

European Spallation Source the project, working with PLM and Asset mgmt.

Henrik Lindblad

Group Leader PLM & Process support

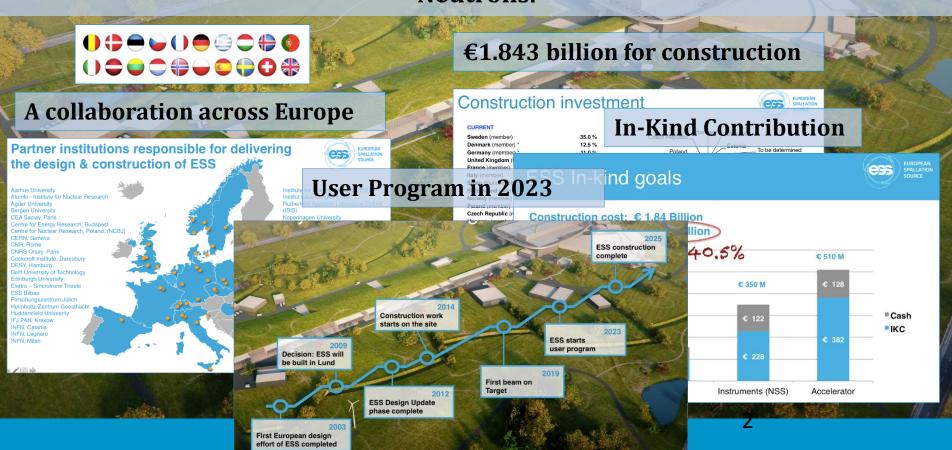
Ola Nanzell Program Manager, TIM & EAM

The ESS Project



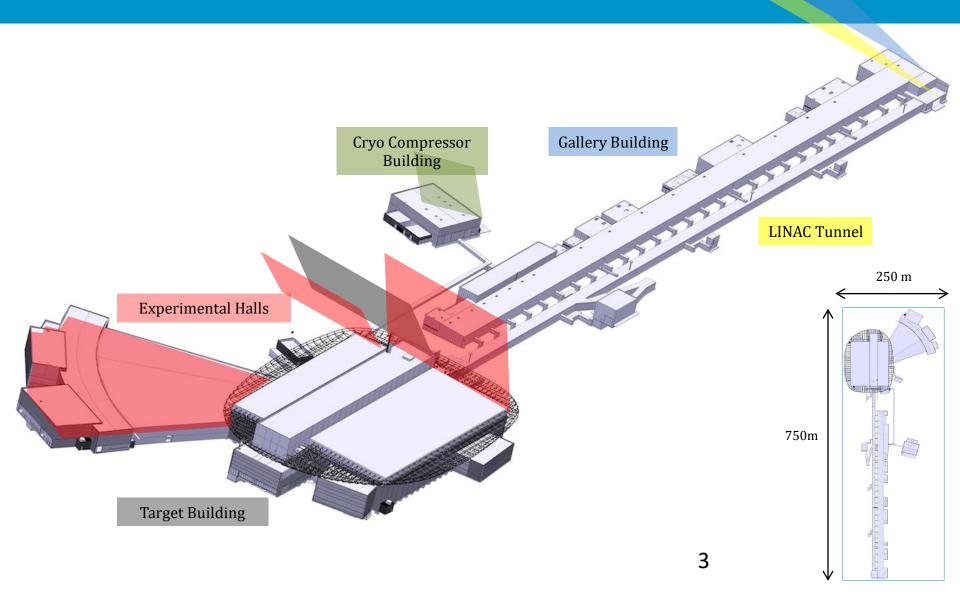
European Spallation Source Mission:

Design, Build, and Operate the world's leading research facility using Neutrons.



