EUROPEAN SPALLATION SOURCE

European Spallation Source

ESS Partner and Industry Day
Bonn, 22 January 2014

Jim Yeck
CEO & Director General

Dimensions of ESS

A Next Generation Materials Research Infrastructure

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PROJECT/FACILITY

A partnership of 17 European nations committed to the goal of collectively building and operating the world's leading facility for research using neutrons by the second quarter of the 21st century.

SCIENCE

The most powerful spallation source with the highest flux and realtime data acquisition

- Life science
- Soft condensed matter
- Chemistry of materials
- Energy research
- Magnetism and superconductivity
- Engineering materials and geosciences
- Archaeology and heritage conservation
- Fundamental and particle physics

SOCIETY

Research directly related to societal values
Opportunity to benefit from the innovation capacity of industry.
Driver for job creation


LIGHTNING
NEW MATERIALS
SOLAR ENERGY
FUNCTIONAL FOOD
MEDICINE
COSMETICS
PACE-MAKERS
TAILOR MADE MATERIAL
MOBILE PHONES
BIO FUEL
TRANSPORTS
IMPLANTS
GEO SCIENCE
ESS
Malmström

Neutrons are special

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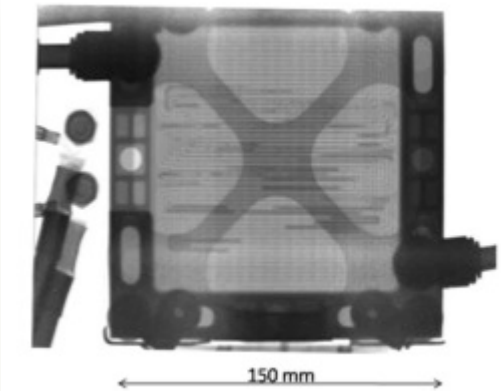
Charge neutral

Deeply penetrating

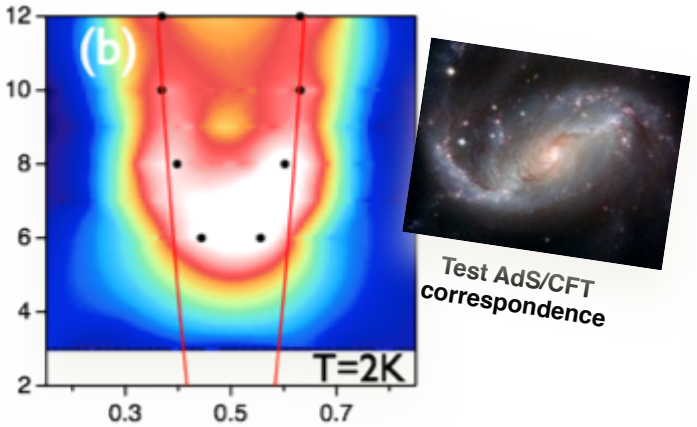


Li motion in fuel cells

Help build electric cars

S=1/2 spin

Directly probe magnetism

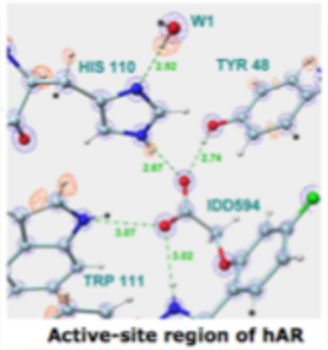


Solve the puzzle of High-Tc superconductivity

Efficient high speed trains

Nuclear scattering

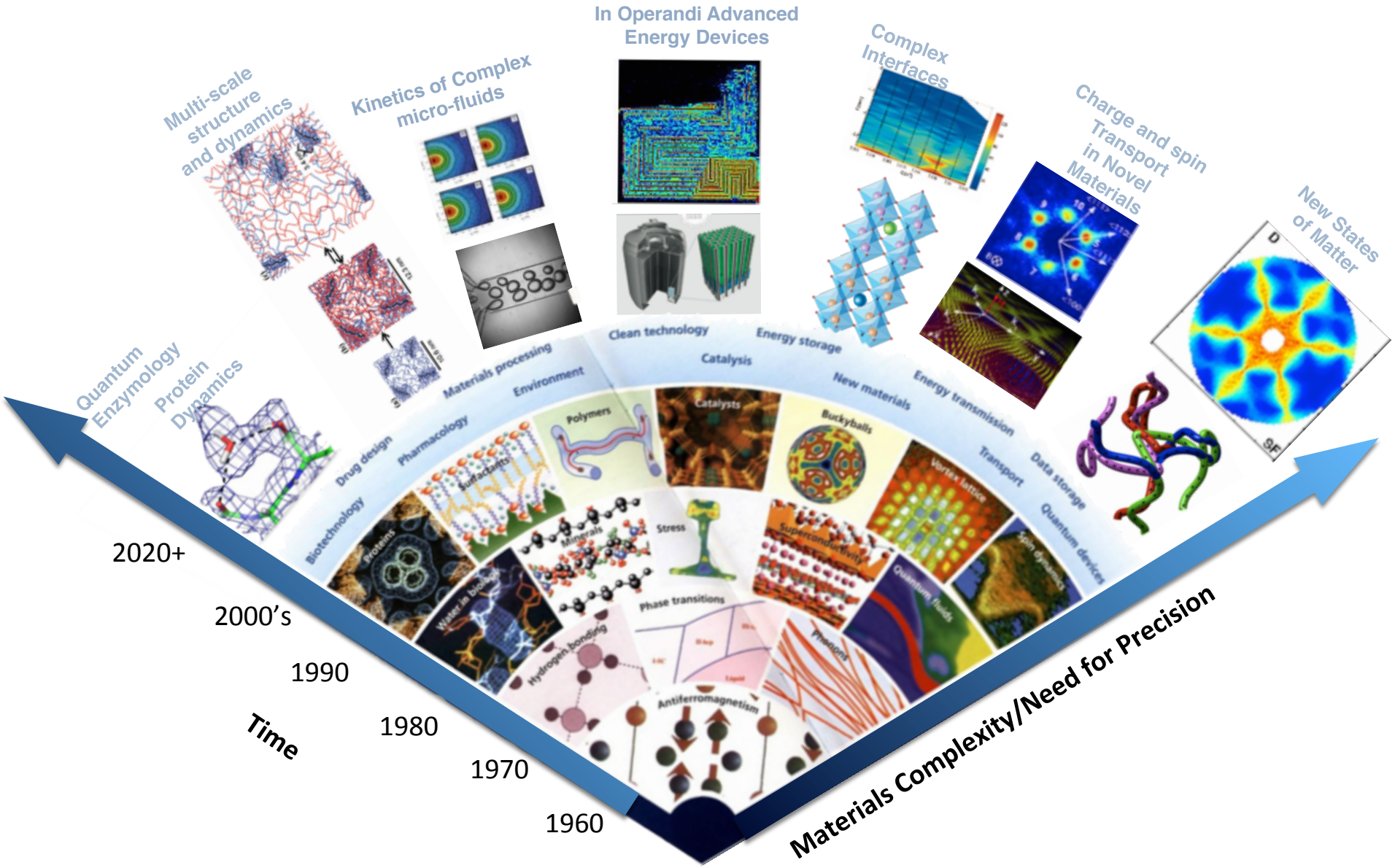
Sensitive to light elements and isotopes



