Fostering diversity and overcoming inequality in the development and use of RIs

Swedish perspective: ESS and MAX IV ?

Lars Börjesson Chalmers University of Technology e 2 0 u 1 8 · a t

MAX IV National facility Large international use Inaugurated 2016 16 Beamlines funded; 3 non-Swedish

ESS

- 13 European Members Countries
- Almost 50% complete many buildings are complete
- In-kind deliveries of high tech equipment

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Large investments

- ESS 1843 M€₂₀₁₃
- MAX IV > 450 M€

SE and DK Governments – strategies for utilisation of the facilities - capacity building, societal challenges, industry co-operation

Utilisation of the ESS for Science and Innovation – Swedish Activities and Opportunities for Cooperation



EUROPEAN SPALLATION SOURCE

- Government's general strategy for ESS (and MAX IV) presented in May 2018
- Capacity building Graduate School (SwedNess)
- High tech delivieries to research facilities Big Science Sweden (ILO- function)
- SweBeams Research Council and Innovation Agencies strategies for Academic and Industrial utilisation and cooperation
- Science Village Scandinavia local platform situated between ESS and MAX IV for science support, innovation, science parks, start-ups, incubators.....

Organisation and People



EUROPEAN SPALLATION SOURCE



Opportunities to fostering diversity and overcoming inequalities

- Open access to beamtime, peer review
- Construction— High-tech development
 - Sharing technical design and procurement
 - In-kind contributions
- Utilisation of RI for Research and Innovation
 - Cross-border cooperation
 - Baltic Tram
 - Involvement in beamlines/instruments

Open data

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Construction

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Shared technical design and procurement.
 MAX IV 1.5 GeV rung – Solaris, Poland

In-kind contributions

Sharing Technical design – Procurement The SOLARIS – MAX IV cooperation

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3 GeV

1.5 GeV

ring

MAX IV technical design

- New magnetic lattice
- Multi-bend achromats
- Higher performance
- Less expensive

- 3 GeV ring 540m /(0.24 nmrad)
- 1.5 GeV ring 96 m (5.6 nmrad)
- 3 GeV linac Injection/short pulse

Cooperation Technical design – Procurement The SOLARIS – MAX IV cooperation





What is Solaris?

Polish Synchrotron Radiation Facility in Krakow

- **Replica** of the MAX IV 1.5 GeV Storage Ring and parts of the injection system being concurrently built in Sweden.
- SOLARIS is on the Polish Research Infrastructure Roadmap
- Agreement has been signed between Jagiellonian and Lund Universities for mutual cooperation in the construction of Solaris based on MAX IV.
- Unique collaboration between two EU countries
 - Maximises the utilisation of human and financial capital for more effective use of public (EU) funds.
 - Quick training of new people with optimal use of mentorship and expert knowledge through project objectives.
 - Procurement efforts are rendered more effective by not duplicating tasks and allows industry to program its response to large-scale research infrastructure requirements.
 - Sharing of critical knowledge of building design and construction.

Implementation

Solaris team (technical) is hosted at MAX-lab and participates in project activities and training.

Sharing of mutual resources.

Procurements for Solaris are as options in MAX IV tenders – with constraints.



The SOLARIS – MAX IV cooperation Shared technical design, training and procurement

- Effective use of technical design effforts
- Cost-effective
- Effective training





Latest technical development

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In-kind contribution to construction

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Benefits

- For RI: Tap into expertise pool among partner labs for technical design and construction. Limits building up of all expertise at RI (geen-field)
- For Contributor: Opportunity to develop and strengthening national/regional technical expertise in certain areas

ESS In-kind Partners

Aarhus University Atomki - Institute for Nuclear Research **Bergen University CEA Saclay, Paris** Centre for Energy Research, Budapest Centre for Nuclear Research, Poland, (NC **CNR**, Rome **CNRS Orsay, Paris** Cockcroft Institute, Daresbury Flettra – Sincrotrone Trieste **FSS Bilbao** Forschungszentrum Jülich Helmholtz-Zentrum Ge Huddersfield University IFJ PAN, Krakow INFN, Catania **INFN**, Legnaro INFN, Milan



ISIS - Rutherford-Appleton Laboratory, Oxford Laboratoire Léon Brilouin (LLB) Lund University Nuclear Physics Institute of the ASCR **Oslo University** Paul Scherrer Institute (PSI) Polish Electronic Group (PEG) **Roskilde University Tallinn Technical University** Technical University of Denmark (DTU) Technical University Munich (TUM) Science and Technology Facilities Council University of Copenhagen (KU) University of Tartu Uppsala University Wigner Research Centre for Physics Wroclaw University of Technology Warsaw University of Technology Zurich University of Applied Sciences (ZHAW)

In-kind contributions to construction

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Success factors

- A clear framework for in-kind, including coordination, at the RI
- Clear benefits to the RI: tap into expertise pool, risk reduction

- Fully committed institutions that have the ability to deliver
- Clear local benefits of the in-kind contribution
- In line with national/inst development strategies
- Use of structural funds

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Utilisation for Research and Innovation

- EC Interreg projects
 - Cross-border Science. MAX4ESSFUN
 - Baltic Tram
- Involvement in instrument or beamlines
- Opportunities for local presence at Lund site

Interreg project



Baltic TRAM (Transnational Research Access in the Macroregion) -

- Strengthens the relationship between analytical research institutions and business,
- Links expertise to concrete industrial needs.
- Companies get consultations and access to research facilities to test their ideas
- Implementation of smart specialisation strategies,
- Operates in the whole Baltic Sea Region effort of making the Baltic Sea Region innovative, sustainable and competitive

Coordinator: DESY

Interreg Project: MAX4ESSFUN

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Goals

- Increase nr of researchers
- Create inter-regional network
- Framework for educati on of PhD students and postdocs
- Strengthen of overall research potential by building on complementary strength of different institutions

https://max4essfun.ku.dk

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Interreg Project: MAX4ESSFUN

Research projects

- Support for up to 6 months for PhD students or post-docs
- Only synchrotron light and/or neutrons projects.
- Educati
 ng young researchers in the use of S &N techniques
- Must involve both a supervisor and a co-supervisor which are cross-border

Large success

- 194 supported projects
- Experienced supervisors building network
- Many new young users
- New areas and research groups in the field
- Builds new capacity in a very effective way
- 6 Summer schools +10 Workshops

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Involvement in instrument/beamlines

Building and operation of beamlines

- FinEstBeamline@MAX IV
- DanMAX@MAX IV

- Long-term capacity building
- Technical development
- Continuous presence at RI knowledge tranfer + hub



Local presence at outstations universities, institutes, companie

Laboratories: Bio, nano, materi environments...

Incubators, R&D Divisions, Sc Hotel and restaurants Science Center, visitors center Conferenses and workshops

SCIENCE VILLAGE SCANDINAVIA

SPACE Building: Reception, exhibition space, guest house for MAX IV and ESS (~100 rooms), office and meeting space, restaurant

SPALLATIO

Swedish Government approval August 2018

Tramway from Lund C station

Conclusions

Ways to

- Share technical design, experience and procurement
- Distribute technical development in kind contr
- Involve industry in broader regions (Baltic sea)
- Build cross-boarder capacity and network effectively
- Be involved at facility through beamline involvement

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Thank you for your attention!

Lars Börjesson Chalmers University/ESS