Final

Welcome Address

Roberto Saban
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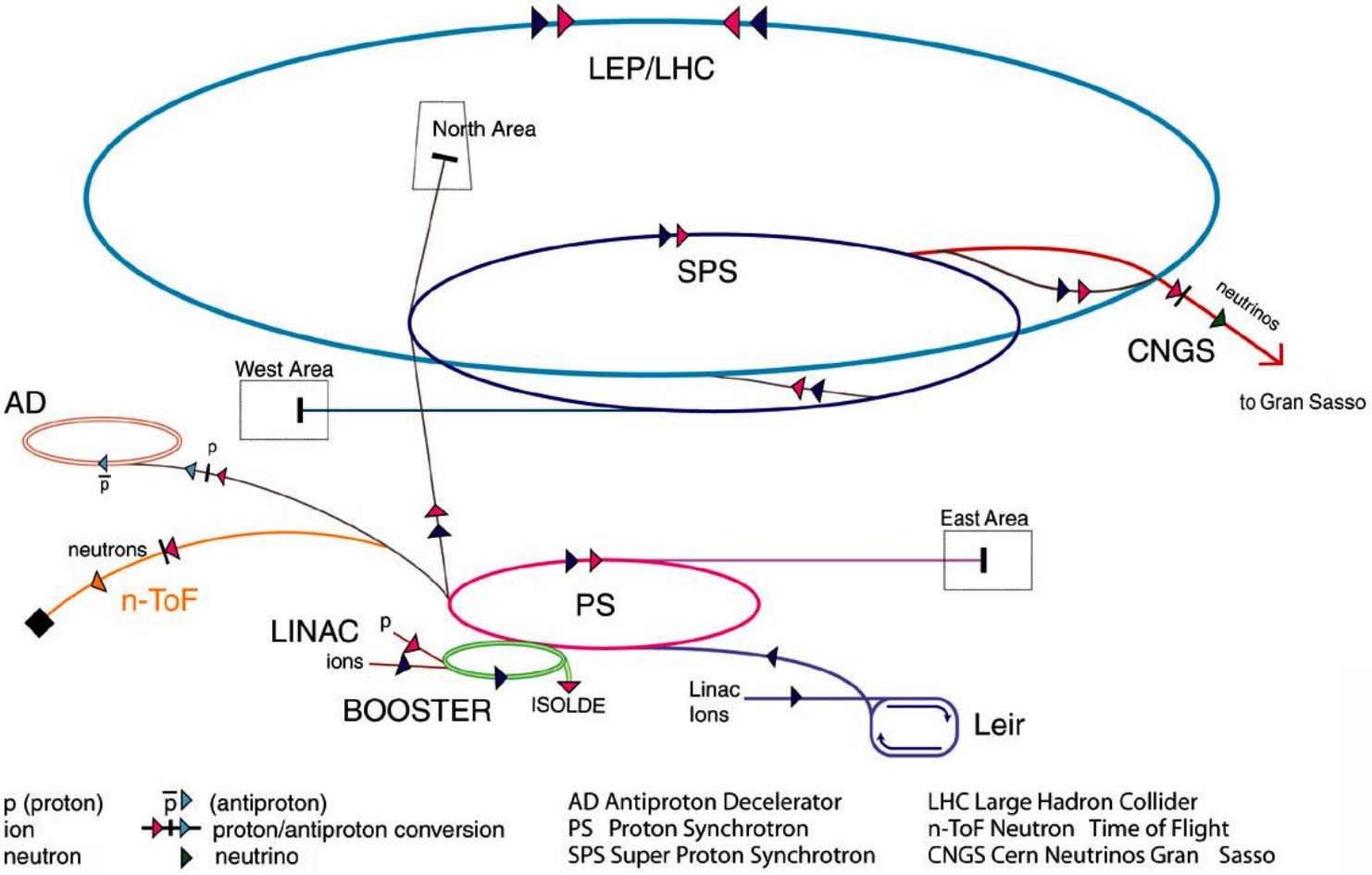
CERN | EN ENGINEERING DEPARTMENT