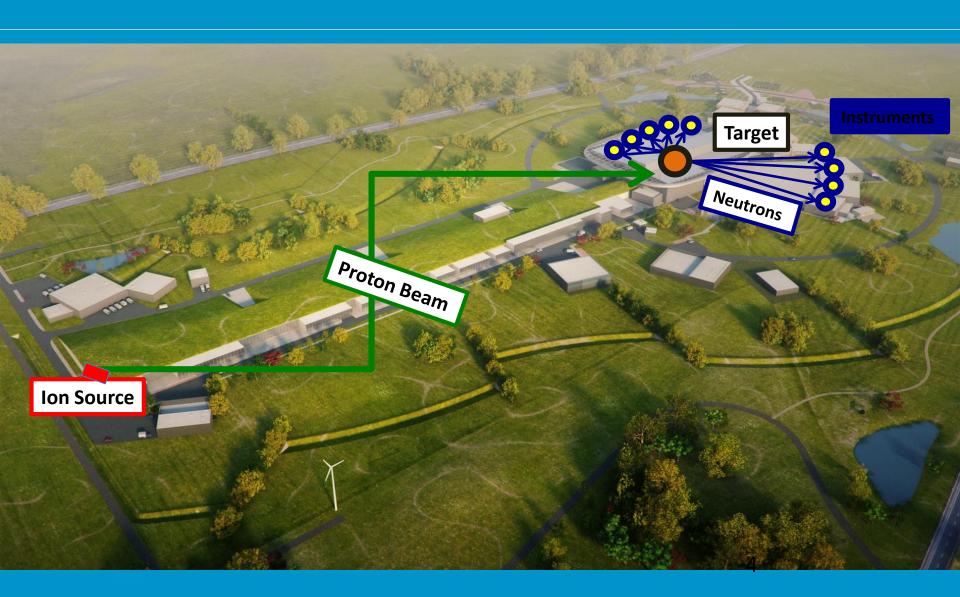
ESS main buildings





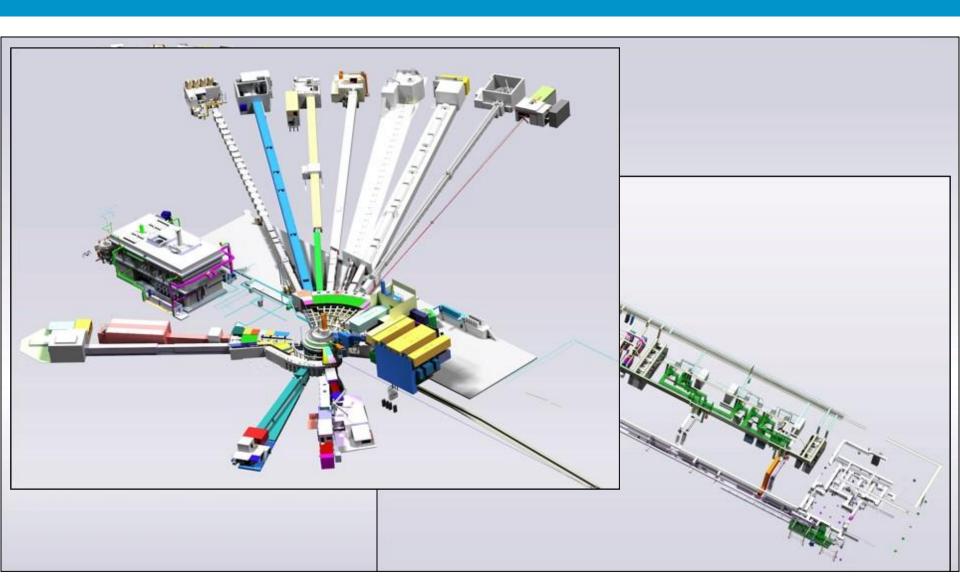
The ESS machine





The ESS machine





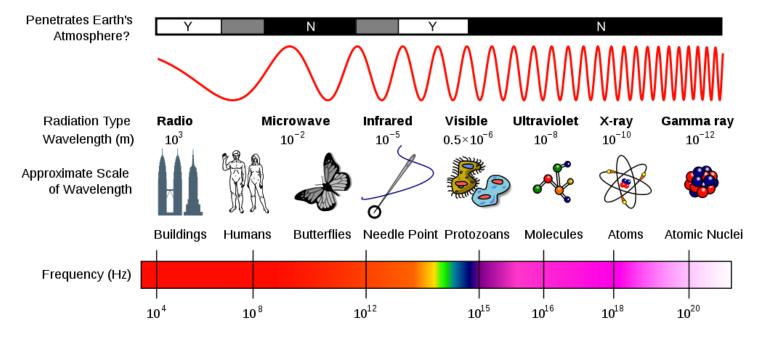
The most powerful spallation source highest flux and real-time data visualization.



