


LARGE HADRON COLLIDER UPGRADE


<http://cern.ch/SLHC-PP>

WP2 status

Gijs de Rijk
26-02-09



This project has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under the Grant Agreement n°212114



LARGE HADRON COLLIDER UPGRADE

<http://cern.ch/SLHC-PP>

Objectives

Objectives

- **Project Management preparation. Set up the project monitoring structures, set up a finance management system and set up a quality assurance plan**
- **Put in place networking and communication. Set up collaboration communication structures and set up information storage and dissemination**

SLHC is on the machine side a multi facet project with

- Approved constructions projects with the aim to give a factor 3-4 luminosity increase (operational in 2014)
- Project preparation studies: A new injector chain in 2018 together with SPS improvements to remove intensity limits
- Studies on further upgrades

2/26/2009 2



SLHC sub-projects

<http://cern.ch/SLHC-PP>

Two construction projects

1. Linac4.

Approved in June 2007. The project organization of Linac4 was finalized in 2008 and the collaboration is defined and functioning. The management tools were modified and this is now operational (complete project is in EVM). This project is based in the BE department. To be ready for physics beam in 2014

2. Inner triplet.

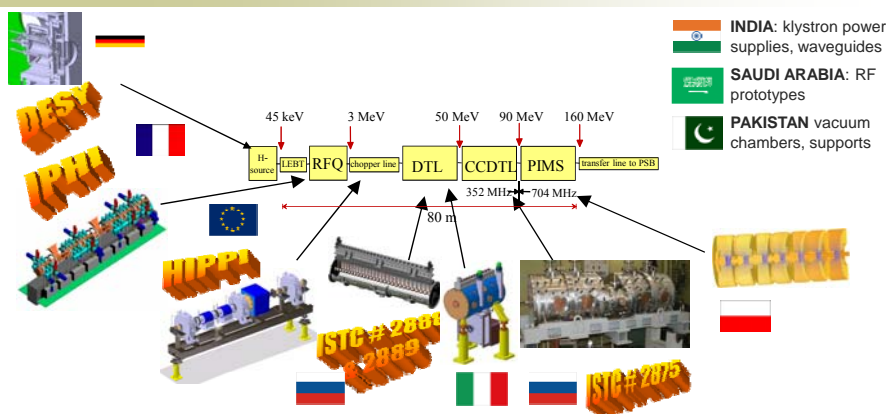
The project was operational in January 2008. The inner triplet project organization is finalized and the collaborations are defined. This project is based in the TE department. The same management tool are used as for Linac4. The installation is foreseen for shutdown 2014

2/26/2009

3



Linac4 R&D collaborations (2004-2008)

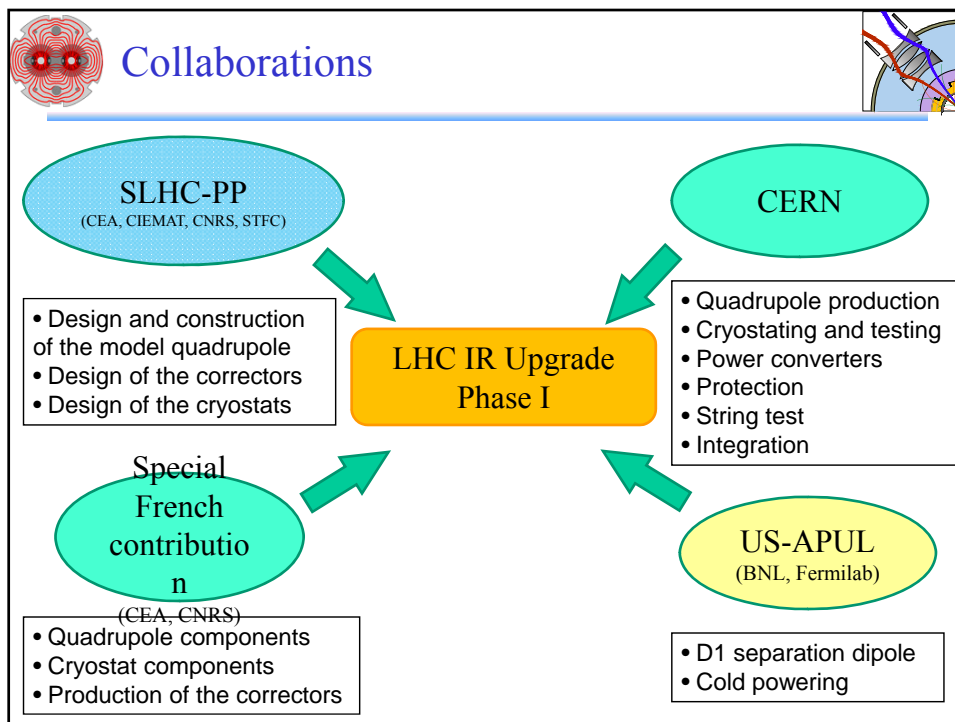



Network of collaborations for the R&D phase, via EU-FP6, CERN-CEA/IN2P3, ISTC (CERN-Russia), CERN-India and CERN-Pakistan agreements.