Actives sites in proteins

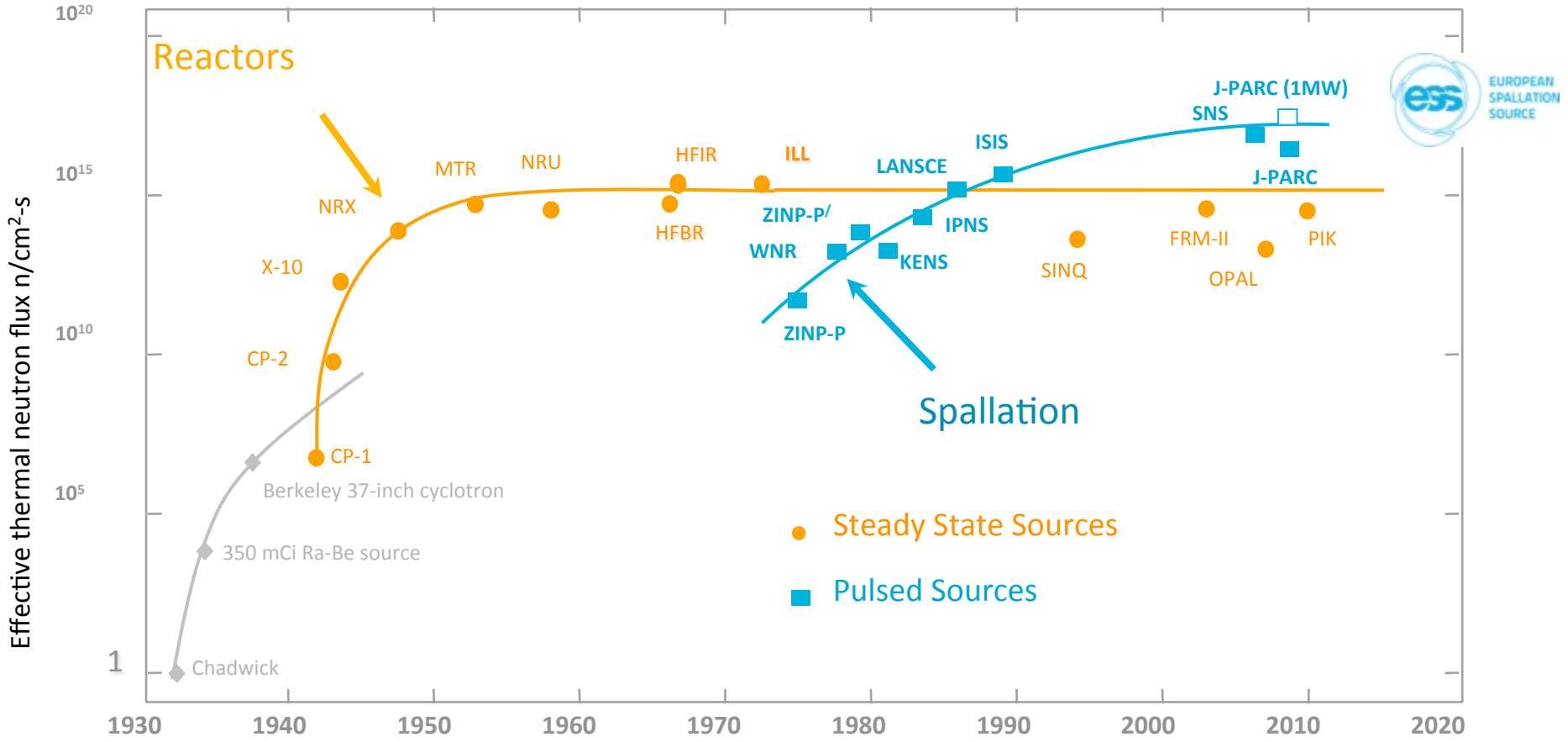
Better drugs

Science with Neutrons
Past-Present and Future

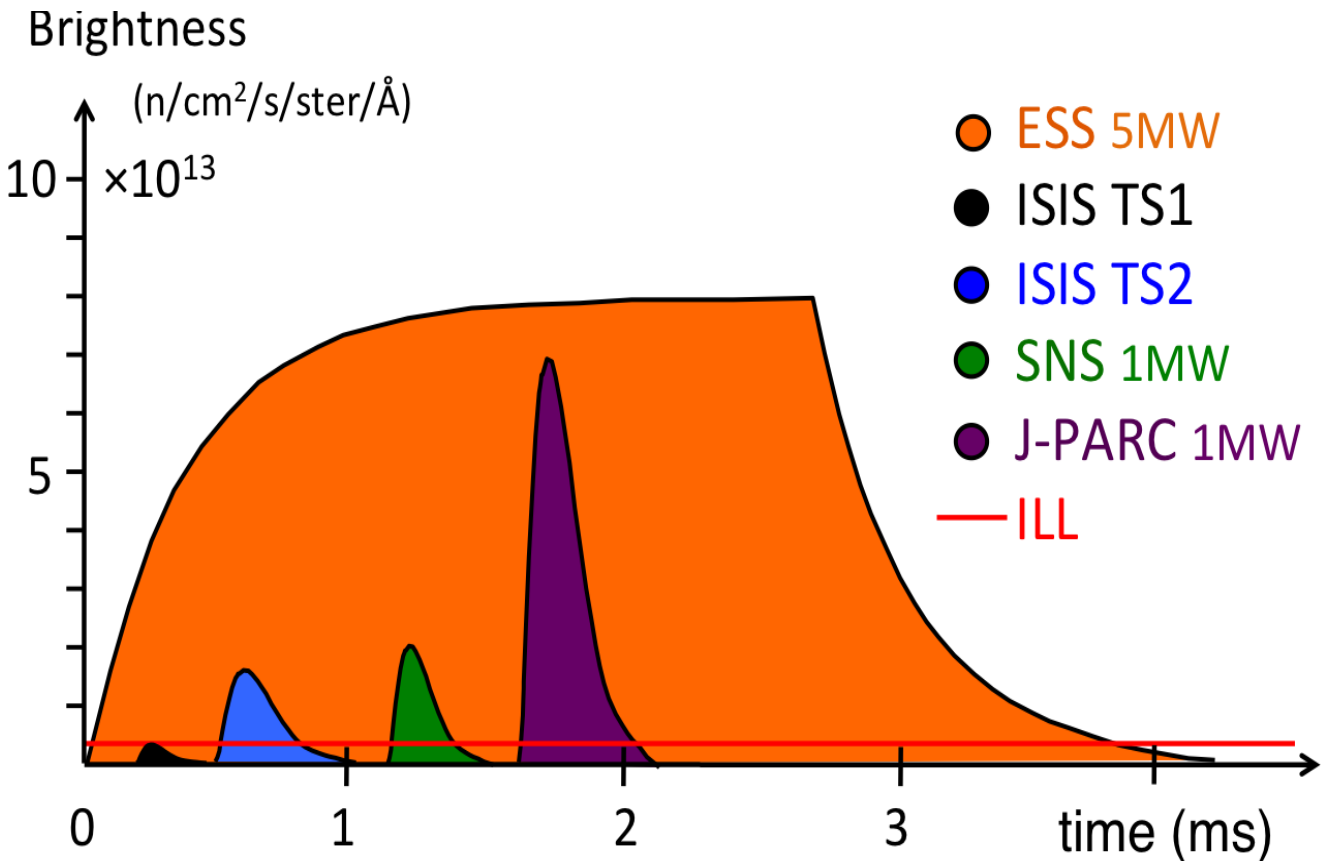


ESS - Bridging the Neutron Gap

- ESS will be more powerful and several times brighter than existing facilities
- Compliments existing neutron scattering facilities



ESS is a long pulse source



Largest European science project

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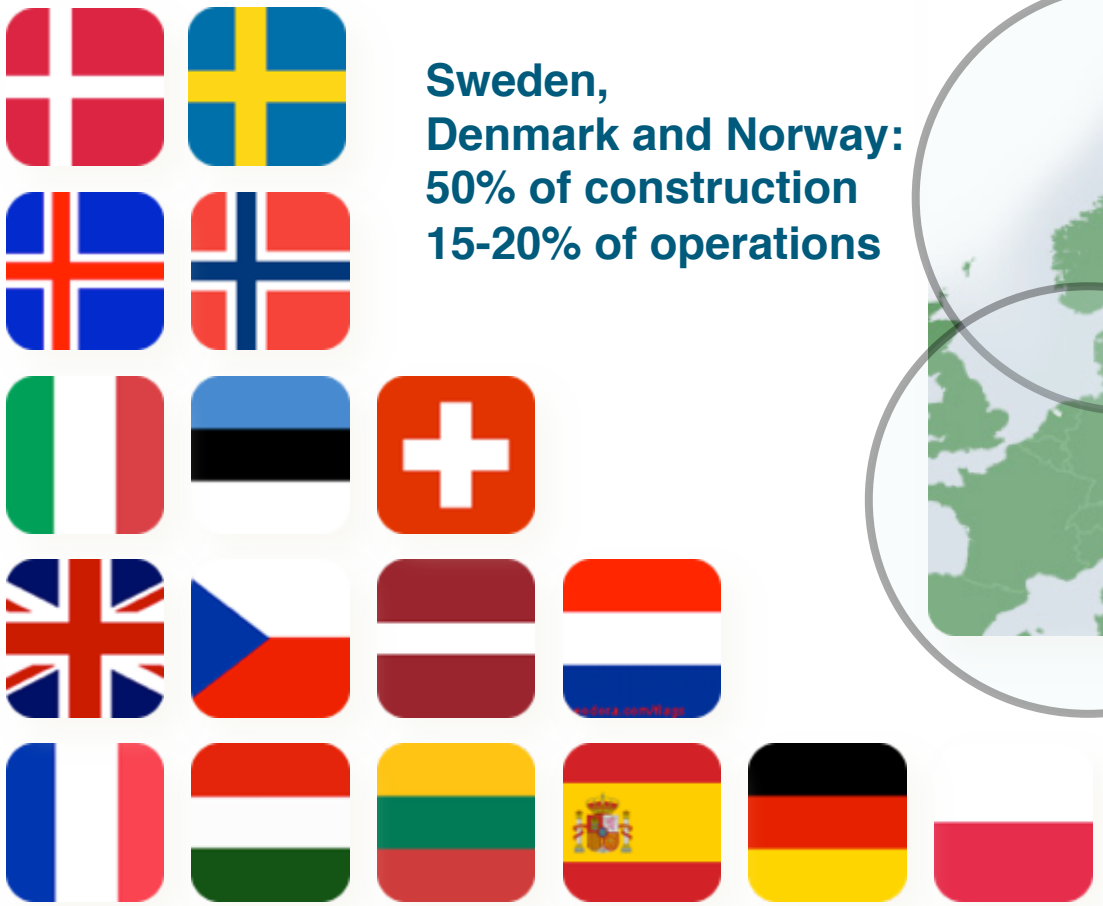

Sweden,
Denmark and Norway:
50% of construction
15-20% of operations

European partners:
50% of construction

Collaboration with Germany in the Pre-construction Phase

- The German in-kind contribution during pre-construction phase totaled over EUR 20m value
- Involvement in 33 WPs related to Accelerator, Science and Target
- 6 German institutes participating in the collaborations :
  DESY, HZB, HZG, JÜLICH, KIT, TUM