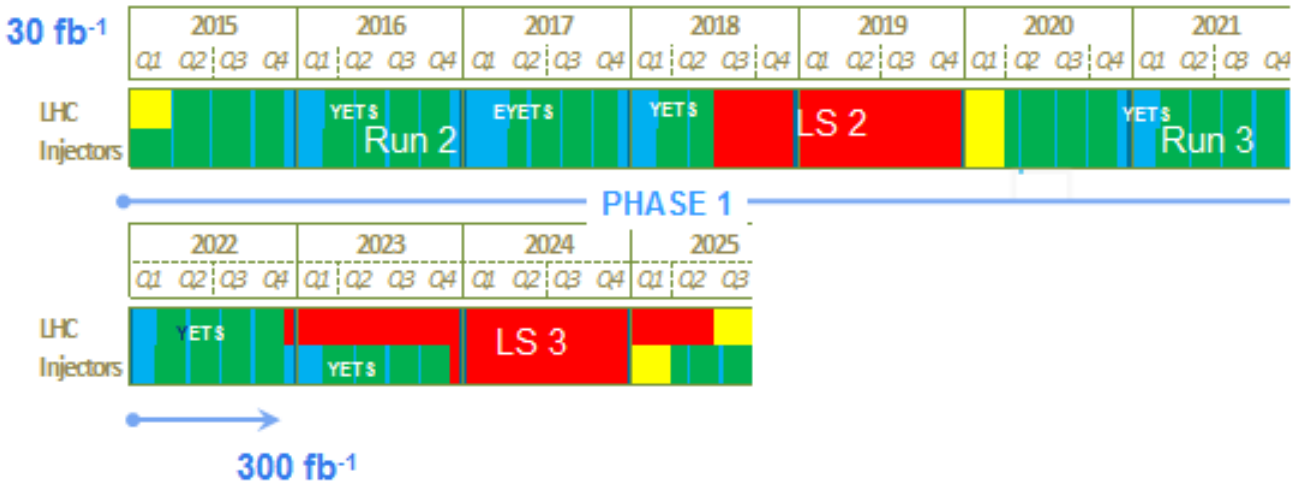
The Accelerator Complex



The Long Shutdowns

LS1	Repair the interconnects, R2E
LS2	Complete LHC Injector Upgrade
LS3	Build High Luminosity LHC

Safety first !



Courtesy Frederick Bordry

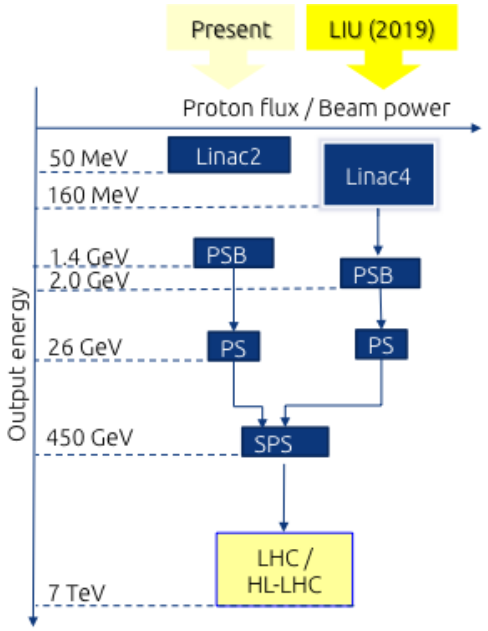
LHC Injector Upgrade
Basic Principles

Linac4 (160 MeV H-) replaces Linac2 (50 MeV H+)

increasing the field in the PSB magnets, replacing power supply and changing beam transfer equipment

feedbacks, cures against electron clouds, hardware modifications to reduce impedance…

1. Increase injection energy in the PSB from 50 to 160 MeV
2. Increase injection energy in the PS from 1.4 to 2 GeV
3. Upgrade the PSB , PS and SPS to make them capable to accelerate and manipulate a higher brightness beam

