The SLHC-PP project

Welcome and overview of the project

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

This project has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under the Grant Agreement nº 212114

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FP7 CNI call, PP project

FP7-CNI program:

"Construction of New research Infrastructures"

Based on a list of ~35 projects selected by ESFRI (European Strategy Forum on Research Infrastructures)

"**PP**" refers to "**preparatory phase**":

" The preparatory phase for the construction of new research infrastructures (or major upgrades of existing ones) aims at bringing the project to the level of legal and financial maturity required to implement the project."

=> **Coordination**, **Support** and *Technical* work are supported

SLHC-PP proposal was submitted in May 2007, approved in July 2007

Final (Annex I) financial envelope: 15.6 M€, of which 5.2 M€ funded by EU

Project start April 1st 2008, for a duration of 3 years

The SLHC-PP project collaboration

Number	Beneficiary name	Short name	Country
1 (coord)	European Organization for Nuclear Research	CERN	Switzerland
2	AGH University of Science and Technology	AGH-UST	Poland
3	Commissariat à l'Energie Atomique	CEA-Saclay	France
4	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas	CIEMAT	Spain
5	Centre National de Recherche Scientifique	CNRS-IN2P3	France
6	Czech Technical University	CTU	Czech Republic
7	Deutsches Elektronen-Synchrotron	DESY	Germany
8	Eidgenössische Technische Hochschule Zürich	ETH Zürich	Switzerland
9	Stichting voor Fundamenteel Onderzoek der Materie	FOM-NIKHEF	The Netherlands
10	Gesellschaft für Schwerionenforschung	GSI	Germany
11	Imperial College London	Imperial	United Kingdom
12	Istituto Nazionale di Fisica Nucleare	INFN	Italy
13	Paul Scherrer Institut	PSI	Switzerland
14	Science and Technology Facilities Council	STFC	United Kingdom
15	Rheinische Friedrich-Wilhelms-Universität Bonn	UBONN	Germany
16	Université de Genève	UNIGE	Switzerland
17	University of Sheffield	USFD	United Kingdom

17 institutes from 9 countries

Work package list

WP #	Work Package Title	Type	Person-months
WP1	SLHC-PP project management	MGT	49
WP2	Coordination for the SLHC accelerator implementation	COORD	52
WP3	Coordination for the S-ATLAS experiment implementation	COORD	102
WP4	Coordination for the CMS2 experiment implementation	COORD	90
WP5	Radiation protection and safety issues for accelerator and experiments	SUPP	116
WP6	Development of Nb-Ti quadrupole magnet prototype	RTD	193
WP7	Development of critical components for the injectors	RTD	181
WP8	Tracking detector power distribution	RTD	183
			966

WP2

"Coordination for the SLHC accelerator implementation"

- **Project Management preparation (tools)**
  - Project monitoring structures, EVM
  - Finance management system
  - Quality assurance plan
- **Networking and communication**
  - Collaboration communication structures for the SLHC accelerator project
  - Storage and dissemination of technical information

CERN, CEA-Saclay, STFC, CIEMAT

WP3

"Coordination for the S-ATLAS experiment implementation"

- **Coordination and project structures**
  - Managerial structure =>
  - Collaboration agreements, reviewing structures, financial rules, cost books, initial MoU documents
- **Project office**
  - Define upgrade project scope
  - Drawings, technical databases
  - Scheduling
  - Installation scenarios

CERN, FOM-NIKHEF, STFC, UNIGE

WP4

"Coordination for the CMS2 experiment implementation"

- **Coordination and organisation of CMS2**
  - Organisational structure
  - Collaboration agreements, dissemination of information, cost books, MoU for upgrade and installation
- **Technical Coordination Unit**
  - Central technical information repositories, design and modification tools, reviewing conceptual design, quality management
  - Scheduling and installation scenarios

Imperial, CERN, DESY, ETHZ

WP5

"Radiation protection and safety issues for accelerator and experiments"