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

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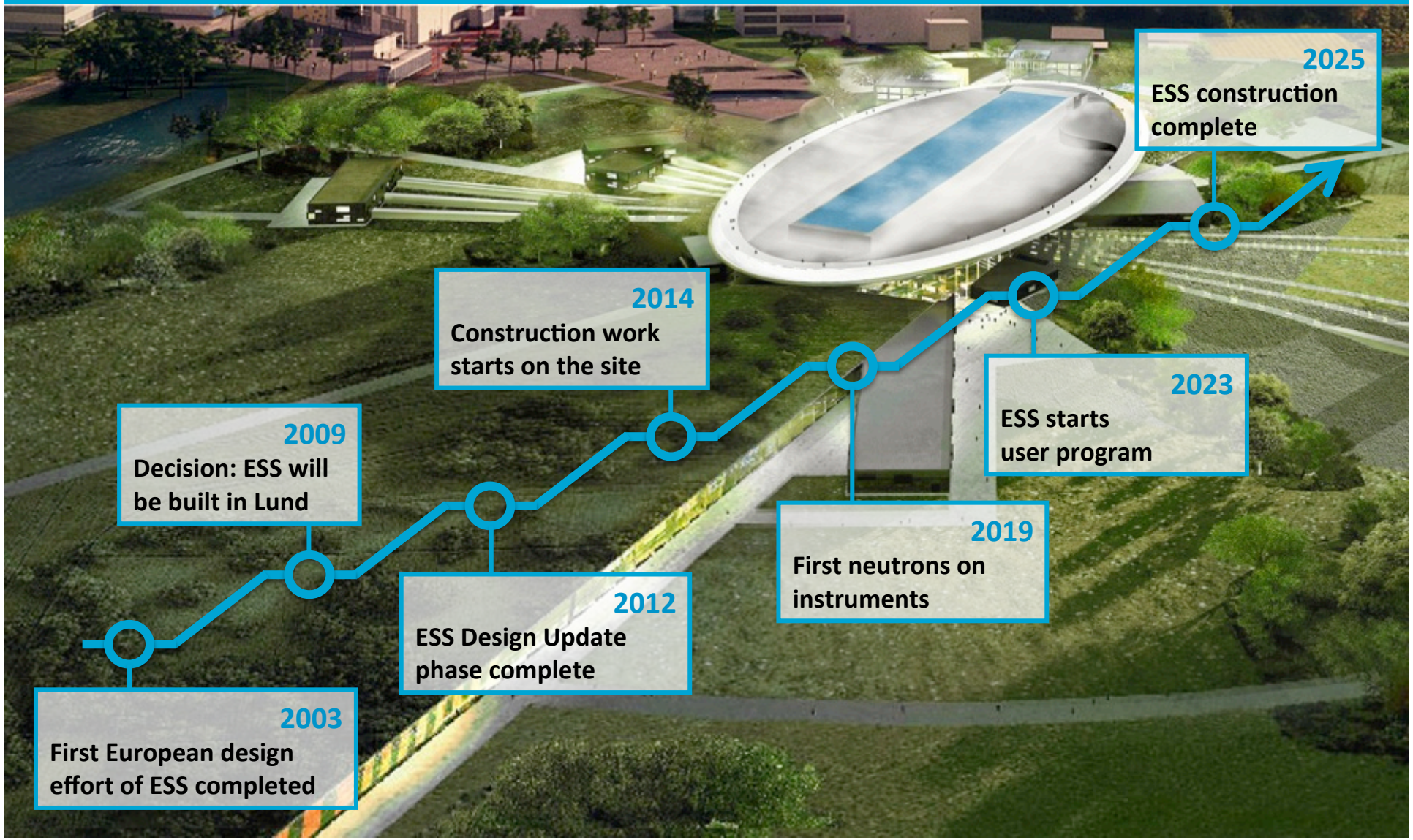
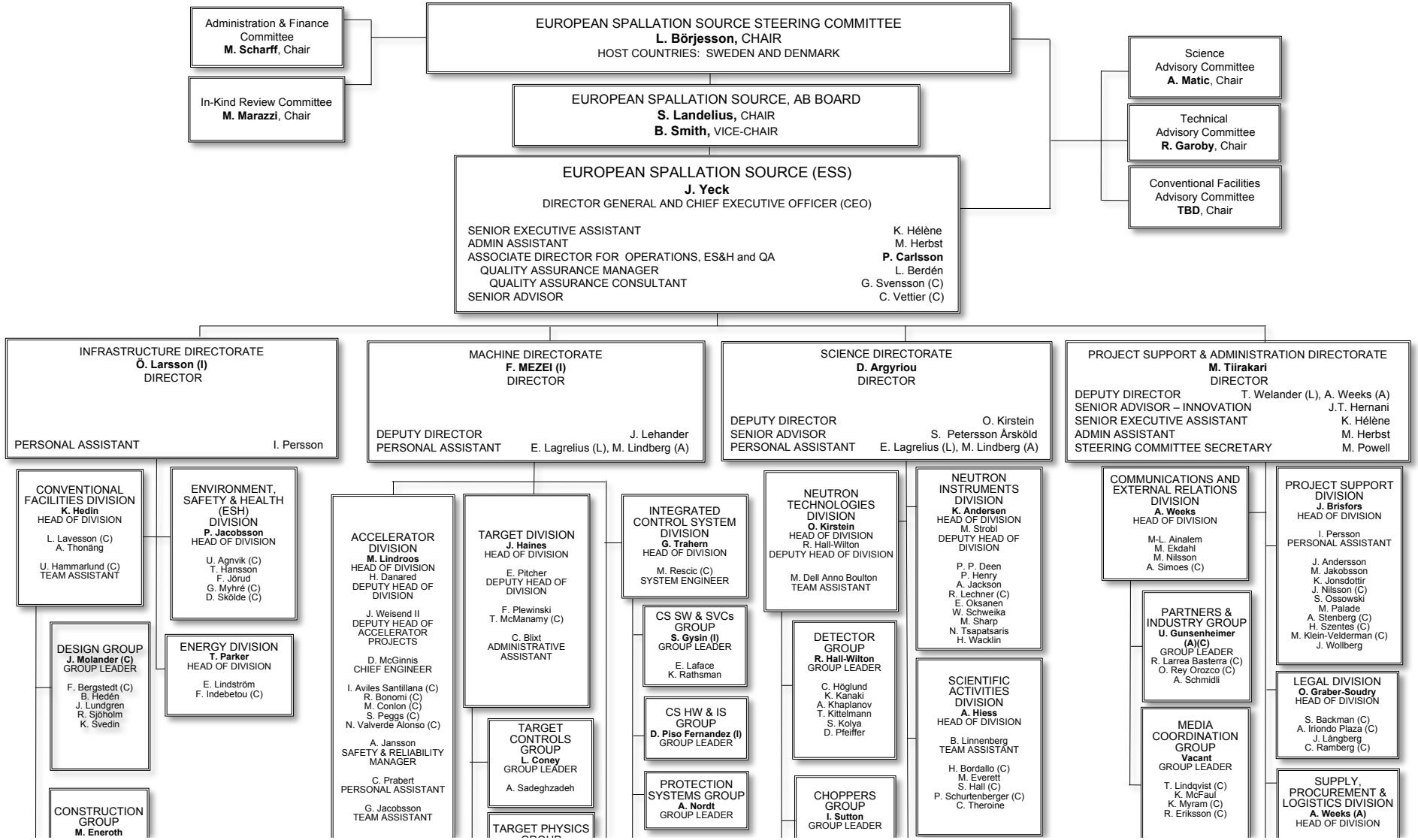
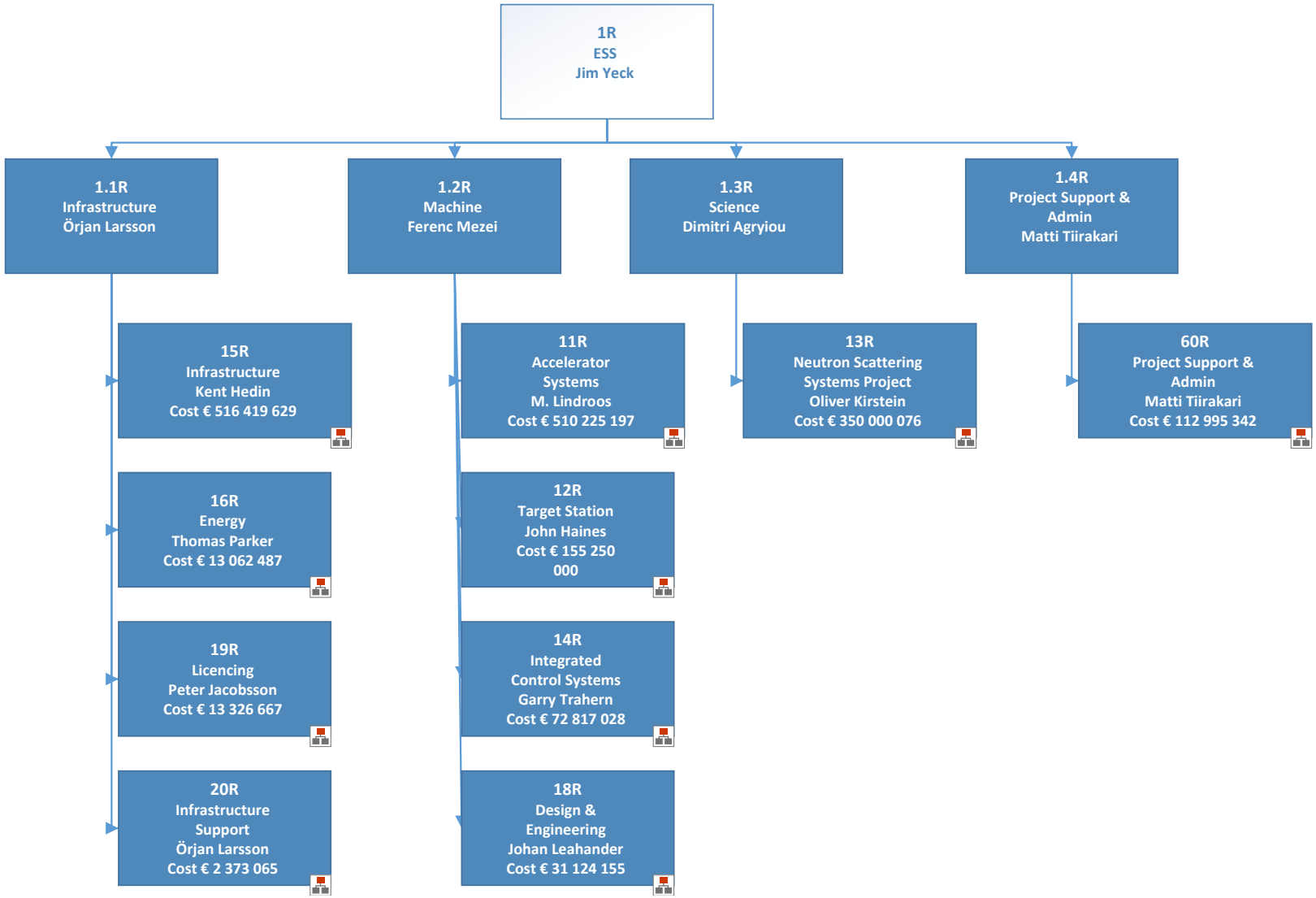