Why Neutrons?

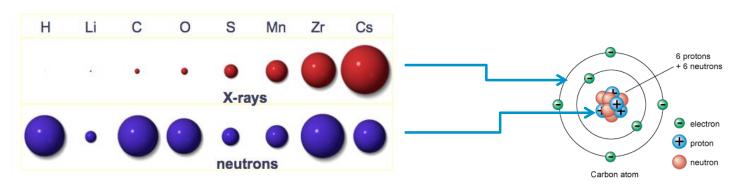






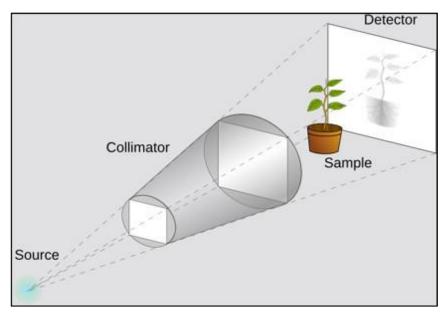
Light Source:

Neutron Source:

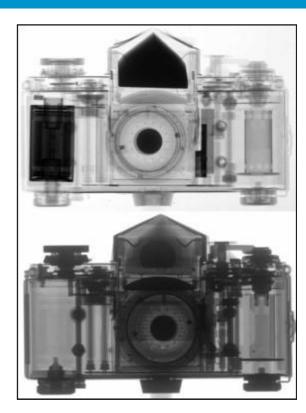


Imaging: X-ray & Neutrons







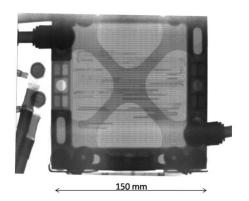




Areas of research using neutrons



Charge neutral deeply penetrating

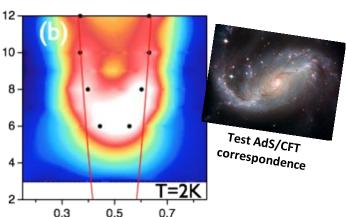


Li motion in fuel cells



Help build electric cars

S=1/2 spin probe directly magnetism



Solve the puzzle of High-Tc superconductivity

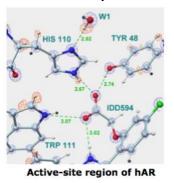


Efficient high speed trains

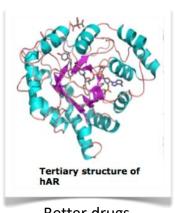
Nuclear scattering

sensitive to light elements

and isotopes



Actives sites in proteins



Better drugs

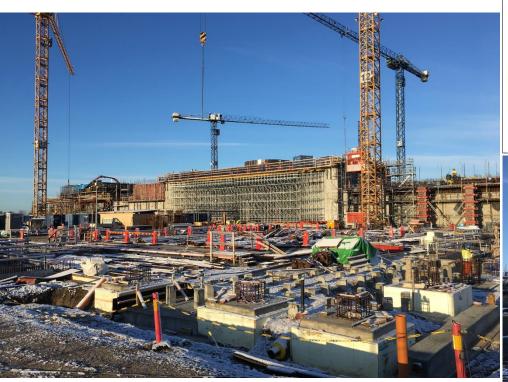
Aerial Picture January 2019

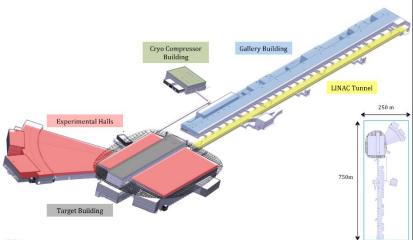




Target Building

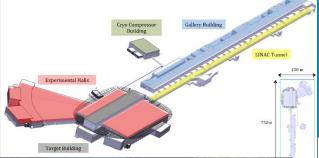








E building: Experimental Halls

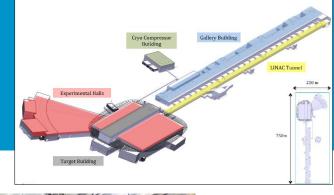




Cryo Compressor Building











Coordination Week 6





PLM & Asset mgmt.