- **Experiment radiation &activation**
  - Simulations for activation and radiation
  - Validation with measurements at LHC
  - Optimization of forward region design, exposure during maintenance and repair
- **Accelerator radiation &activation**
  - Simulations for activation and radiation in critical regions
  - Evaluation of doses to materials and equipment
  - Minimize consequences for equipment and beam operation
- **Impact study**
  - Dose rates in areas of SLHC access
  - Environmental impact
  - Estimates related to radioactive waste

CERN, CTU, GSI, PSI, USFD

WP6

"Development of Nb-Ti quadrupole magnet prototype"

- **Design of Nb-Ti superconducting quadrupole**
  - Basic triplet design
  - Full interaction region design
- **Construction and testing of short models**
  - 1 m long prototype, incl. correctors
- **Construction and testing of full-scale prototype**
  - Full scale prototype, incl. correctors

CERN, CEA-Saclay, CIEMAT, CNRS-IN2P3, STFC

WP7

"Development of critical components for the injectors"

- **Development towards an H^- source for the SPL**
  - Finite element thermal studies
  - Design, construction and test of high-duty factor plasma generator and sub-systems
- **Field stabilisation in pulsed superconducting low β (v/c) accelerating structures**
  - Characterisation of tuners/cavities developed under HIPPI
  - RF modelling/design
  - Production of electronic system
  - Full characterisation of RF system

CERN, CEA-Saclay, DESY, INFN, STFC

WP8

“Tracking detector power distribution”

- **DC-DC converters**
  - Buck converters based on air-core conductors and on-chip conversion options
  - Evaluation of technology, prototypes, integration in detector modules
- **Serial powering**
  - Generic studies
  - Custom serial powering circuitry
  - Integration in full-scale super-module

STFC-RAL, CERN, AGH-UST, PSI, UBONN

R&D outside SLHC-PP

Descriptive Title	Short description and specific objectives	Organisations involved	Estimated budget
Improved injection complex	Study of a replacement of the PS, with a final energy of about 50 GeV, and of a new superconducting proton linac, capable of about 5 GeV and large current	CERN, CEA, IN2P3, INFN, GSI	7 M€
Front end of the improved injection complex	Replacing the old proton linac 2 with a new one, Linac 4, delivering H^- ions at 160 MeV	CEA, IN2P3, INFN, BINP, ITEP, IHEP, VNIIEF, VNIITF (Russia), BARC, CAT (India), IHEP (China)	66 M€
High-field SC magnets, based on Nb_3Sn	Development of magnets with about 15T max. field, to be used for the ultimate upgrade of the interaction regions for very high luminosity. This work includes advanced collimator design.	CERN, CEA, CIEMAT, INFN, STFC, Twente Univ. Wroclaw Univ, LBNL, KEK, FNAL, BNL, SLAC	20 M€
SC pulsed field magnet	Development of pulsed SC magnets for a possible SC version of the PS and possibly of the SPS	CERN, GSI, BNL, INFN KEK, JINR, Dubna	10 M€
Cryogenic upgrade	Study of the possible cryogenics improvement for the cooling of the Interaction region new magnets	CRN, CEA , CERN, CEA, CNRS, Wroclaw Univ, Valadolid Univ.	2 M€
Common R&D for S-ATLAS and CMS2	Common development work in electronics, detectors, triggering, data acquisition, data analysis, simulation and computing	CERN	12 M€
S-ATLAS R&D projects	Development and testing of electronics, sensors and modules for an upgraded Inner Detector for ATLAS	KEK, U. of Tsukuba, U. of Liverpool, CERN, Lancaster U., U. of Glasgow, USFD, U. of Cambridge , QM London, U. of Freiburg, MPI, CU, JU, U. of Ljubljana, U. of Oxford, STFC, HU, LBNL, NYU, UB, U. of Milano, FOM-NIKHEF, U. de Valencia, UCSC, BNL	7 M€
CMS2 R&D Activities	R&D on technical issues related to the CMS2 inner tracking detector (solid state pixel detector), outer tracking detector, Level 1 Trigger and data acquisition, Calorimeters, and Muon systems	DESY, DOE, DUBNA, ETHZ, IHEP, INFN, IN2P3, ITEP, NSF, PSI , STFC	12 M€
		TOTAL	136 M€