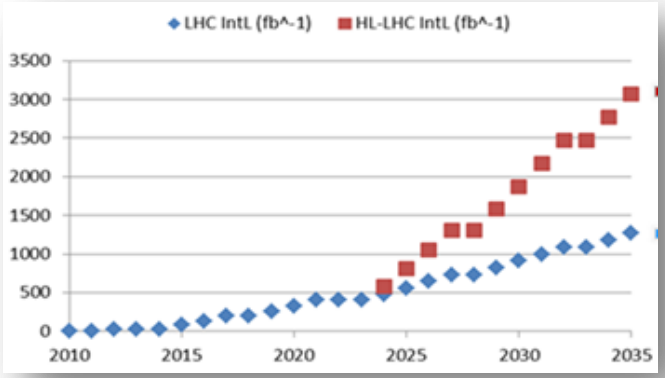


Courtesy Roland Garoby, Simone Gilardoni

High Luminosity LHC

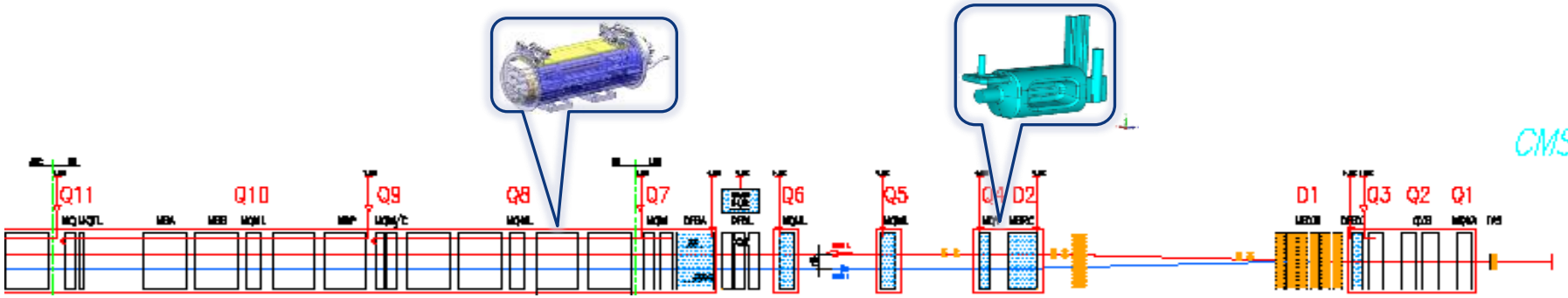
Goal of the HL-LHC project

- 250-300 fb^{-1} per year
- 3000 fb^{-1} in about 10 years



- New IR-quads Nb_3Sn (IT)
- New 11 T Nb_3Sn (short) dipoles
- Collimation upgrade
- Cryogenics upgrade
- Crab Cavities
- Cold powering
- Machine protection
- Infrastructures

Will impact 1.2 km of the LHC



Courtesy Jose Miguel Jimenez

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation

Improving the safety of interventions in facilities emitting ionizing radiations

- in scientific facilities
- in hospitals and medical centers
- in nuclear power stations

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation

at design time

Design optimization to reduce activation and maintenance interventions

during operation

- Safe operation of the facilities and equipment
- Safety monitoring
- Remote inspections

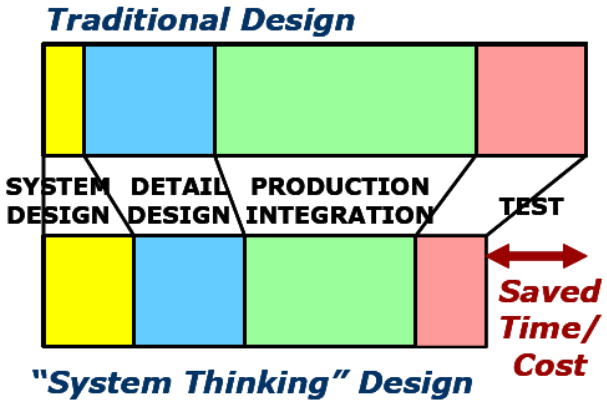
during maintenance

- Optimized interventions (augmented reality)
- Tele-operation Remote handling

when dismantling

- Enhanced disassembly
- Waste sorting
- Reuse

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation



at design time

ActiWeb (© CERN DGS-RP)