International participations to the construction of Linac4 **under definition**:

Signed or being signed: **Russia** (CCDTL), **France** (modulators, etc.), **Pakistan** (transfer line)

In preparation: **Saudi Arabia** (DTL tanks), **Poland** (PIMS), **India** (supports, waveguides, couplers, etc.), **USA** (diagnostics).





SLHC sub-projects

<http://cern.ch/SLHC-PP>

Three project preparation studies

The study projects and study groups are CERN based in the BE department
 These studies were supported by CARE-HHH networks and are now by EuCARD-AccNet

- PS2
 - Project study with conceptual design report in 2011 when a council decision on construction is envisaged. Design study in full swing. Collaborations will be defined at an appropriate time.
- SPL
 - Conceptual design exists. Project preparation for a council decision on construction in time for PS2.
Multiparty collaboration.
- SPS upgrade
 - Study to upgrade the SPS for high brilliance beams. CERN working group with strong networking in HHH and AccNet

2/26/2009
6

General planning 2009 - 2011

- **12/08 – 03/09 Finalize linear lattice and machine integration**
 - Linear lattice design and machine geometry studies
 - Transfer lines from TT10, from SPL, to SPS
 - Injection and extraction studies
- **04/09 – 06/09 Iteration on element integration with technical groups and refinement of lattice studies**
- **06/09 Freeze linear lattice, machine layout and integration**
- **07/09 – 12/10 Conceptual design phase**
 - Conceptual design of all technical systems
 - Refinement of beam dynamics
 - Civil engineering and technical infrastructure design
 - Cost estimates, resource estimates, implementation planning
- **01/11 – 05/11 Preparation of conceptual design study**

26/02/2009

PS2 Status, M.Benedikt

7



SPL

<http://cern.ch/SLHC-PP>

organisation of collaboration


- Four working groups were created:
 - ➔ beam dynamics/loss management,
 - ➔ high-power RF equipment: power distribution, circulators, loads, vector modulators,
 - ➔ cryo-module and integration,
 - ➔ cavity design & construction: cavity geometry, HOM damper, power coupler & manufacturers, processing, testing
- working groups have common meetings, phone/video conferences,
- collaboration meetings with lab representatives 1-2x per year,
- one yearly meeting at CERN open to everyone,
- a collaboration "constitution" in form of an MoU will be circulated and signed by all collaborators,

2/26/2009

"SPL", SLHC public event 2009, F. Gerigk

26

8



SPL

<http://cern.ch/SLHC-PP>

agreed collaborations:


institute	subject
CEA Saclay (France)	<ul style="list-style-type: none"> ■ Design and construction of 2 $\beta=1$ cavities (EUCARD task 10.2.2), ■ Helium vessels for 2 cavities & tools for cryomodule assembly (French in-kind contribution), ■ Test of existing $\beta=0.5$ cavity in pulsed mode and participation to LLRF design (CNI sLHC)
CNRS/IPN Orsay (France)	<ul style="list-style-type: none"> ■ Design and construction of $\beta=0.65$ cavity (EUCARD task 10.2.1), ■ Design and construction of prototype cryomodule (French in-kind contribution)
Soltan Institute (Poland)	<ul style="list-style-type: none"> ■ FLUKA simulations for radiation protection issues, ■ collimator development,
ESS-S (Scandinavia)	<ul style="list-style-type: none"> ■ beam dynamics, ■ RF developments,
Cockroft Institute (UK)	<ul style="list-style-type: none"> ■ participation to specification & design of RF system, ■ study of RF components (RF power distribution, vector modulators, phase-locked magnetrons), ■ study & design of low-power collimation systems,