Estimate put down in Annex I: 136 M€ for accelerator and experiments together

SLHC-PP coordination roles for SLHC in general

The overall R&D effort for SLHC is much larger than the limited R&D effort of the SLHC-PP project itself

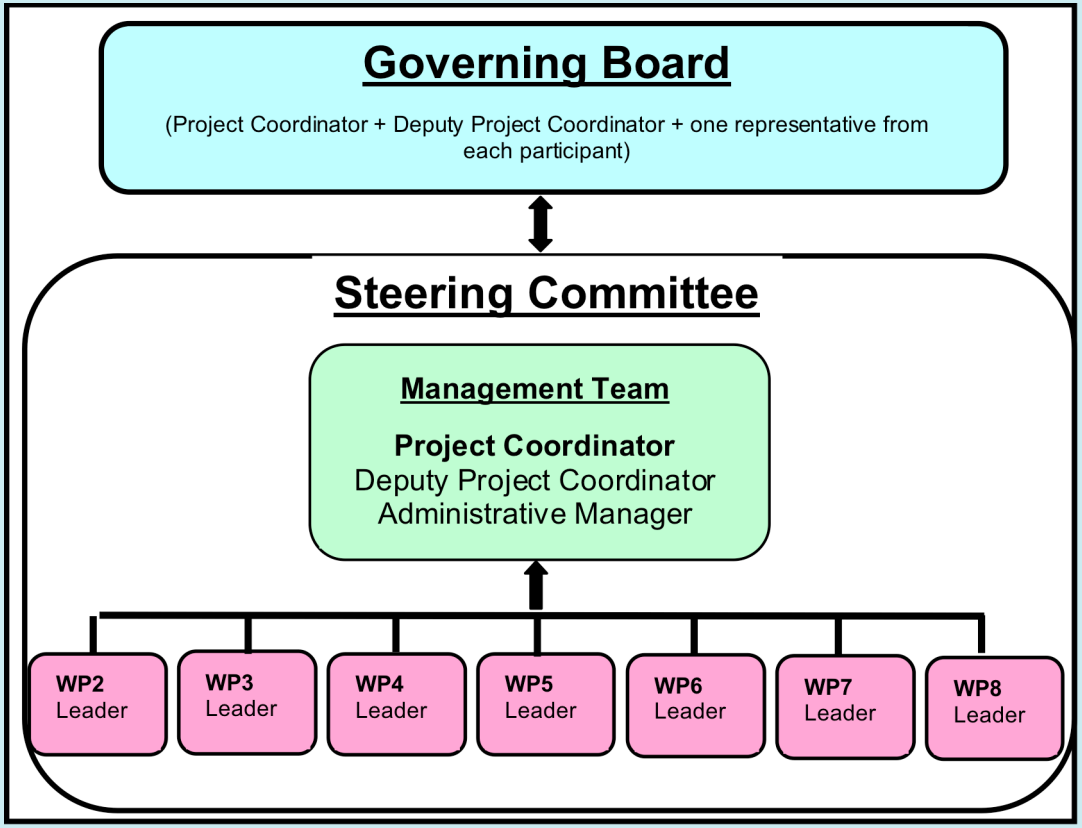
(WP6+WP7+WP8 ≈ 6M€ direct costs)

The coordination roles of WP2+WP3+WP4 go well beyond the SLHC-PP technical project deliverables and shall cover the full effort towards SLHC

As a first action in this context the **public SLHC R&D kick-off event** is organised tomorrow:

http://indico.cern.ch/conferenceDisplay.py?confId=30583

SLHC-PP management structure



Governing board

- The Governing Board (GB) is the top-level decision making and arbitration body. The GB will have the power to decide, upon Steering Committee proposals, on strategic issues, such as modifications of the project programme (if necessary) and admission of new participants.
- The Governing Board will review the progress of the project at the annual SLHC-PP meetings, and, where necessary, decides on changes in the work plan and budget allocation for the next reporting period.
- **http://cern.ch/SLHC-PP/GB.htm**

