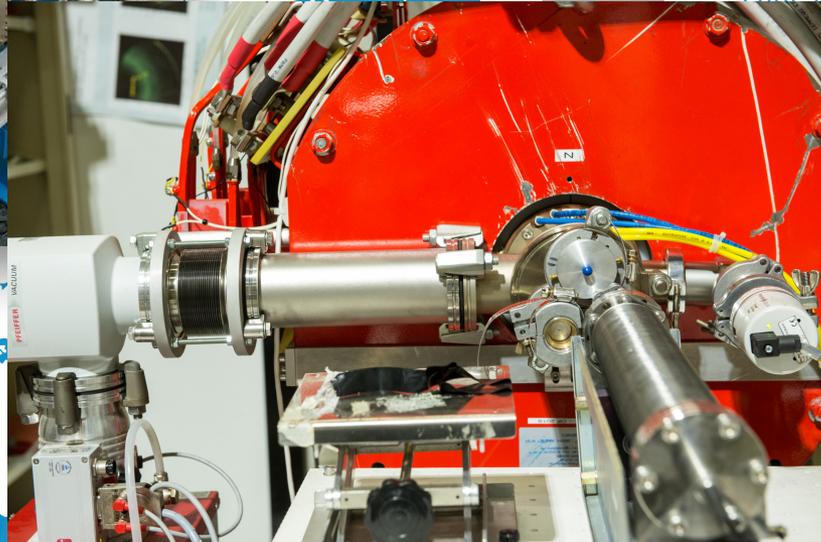
ESS In-kind Partners



Forschungszentrum Jülich
Helmholtz-Zentrum Geesthacht
Huddersfield University
IFJ PAN, Krakow
INFN, Catania
INFN, Legnaro
INFN, Milan
Institute for Energy
Research (IFE)



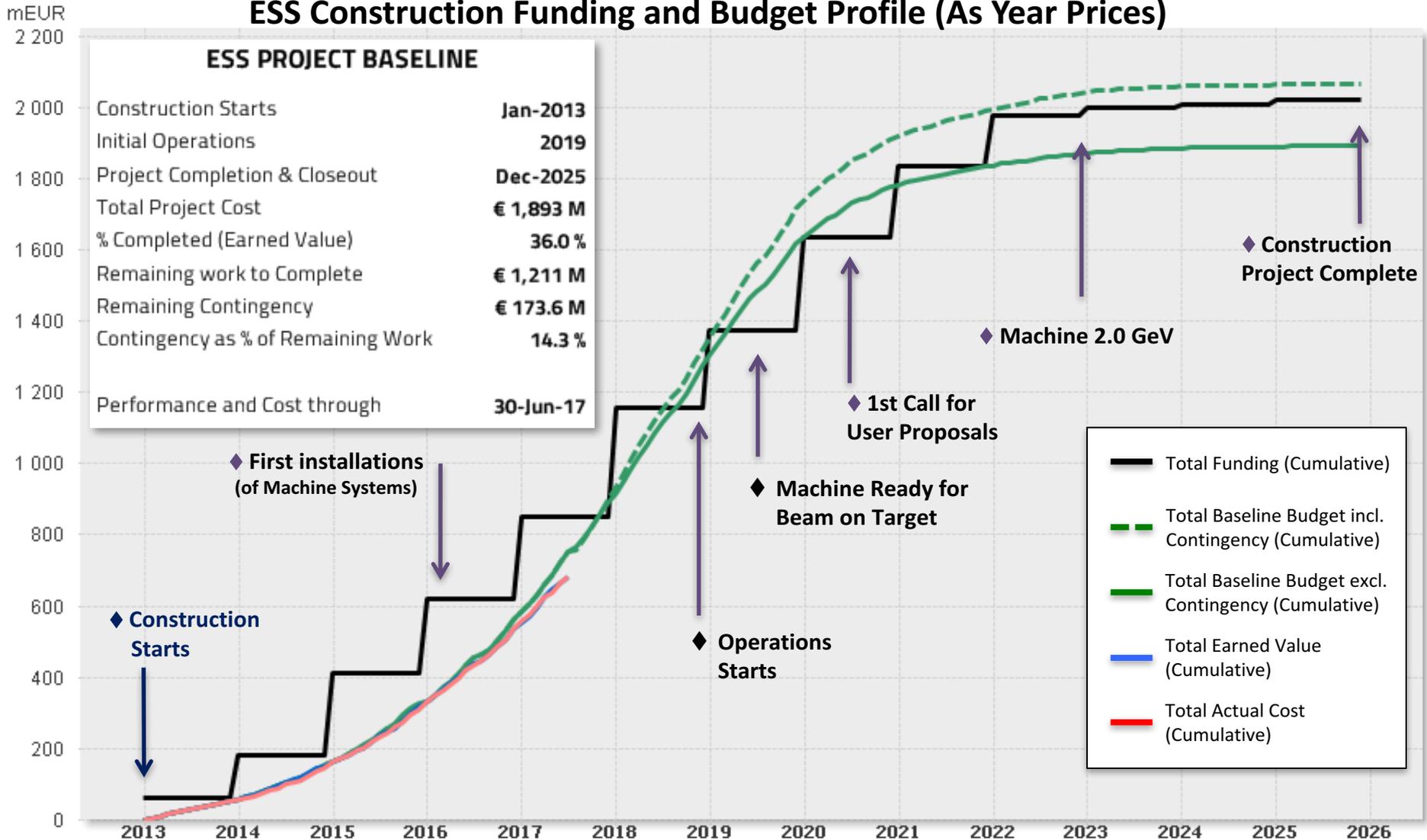
ISIS - Rutherford-Appleton Laboratory, Oxford
Laboratoire Léon Brillouin (LLB)
Lund University
Nuclear Physics Institute of the ASCR
Oslo University
Paul Scherrer Institute (PSI)
Electronic Group (PEG)
University of Jyväskylä
Technical University
Technical University of Denmark (DTU)
Technical University of Munich (TUM)