openSE

Systems Engineering Framework suited to scientific facilities

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation

IMPACT

for planning and scheduling interventions

during operation

TIM for remote inspections

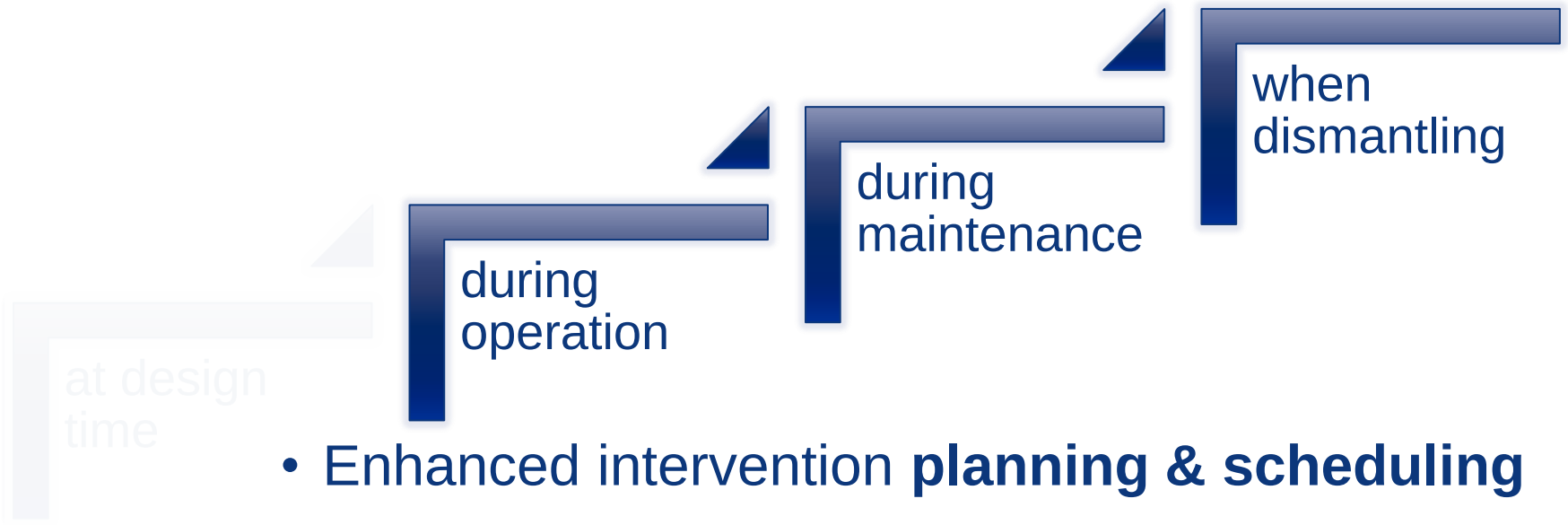
during maintenance

CERN ALARA Committee

infor

for managing maintenance

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation



- Enhanced intervention **planning & scheduling**
- Enhanced **augmented reality** solutions
- **Remote handling** and **tele-robotic** solutions enhanced for scientific facility interventions

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation

It is an Initial Training Network (ITN) that aims at

1. enhancing career development and
2. training of Early-Stage Researchers (ESRs)

The program trains 15 young researchers in the field of systems engineering and tele-robotics from domains such as mechanical engineering, software engineering, robotics and radiation protection for the purpose of cost-efficient life-cycle management of facilities generating ionizing radiation.