Institute	GB representative	Institute	GB representative
CERN	L. Evans, L. Linssen, M. Capeans (1 vote)	FOM-NIKHEF	N.Hessey
		GSI	G. Fehrenbacher
AGH-UST	W. Dabrowski	Imperial	J. Nash
CEA-Saclay	J-M. Riffle t	INFN	P. Pierini
CIEMAT	F. Toral	PSI	C. Wernli
CNRS-IN2P3	D. Gardes	STFC	M. Weber
CTU	S. Pospisil	UBONN	M. Cristinziani
DESY	W. Zeuner	UNIGE	A. Clark
ETH-Zurich	F. Pauss	USFD	I. Dawson

Steering Committee

It is the executive body of the Consortium in charge of the coordination and management of all activities in the project. It shall monitor and review the work progress and will take executive decisions on scientific and administrative issues that may arise.
http://cern.ch/SLHC-PP/SC.htm

Management team:

Lyn Evans	Project Coordinator (acc)
Lucie Linssen	Deputy Project Coordinator (expt)
Mar Capeans	Administrative manager

Work package leaders:

WP1	Lyn Evans
WP2	Gijs de Rijk
WP3	Steinar Stapnes
WP4	Jordan Nash (Imperial)
WP5	Hans-Georg Menzel and Thomas Otto
WP6	Paolo Fessia
WP7	Richard Scrivens
WP8	Marc Weber (STFC)

Outreach coordination

Dissemination of information (see WP1, task 1.2)

- **Central web page:**
  - Based on information repository of all work packages (in particular the COORD WPs 2, 3, 4)
  - Series of internal technical/scientific reports
  - Repository of Published Publications with SLHC-PP participation

- Following the main nature of SLHC-PP, establishing contacts and providing information on SLHC is a very essential element of the project
  - Including repositories on R&D work outside SLHC-PP
  - Organisation of SLHC workshops !

Luminosity upgrade, 2 stages

Note: this overview is taken from the Annex I document, autumn 2007. Obviously, as a function of the R&D progress, these plans are subject to change…….

- **Stage 1: 2008-2011**
  - SLHC-PP project together with world-wide technical R&D:
    - Construction of Linac4 (160 MeV/c)
    - Design of new injector complex (to replace PSB and PS)
    - Design of high-luminosity LHC interaction region upgrades (Nb-Ti, then Nb3-Sn quadrupole magnets)
    - Other LHC machine upgrades: RF, collimation…….
    - Definition of possible SPS upgrades
    - R&D for experiment upgrades
- **Stage 2: until 2016 implementation (progressive)**
  - Construction of new injectors
  - Implementation of LHC, SPS upgrades
  - Implementation of experiment upgrades (possibly progressive)

SLHC-PP contractual documents

Annex I document

- Our principal working document
  - The work plan, including deliverables/milestones
  - The sharing of the work between the partners
  - The sharing of the resources

Grant Agreement (GA)

- Our legal contract (with the European Commission and between the partners)
  - Annex I is part of the Grant Agreement

Consortium Agreement (CA)

- Our internal constitution
  - Internal collaboration rules (sharing responsibilities, management, publications, sharing of information)
  - The EC is not a signatory of the CA

Kick-off meeting

- **Aim of the meeting**
  - Meet the participants!
  - Define the work program for the first year
  - Provide information to collaboration members on the project and on FP7 procedures
  - Give broad visibility to the SLHC project

- **Have a nice meeting !**
  - 55 persons inscribed
  - Almost all institutes represented

Practical info

- Plenary and parallel sessions all take place in or close to the main building

- **Welcome drink, this evening at 18.15 hrs in the Glassbox (Restaurant 1, NOVAE) => Everyone welcome**

- In case of practical problems/questions do not hesitate to contact us
  - Kate Ross 16-2771, 076-4872771
  - Cecile Noels 74321
  - Lucie Linssen 16-3202, 076-4873202
  - Mar Capeans 16-4590, 076-4874590