21 June 2017 version

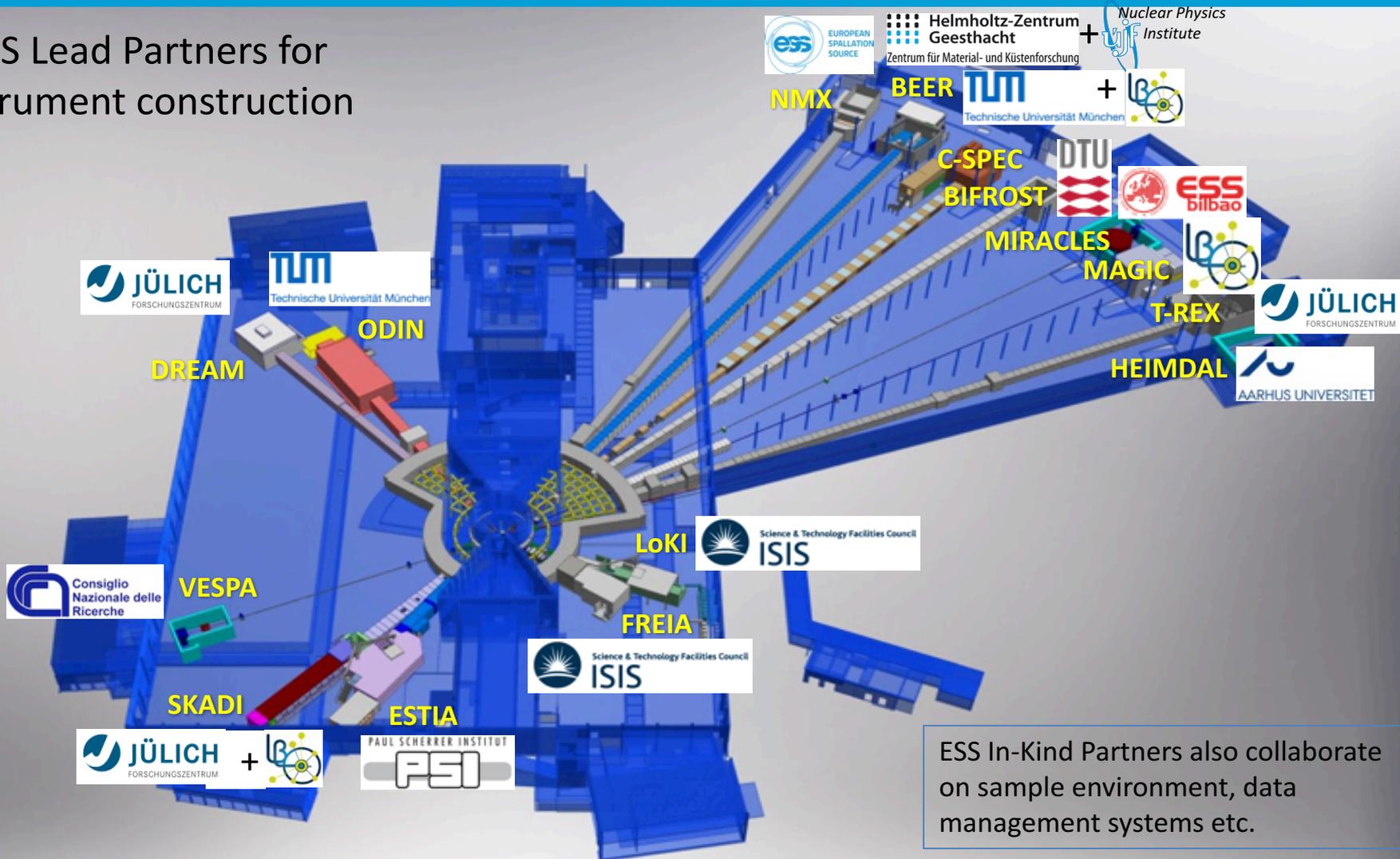


ESS Construction Funding and Budget Profile (As Year Prices)



NSS Neutron Instrument positions

ESS Lead Partners for
instrument construction



ESS In-Kind Partners also collaborate on sample environment, data management systems etc.

The 15 NSS Project Instruments

All are funded to be world leading in 2023

Instrument Class	Instrument	Costbook Value (M€)	Performance targets (@ 2MW)
Large Scale Structures	LOKI (Broad band SANS)	12.19	5 x D22 & 20 x SANS2D
	SKADI (General Purpose SANS) (+SONDE funds)	11.50	4 x D22
	ESTIA (Focusing Reflectometer)	11.80	<ul style="list-style-type: none"> Conventional mode: ~ 100 x D17 High intensity mode: 1cm² samples = seconds
	FREIA (Liquids Reflectometer)	13.2	30 x FIGARO, INTER
Diffraction	DREAM (Bispectral powder diffractometer)	13.66	> 10 x POWGEN or WISH
	HEIMDAL (Hybrid diffractometer)	13.55	~ 50 x GEM, ~ 8 x new POLARIS
	MAGIC (magnetism single crystal diffractometer)	13.10	<ul style="list-style-type: none"> Cold: > 100 x worlds best, Thermal: 1mm³ crystals = 10 min
	NMX (Macromolecular crystallography)	11.67	> 10 x LADI & Biodiff
Engineering & Industrial	BEER (Engineering diffractometer)	14.99	world leading in strain scanning, unique flexibility
	ODIN (multi-purpose imaging)	11.60	world leading for high resolution, > 10 x best for TOF methods
Spectroscopy	BIFROST (extreme environment spectrometer)	13.45	> 10 x THALES & MACS
	C-SPEC (cold chopper spectrometer)	16.50	100 x IN5 (w RRM)
	T-REX (bispectral chopper spectrometer)	16.85	3 x 4-SEASONS, 3 x IN5
	VESPA (vibrational spectroscopy)	12.0	10 x VISION ($\Delta E = 130$ meV)
	MIRACLES (backscattering spectrometer)	13.53	2 x BASIS and DNA
Total cost book value		199.59	

Data Management and Software Centre

COBIS, Copenhagen University North Campus



Provide world leading scientific software and scientific computing support for neutron scattering at ESS

Scientific Software

ESS experiment control system, Data acquisition, Data correction software, visualization, and software to model and analyze experimental data sets.