2/26/2009

"SPL", SLHC public event 2009, F. Gerigk

23

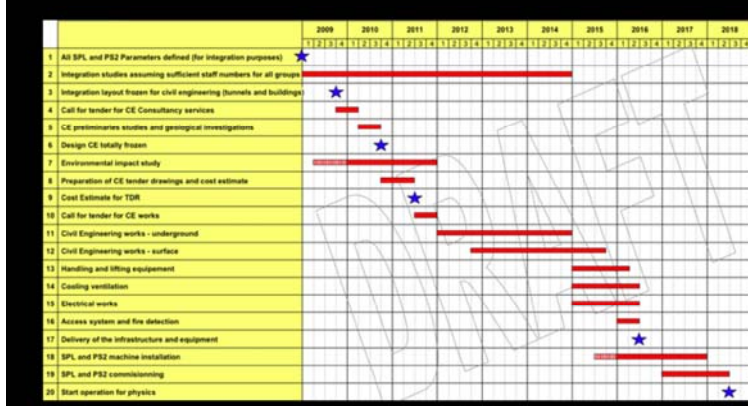
9



SPL

<http://cern.ch/SLHC-PP>

(agressive) civil engineering **draft** planning



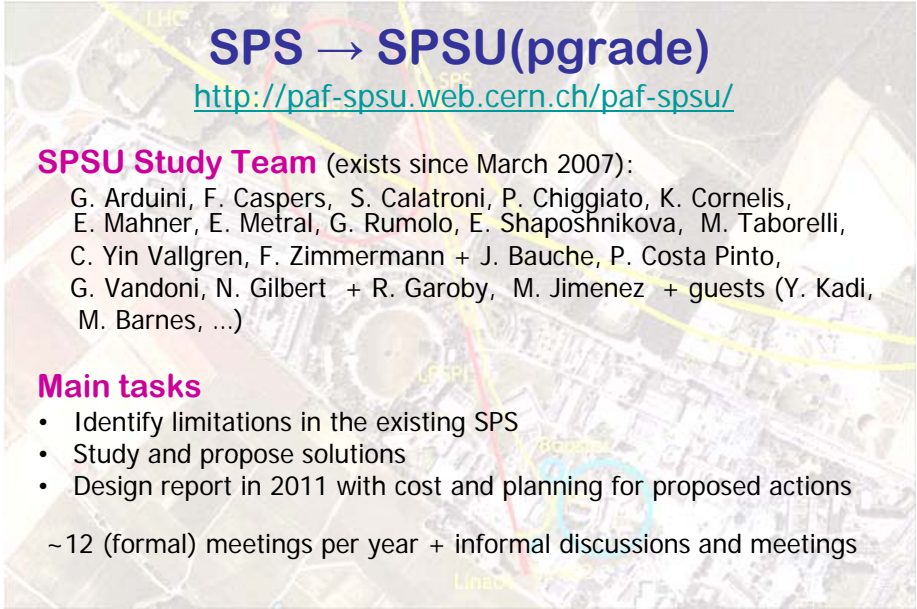
time is running!

2/26/2009

"SPL", SLHC public event 2009, F. Gerigk

29

10



SPS → SPSU(pgrade)
<http://paf-spsu.web.cern.ch/paf-spsu/>

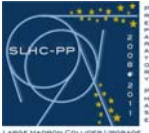
SPSU Study Team (exists since March 2007):
 G. Arduini, F. Caspers, S. Calatroni, P. Chiggiato, K. Cornelis,
 E. Mahner, E. Metral, G. Rumolo, E. Shaposhnikova, M. Taborelli,
 C. Yin Vallgren, F. Zimmermann + J. Bauche, P. Costa Pinto,
 G. Vandoni, N. Gilbert + R. Garoby, M. Jimenez + guests (Y. Kadi,
 M. Barnes, ...)

Main tasks

- Identify limitations in the existing SPS
- Study and propose solutions
- Design report in 2011 with cost and planning for proposed actions

~12 (formal) meetings per year + informal discussions and meetings

26 Feb 2009 11

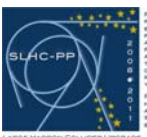


SLHC sub-projects
<http://cern.ch/SLHC-PP>

One luminosity upgrade network

- EuCARD-AccNet-Eurolumi
 The study group was part of the CARE-HHH network and will continue in the EuCARD EuroLumi network. This group is based in the BE department.
 - All aspects of the SLHC are subject to study by the EuroLumi network. They are inside the sub-projects and also working on upgrade inside the LHC itself which are not (yet) a sub-project. They also network with other programs like LARP

2/26/2009 12



WP 2 deliverables

<http://cern.ch/SLHC-PP>

Deliverables task 2.1	Description	Nature	Delivery date
2.1.1	Common fund, Financial Management System (software) and user requirements and user guide document	O	M30
2.1.2	Quality Assurance plan for the implementation phase	R	M30
2.1.3	Earned Value management system (software) with user requirements and user guide document	O	M36


Deliverables task 2.2	Description	Nature	Delivery date
2.2.1	Functioning collaboration communication structure	O	M12
2.2.2	Project web site linked to the technical databases: Machine layout database, hardware baseline database, project notes and reports	O	M12

Milestones	Description	Nature	Expected date
2.1	Financial management system (initial version)	P	M18
2.2	EVM software (initial version)	P	M24

2/26/2009
13

OK, report to be written

Project pages ok,
Top page being made,
report to be written



Budget

<http://cern.ch/SLHC-PP>

- The organizational work was done by the SLHC project office and the sub-projects
- The tools were developed for the first operational sub-projects and are applied for all
- No EC budget part touched in first year
- In second year PM budget will be spend on:
 - Project office person-power (0.5 FTE),
 - fellow for the AIS tools (finalization EVM + user support)
 - web page construction (1 month subsistence)
- The partners (CEA, STFC and CIEMAT) are working out a proposal for networking for SLHC (workshops, meetings)

2/26/2009
14