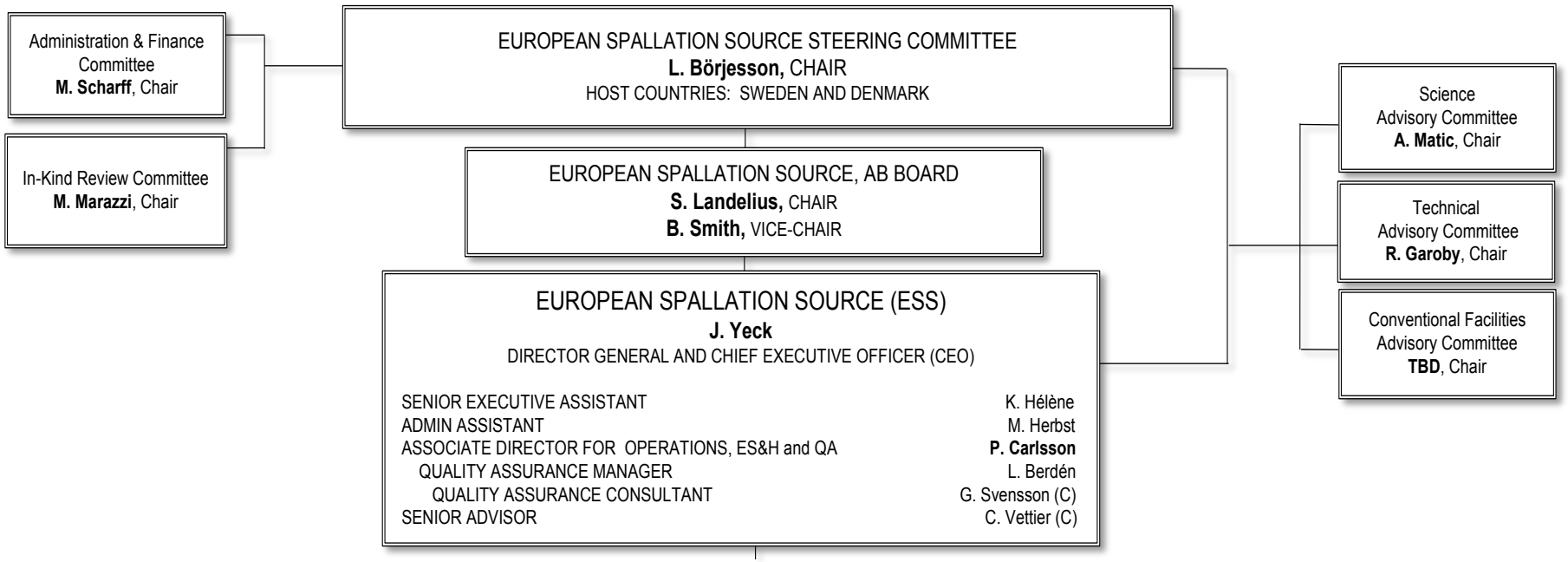
ESS organization



ESS work breakdown structure



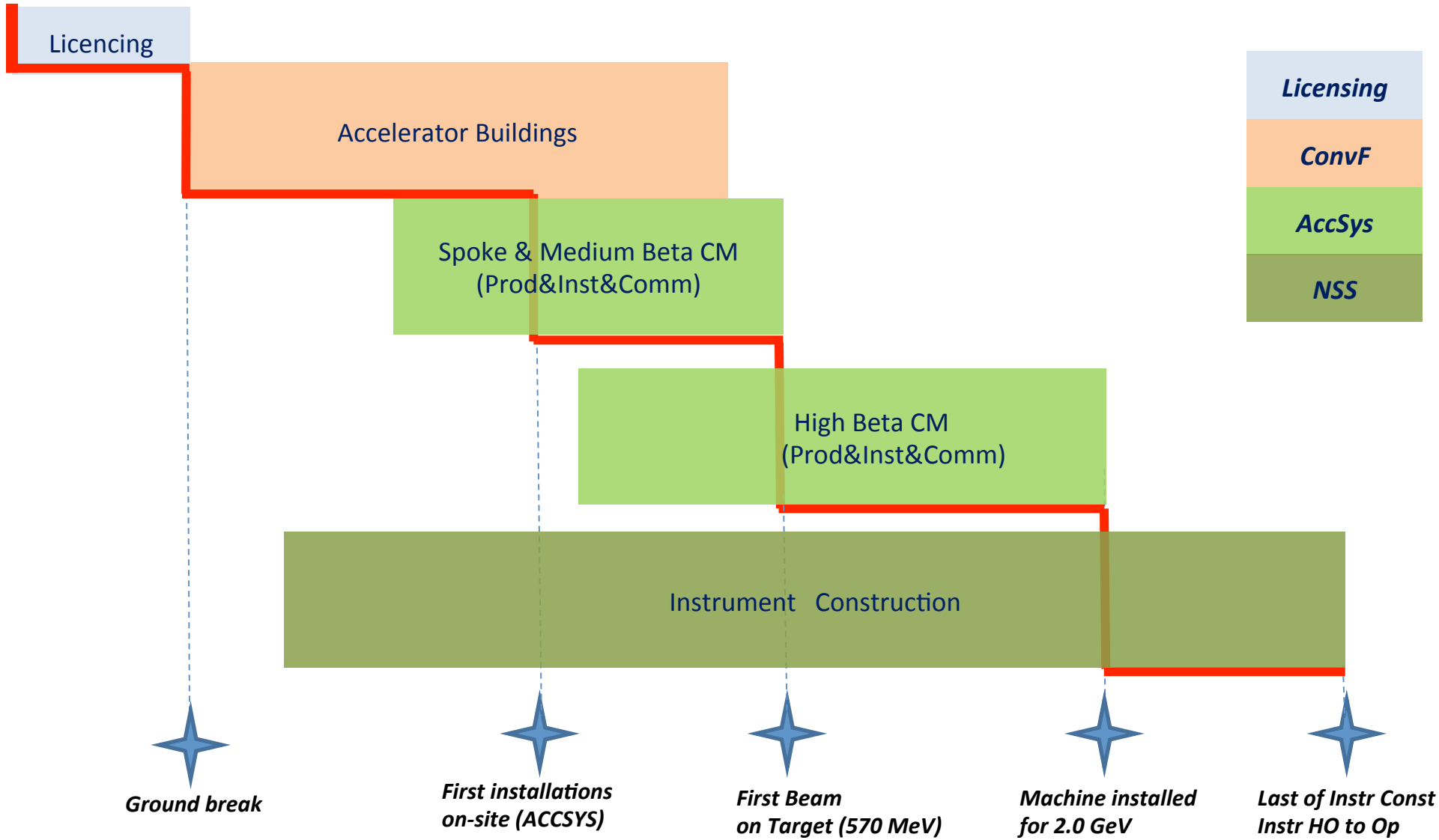
ESS organization



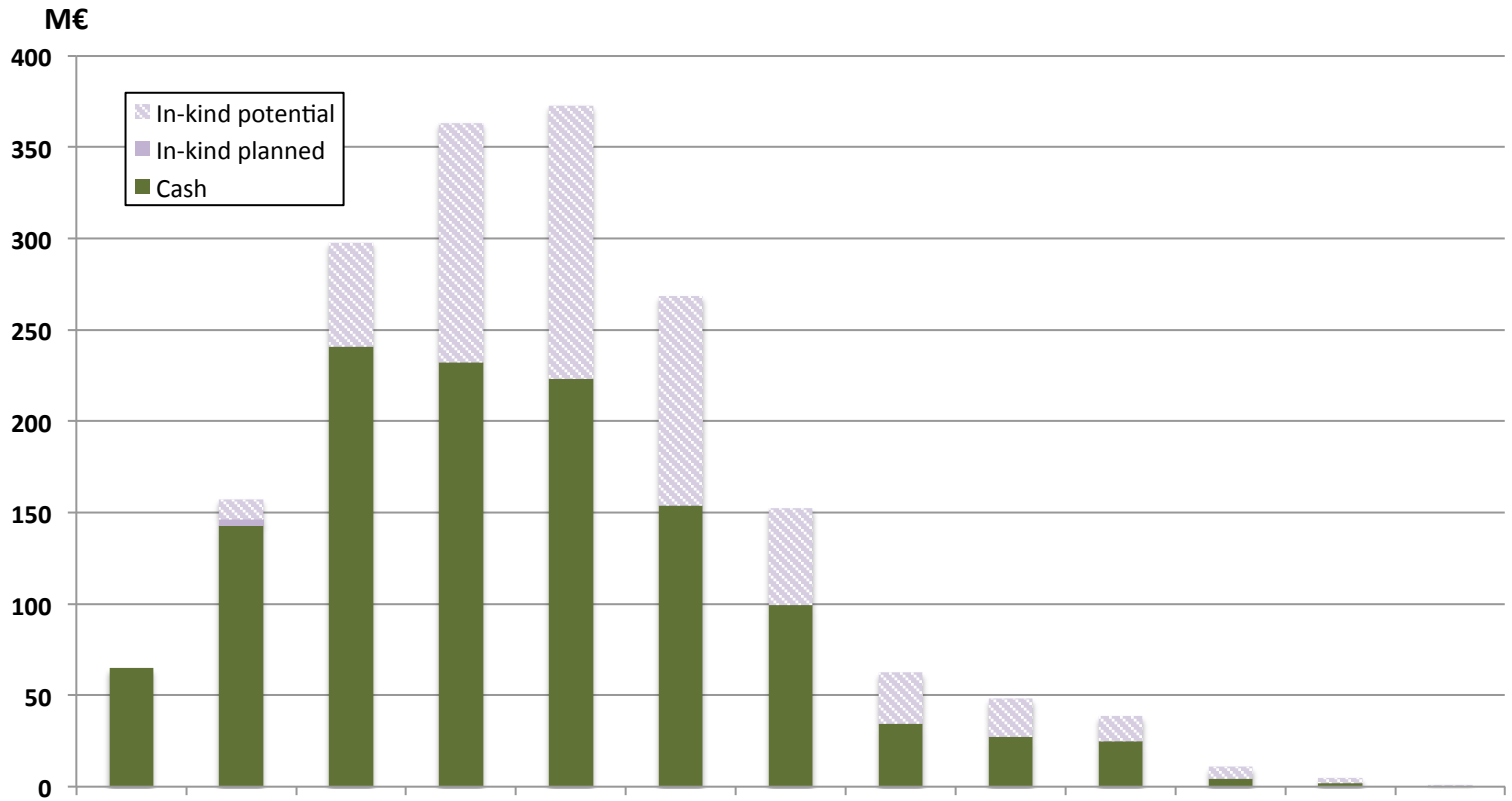
Preparing the project

- Deliver on the Technical Design Report performance and Steering Committee commitments
  - **5 MW accelerator capability**
  - **Construction cost of 1,843 B€**
  - **Operations cost target of 140 M€**
  - **22 “public” instruments**
- Start w/ unconstrained resources (technically limited schedule) and develop credible project execution plans
- Comprehensive review of project baseline and execution plans
- Secure funding and resources and align schedules with the available resources