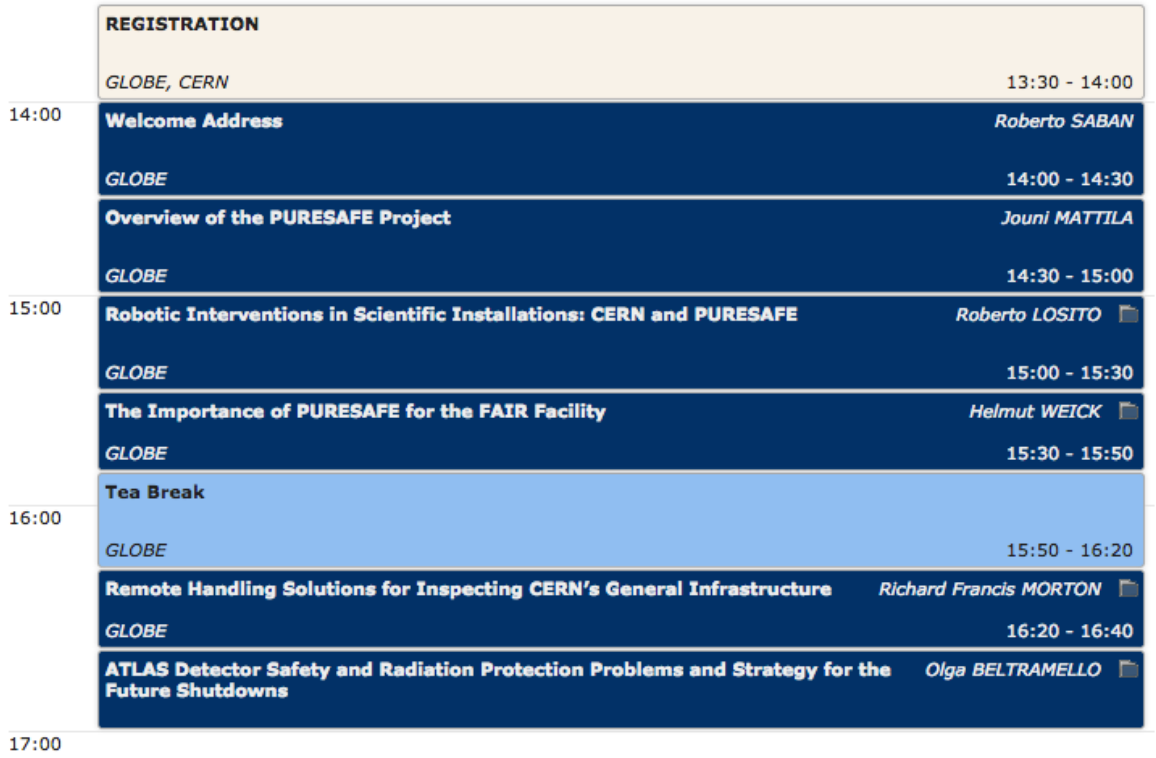
The project is hosted in academic institutions (Tampere, Madrid, Karlsruhe), research centers (CERN, GSI) and industry (Oxford Technologies, SenseTrix, bgator).

The PURESAFE Final Conference is the closing event of the project.

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation

	Monday	Tuesday	Wednesday	Thursday	Friday
a.m.		**Systems Eng.**	**Tele-robotics**	**Tele-robotics**	**Tele-robotics**
p.m.	**Users' Needs**	**Systems Eng.**	**Visit** LHCb	**Tele-robotics**	
	Welcome Drink		**Social Dinner**		

Preventing hUman intervention for incrREased SAfety in inFrastructures Emitting ionizing radiation



	REGISTRATION	
	GLOBE, CERN	13:30 - 14:00
14:00	**Welcome Address**	*Roberto SABAN*
	GLOBE	14:00 - 14:30
	Overview of the PURESAFE Project	*Jouni MATTILA*
	GLOBE	14:30 - 15:00
15:00	**Robotic Interventions in Scientific Installations: CERN and PURESAFE**	*Roberto LOSITO*
	GLOBE	15:00 - 15:30
	The Importance of PURESAFE for the FAIR Facility	*Helmut WEICK*
	GLOBE	15:30 - 15:50
	Tea Break	
16:00	*GLOBE*	15:50 - 16:20
	Remote Handling Solutions for Inspecting CERN's General Infrastructure	*Richard Francis MORTON*
	GLOBE	16:20 - 16:40
	ATLAS Detector Safety and Radiation Protection Problems and Strategy for the Future Shutdowns	*Olga BELTRAMELLO*
17:00		

http://indico.cern.ch/e/PURESAFE

Many thanks to the PURESAFE community

Many thanks to the organizers