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ESS

Implementing PLM & Asset mgmt. in a science driven organization



- Low level of previous PLM / operational experience
- ·Much focus on delivery, not so much on operational requirements, systems have to pick up the slack
- Not used to connecting design data to operational requirements
- Not used to requirements to manage and maintain design data after commissioning
- Operations supporting systems and predictive maintenance planning is not commonly used yet
- Working in a green field project means users have to cope with the fact that systems, methods and requirements are set in place while the build is going on

PLM & CAD status & tools



- ESS is using Catia/Enovia 3DExperience V6R2016x
- The EPL (ESS Plant Layout) is the CAD master model.
- Buildings design is done in other tools (Revit/Navisworks) and translated and inserted in EPL manually at the moment.
- Plant design is done in AVEVA E3D
- Integration and coordination between disciplines is done in Catia.
- Export of reference models for other disciplines done from ESS Plant Layout in 3DExperience
- Infor EAM is used for asset management
- Epics is control system for the machine



3DEXPERIENCE

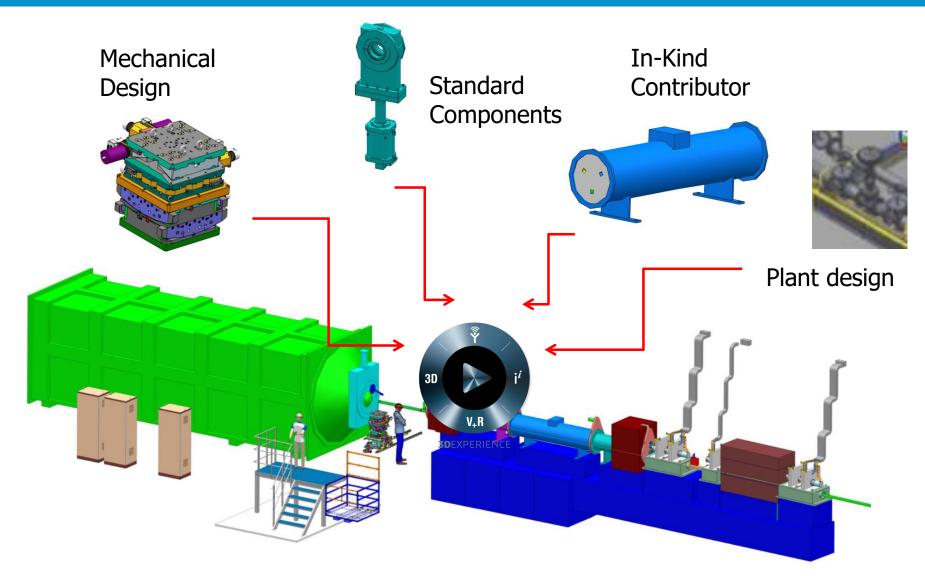




Integration of information



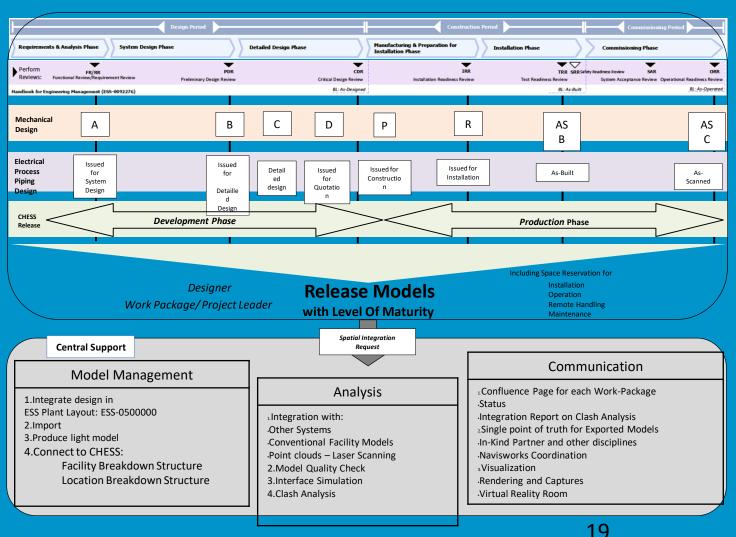
Design digital twin



Lifecycle – Digital Twins



V3: 23-10-2018



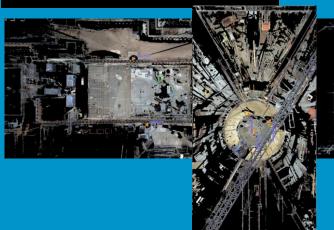
As built scans



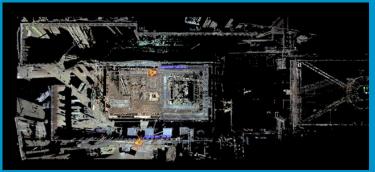












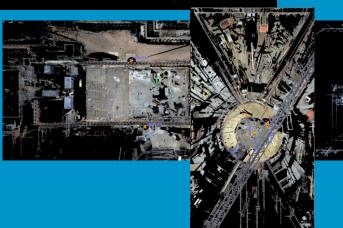
As built scans















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Virtual Reality



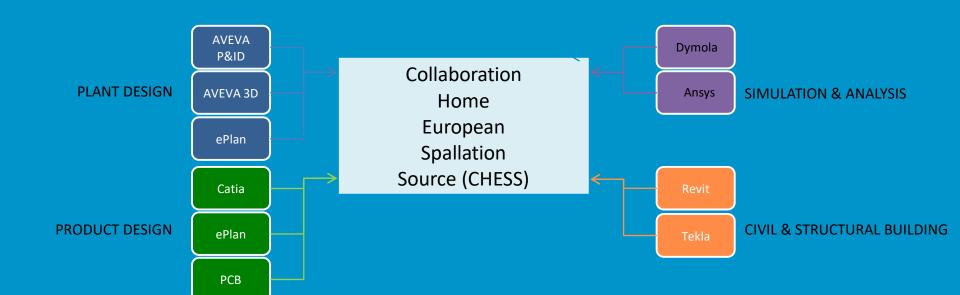
Spatial Integration Section



Systems Integration at ESS

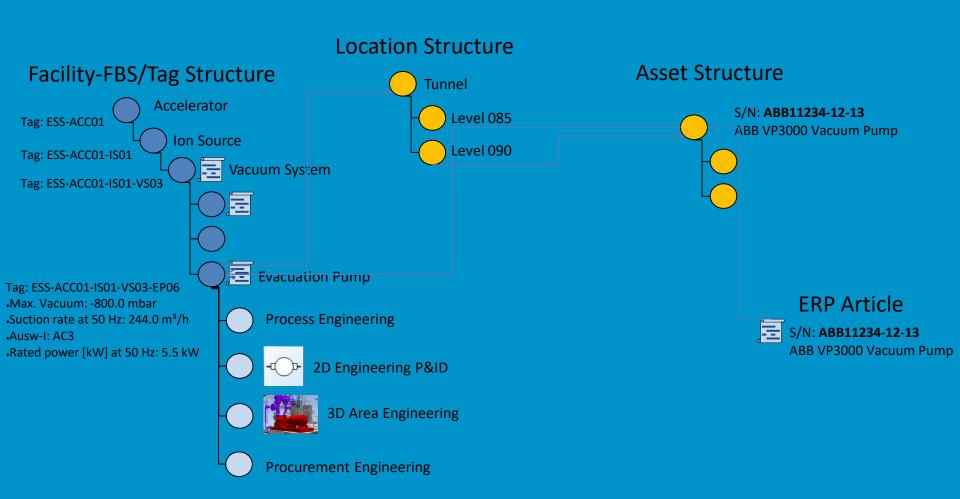


Enterprise Resource Planning Enterprise Asset Management Integrated Control System



Information Flow





What does it look like?