Critical Path



Cash vs. In-kind



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Sum (M€)
In-kind planned	0	4	0	0	0	0	0	0	0	0	0	0	0	4
In-kind potential	*0*	*11*	*57*	*131*	*150*	*115*	*53*	*28*	*21*	*14*	*6*	*3*	*1*	589
Cash	65	143	241	232	223	154	99	34	27	25	4	2	1	1 250
Total	**65**	**157**	**298**	**363**	**373**	**269**	**152**	**62**	**48**	**39**	**11**	**5**	**1**	**1 843**

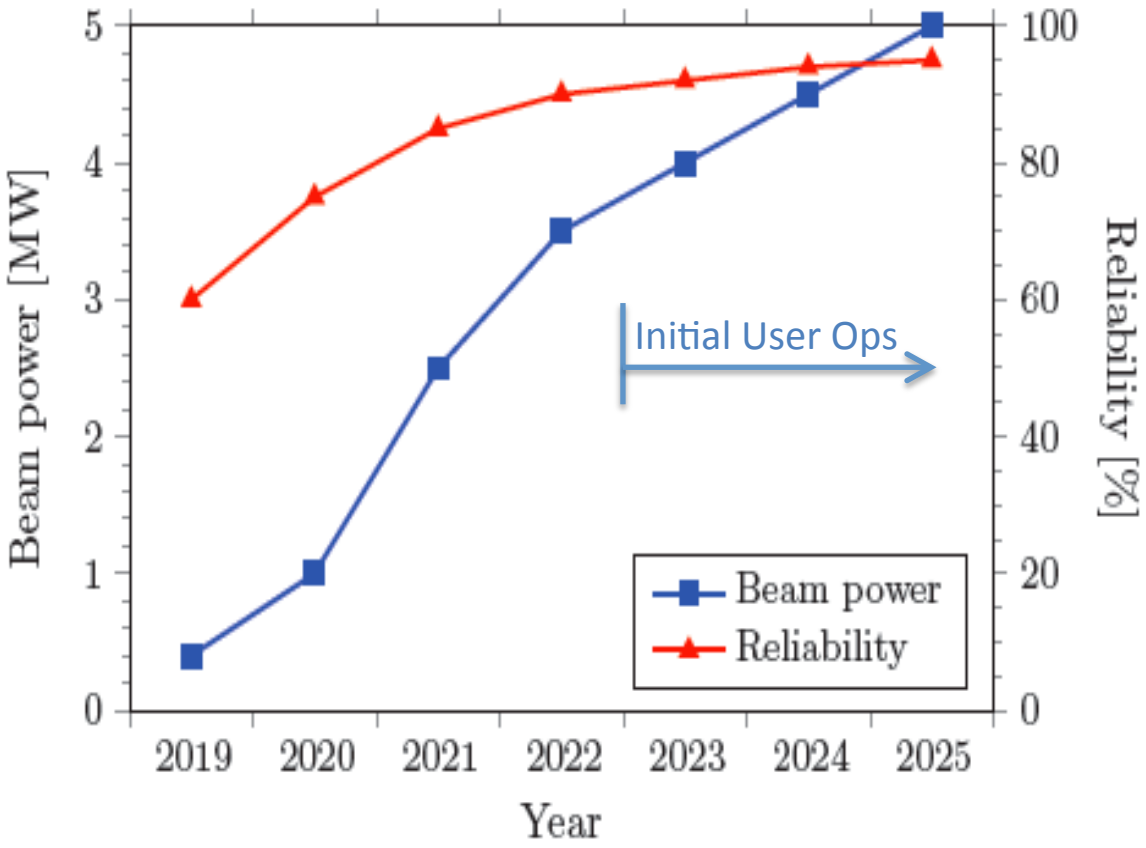
Commissioning and operations

Criteria for start of Initial Operations:
Deliver a measurable number of moderated neutrons to an instrument.

Strategy

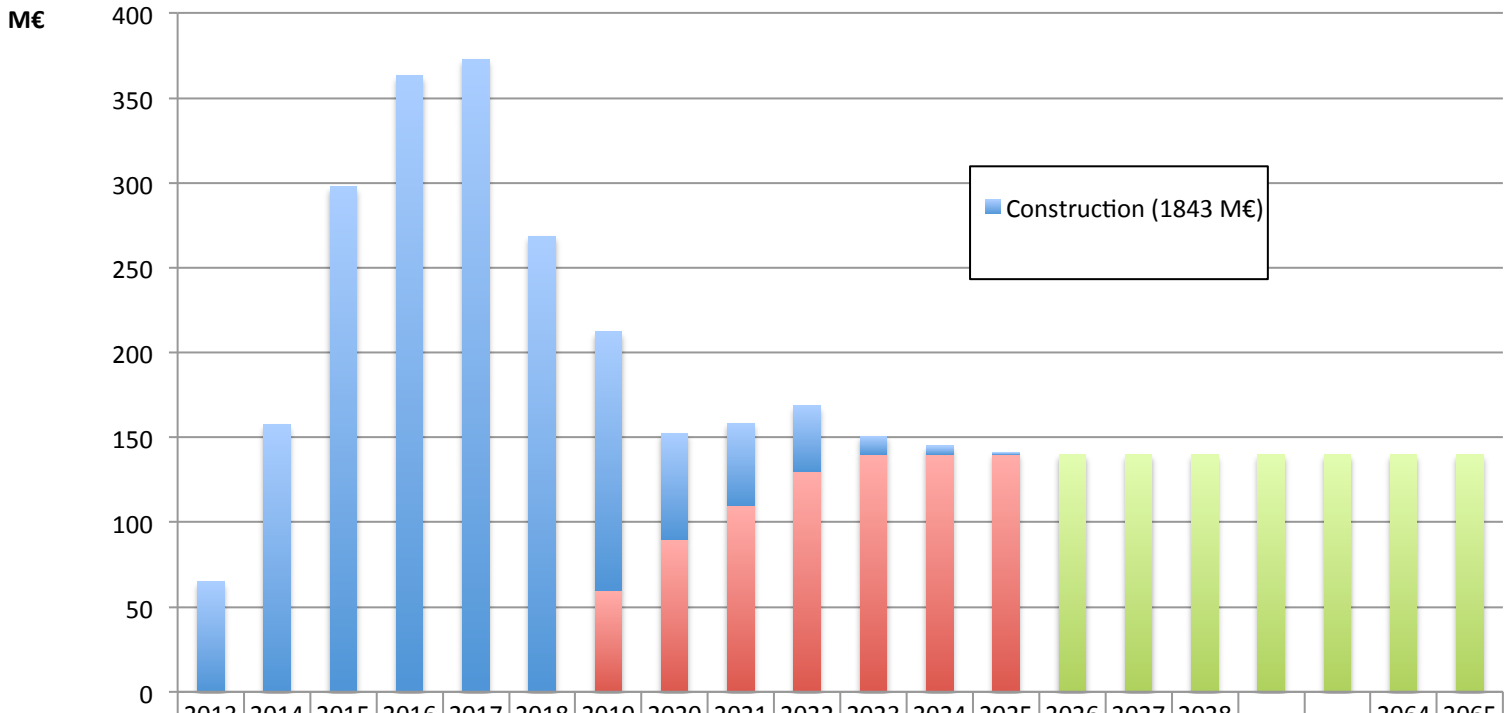
- Initially keep radioactivity and doses low to allow hands on maintenance.
- Ramp up power quickly to find limitations and increase reliability before user operations start.