Data center operations

Store and catalogue ESS datasets, provide ESS users remote access to their data, computing for live data correction, and analysis software during and after experiments.

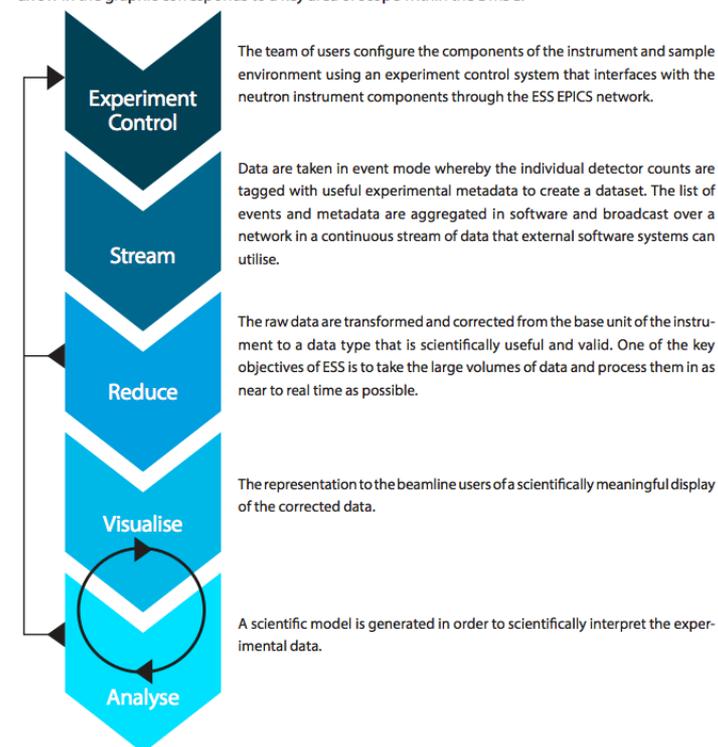
User support

Support ESS users with data treatment and analysis.



From Lund to Copenhagen, and Back Again

The figure illustrates a typical data flow for a neutron scattering experiment. Each arrow in the graphic corresponds to a key area of scope within the DMSC.



Data Flow / Experiment Control

A key objective is to build in from the start the capability for the interconnected software systems to control the experiment. The lines connecting parts of the data flow to the experiment control represent this functionality.

Iterative Workflow

The circle in the graphic represents the iterative workflow of scientific modelling and visualisation of model and experimental data that is often used.

Civil Construction Groundbreaking



September 2014

Civil Construction Groundbreaking



EUROPEAN
SPALLATION
SOURCE



September 2015

Civil Construction Groundbreaking



EUROPEAN
SPALLATION
SOURCE

September 2016

Civil Construction Groundbreaking



September 2017

ESS and Belgium: Current Status



Belgium is a **Founding Observer** of the European Spallation Source ERIC and intends to **become a full Member**.
The level of participation is under consideration.



Belgium is seeking Swedish participation in MYRRHA and a **cross-collaboration between ESS and MYRRHA**.



In-Kind Contribution discussions related to **Accelerator, Target, Environment Safety & Health, and Radwaste Management**.

Contacts between ESS and Belgium



Accession Process

Letter by a formal governmental body addressed to the Council Chair of ESS, describing intended contribution and compliance with European Spallation Source ERIC Statutes

Level of contribution subject to agreement between Belgium and the Council

Conditions the same as for Founding Members if accession completed by April 2018

Council approval of the admission of Belgium as a European Spallation Source ERIC Member by unanimous vote

EU Commission informed