Availability



.24/7 availability while running (95%)

Scheduled maintenance windows

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Warm-up		١	W 1	Warm	n: Lin	ac & Ri	F & 1	magne	ets&s	ub-sy	stems	main	tenac	e an	d optim	nisatio	on																													
Shutdown			Off	Civil E	vil Engineering, Accelerators and BL maintenance with no beam, installations and upgrades 2018															2018_calendari_v8_20180111.xlsx																										
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Control System



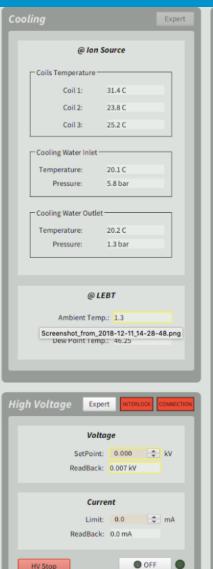
- Experimental Physics and Industrial Control System (EPICS)
- –EPICS is a set of software tools and applications which provide a software infrastructure for use in building distributed control systems to operate devices such as Particle Accelerators, Large Experiments and major Telescopes.
- –Control system for the particle accelerator at ESS
- –Separate network

EPICS, ION Source





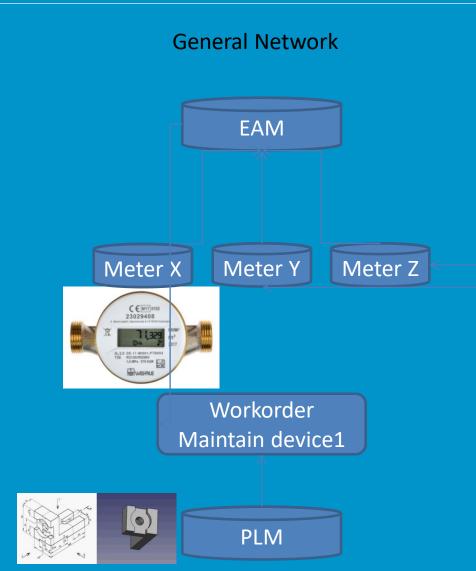


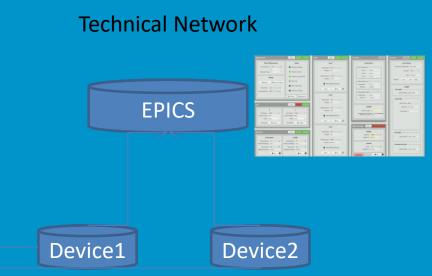




Maintenance from Meter Readings





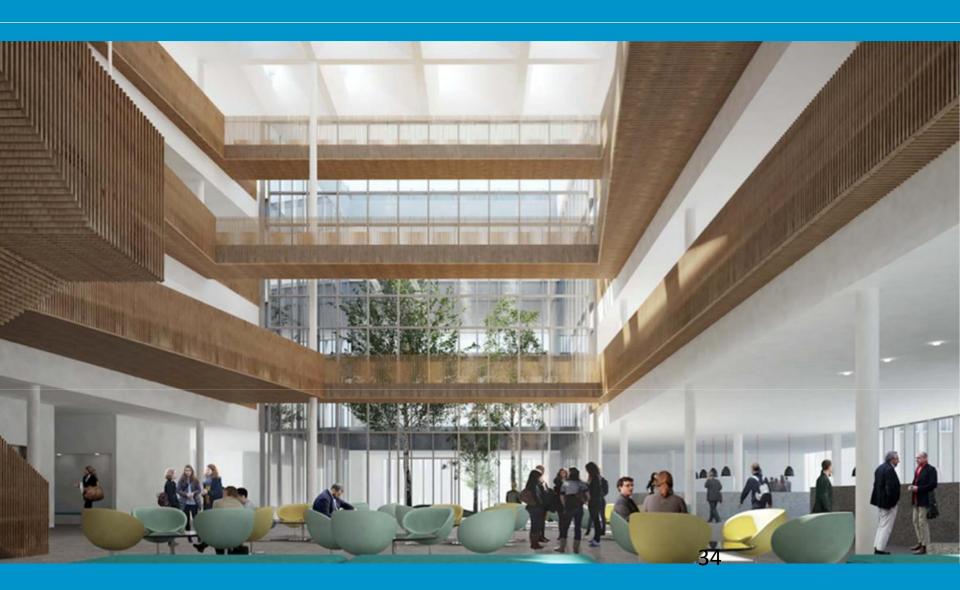


ESS Campus









ESS (I)IOT