TDR Performance Goals



Initial Operations planning & budget

Status of activity and resource planning for transition to operations



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	…	…	2064	2065
Construction (1843 M€)	65	157	298	363	373	269	152	62	48	39	11	5	1							
Initial Operations + ramp-up							60	90	110	130	140	140	140							
Steady State Operations														140	140	140	140	140	140	140

Next 6 months

- Letters of Intent or Agreements with Member countries
- Demonstrate accelerator and target station technology readiness – key interfaces resolved for a civil construction start
- Increase engagement of the scientific user community and continue selection of instruments for engineering development
- Partner days to promote opportunities to participate in ESS construction
- Select conventional facilities partner company/start final design in Feb 2014
- Secure permits for facility construction and establish Project Performance Measurement Baseline by May 2014
- **Start facility construction!**

ESS In-kind contributions potential

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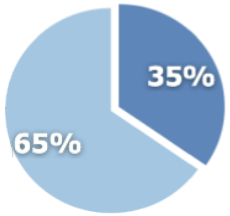
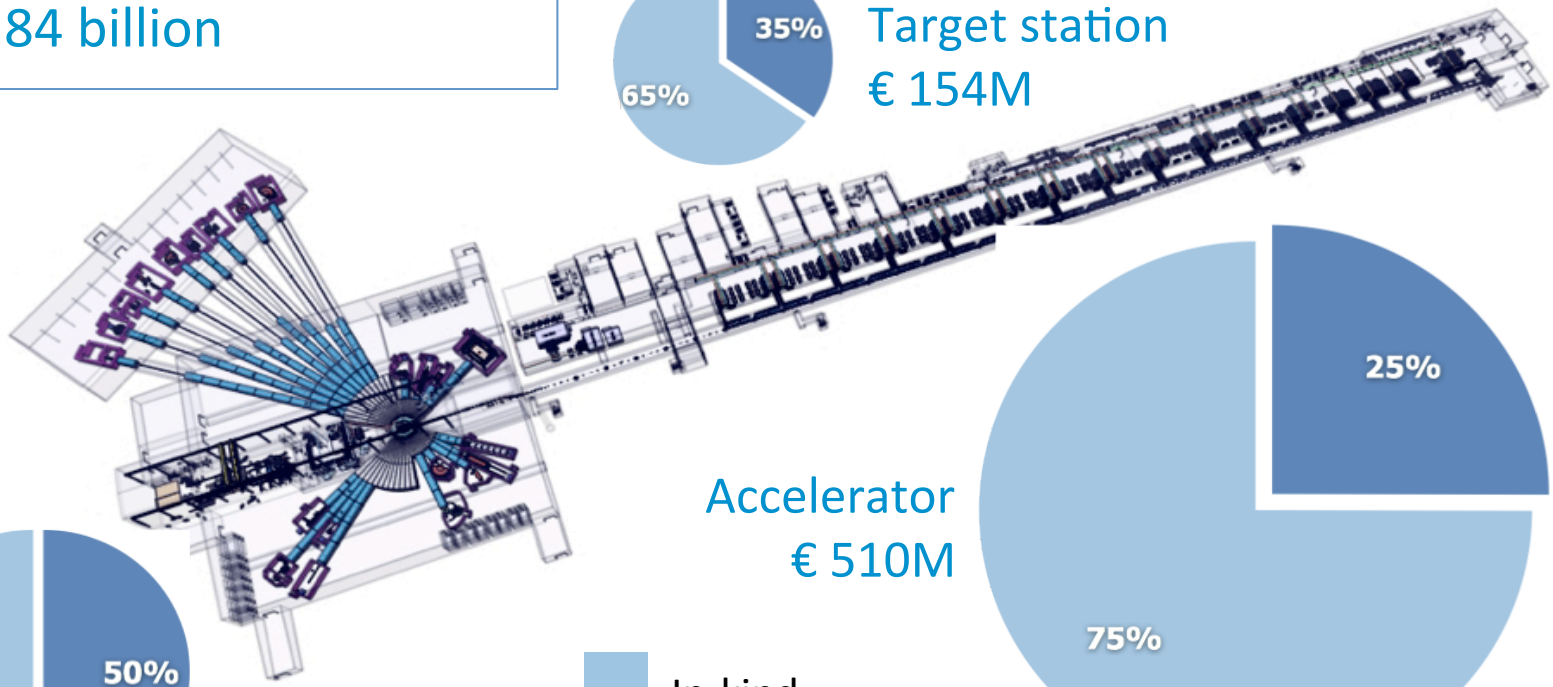
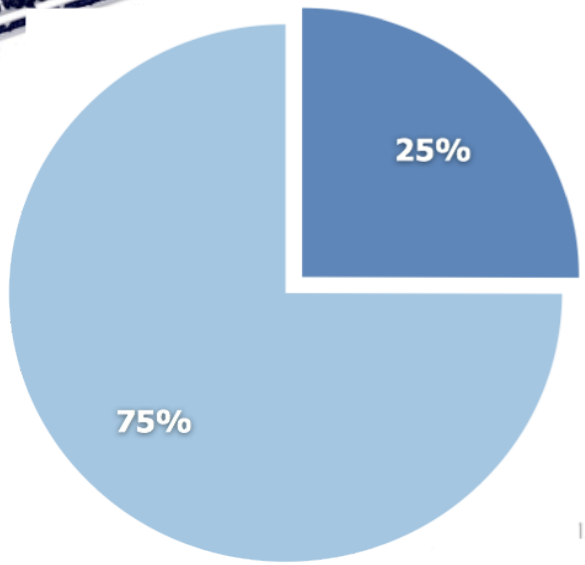
Total construction cost:
€ 1,84 billion

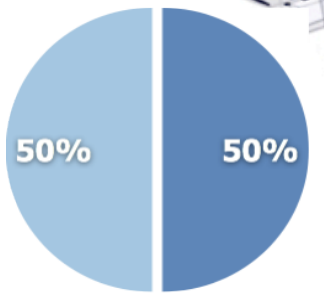


Target station
€ 154M





Accelerator
€ 510M



NSS/Instruments
€ 350M

In-kind

Cash

German In-Kind Contribution Potential

- Over EUR 230m value identified as potential for in-kind contributions form Germany
- Potential areas for cooperation include the Accelerator, Target Station, Integrated Control Systems, and Instruments

It's time to get involved now

Macht mit!

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Vielen Dank für Ihre Aufmerksamkeit!

Thank you very much for your attention!