TECHNOLOGY Department
Plenary Meeting 2014

José Miguel JIMENEZ
Main Topics

- Safety Objectives & Organisation
- Human Resources & Training
- Financial Statements
- LS1 status
- Groups’ Achievements
- Medium & Long-term objectives
- Space Management & Strategy
- Conclusions
Safety Objectives & Organisation in TE Department

Don’t be imaginative with Safety

Protect our Users & Visitors

Ensure availability of Safety Devices

Simple messages and rules help…

Don’t be imaginative with Safety

Protect our Users & Visitors

Ensure availability of Safety Devices

Simple messages and rules help…

SAFETY FIRST

THERE IS NO SUBSTITUTE FOR SAFETY
Safety Objectives & Organisation in TE Department

Safety in LS1

- We followed the principle: “Safety First, Quality Second, Schedule Third”

- LS1 Accident Statistics*: Prevention shows to be effective

- ~3.7 million working hours for LS1
- 64 minor accidents (no absence)
- 31 accidents with 273 days of absence

- Frequency rate: 8.4
- Severity rate: 0.07

*Road accidents are not included
Safety Objectives & Organisation in TE Department

Safety Organisation

Confirms the principles of Safety at CERN:

- **Everybody** is responsible for Safety aspects of his own activity and workplace
- **Every supervisor** is responsible for Safety in his area of responsibility
- **Nobody** can delegate his Safety responsibility
- Safety officers, support officers and linkpersons are ready to help you with your **Safety responsibility**

29. Sept. 2014
## Safety Objectives & Organisation in TE Department

### Safety Officers

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Department</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Otto</td>
<td>DSO, Deputy RSO</td>
<td>Technology</td>
<td>160648</td>
</tr>
<tr>
<td>Francesco Castronuovo</td>
<td>Deputy DSO</td>
<td>Technology</td>
<td>164735</td>
</tr>
<tr>
<td>Michael Jonker</td>
<td>Radiation SO</td>
<td>Technology</td>
<td>160606</td>
</tr>
<tr>
<td>Johan Bremer</td>
<td>Cryogenic SO</td>
<td>Technology</td>
<td>160553</td>
</tr>
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<td>Mats Wilhelmson</td>
<td>Flammable Gas SO</td>
<td>Technology (EN)</td>
<td>160553</td>
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<tr>
<td>Steve Hutchins</td>
<td>Laser SO</td>
<td>Technology (BE)</td>
<td>163061</td>
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## Safety Objectives & Organisation in TE Department

### Safety Link persons 2014

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Christophe Boucly</td>
<td>ABT</td>
</tr>
<tr>
<td>Serge Claudet</td>
<td>CRG</td>
</tr>
<tr>
<td>Valérie Montabonnet</td>
<td>EPC</td>
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<tr>
<td>Knud Dahlerup-Pedersen</td>
<td>MPE</td>
</tr>
<tr>
<td>Michele Modena</td>
<td>MSC</td>
</tr>
<tr>
<td>Sophie Meunier</td>
<td>VSC</td>
</tr>
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</table>

9
25 November 2014
Safety Objectives & Organisation in TE Department

Safety documentation for buildings

- TE department operates workshops and labs on the edge of current technology. We need to ascertain and document that our collaborators are Safe.
Safety Objectives & Organisation in TE Department

Safety documentation for buildings

- **Workplace analysis and Safety documentation for TE buildings**
  - **Phase 1**: identification of workplaces in “high priority” buildings (2014)
  - **Phase 2**: risk analysis, recommendations and documentation (2015)
  - **Phase 3**: the operating groups / sections review and update the documentation regularly assisted by the Safety Officers

This documentation will constitute the “Safety File” for most TE activities (exceptions are projects: HL-LHC, LS2, …)

Acknowledgements to:
- Francesco Castronuovo (definition of the method)
- Delphine Letant-Delrieux (workplace identification)

Decided to follow the analysis process proposed by the Swiss Professional Accident Insurance SUVA

T. Otto
Safety Objectives & Organisation in TE Department

TE Safety Officers

Strong Acknowledgements to all TE Personnel, Associates and Contractors

helping with Safety!
Safety Objectives & Organisation in TE Department

Cool-down clearance

A documented process to ascertain that Safety requirements are met before starting a cool-down

Collaborative effort of TE-CRG, TE-VSC, GS-ASE (Alarms), EN-MEF (Patrols, barriers) and the DSO
Safety Objectives & Organisation in TE Department

Activities in sensitive areas for Helium spill

As a result of Helium spill tests, the He spill working group proposed to restrict activities in LHC sectors with T < 80 K.

An authorisation for such activities can be given by the Complex Manager (F. Bordry), after a risk assessment by the TE DSO.
Controlled cold He spill in the LHC tunnel

9 tests with He spill of 1 kg/s, 0.3 kg/s and 0.1 kg/s under realistic tunnel conditions

Tunnel side view

Tunnel cross section

Two 500 l Dewars with liquid helium combined extraction system

Dewars placed in the walk way
Release mock-up on top of magnet
Controlled cold He spill (100 g/s) in the LHC tunnel

View + 23.7 m
Outcome from the Helium Spill WG

Risk Assessment – Helium Spill Rate (when not in “Closed Beam Mode”)  

- **1 kg/s (MCI):** Failure mode is based on a **mechanical rupture** of liquid Helium enclosure or on an **electrical arc.**  
  - Pressure Test  
  - Cool down from 300 K down to 80 K.  
  - Powering Phase 1b (100 kJ or 1 kA max).

_Rmq: Risk of mechanical rupture is mitigated since the entire cryogenic system was designed according to the French engineering regulation for pressure vessels combined with conformity validations by the Pressure Test._

- **320 g/s:** Failure mode is based on an **electrical arc.**  
  - Powering Phase 1a with reduced power (30 kJ maximum in each circuit).  
  - Copper Stabilizer Continuity Measurement (CSCM) tests (300 kJ in each circuit, in this case @ normal conducting state).

- **<100 g/s:** Failure mode identified linked to presence of personnel since ONLY a **human mistake** can provoke the Helium Spill.  
  - All other periods when below 80 K: Flushing, Cool down from 80 K to 1.9 K, Cold Standby, Warm-ups, Interventions, Technical and Christmas Stops.
Outcome from the Helium Spill WG

Safety Impact - *No risk at 100 g/s and below*

- Dilution (calculations) keeps oxygen content higher than 18%.

- **Confirmed by the 2nd Helium Spill Test** which aimed at validation
  - Ambient temperature in the tunnel lowers no more than 10 K.
  - Oxygen content in the tunnel remains above 19%.
    - except at spill zone, oxygen content is about 11% (very local, 10 m).
  - Values valid downstream the ventilation flow, no impact upstream
  - Visible cloud is only present at the top of the tunnel, above 1.75 m
    - visible stratification.
Access and Work Conditions

Summary – below 80 K

- **Arcs**
  - Wearing personal ODH detector is mandatory
  - Restricted access to work on “Passage side”
    - Restricted with prior authorisation to work on QRL side

- **LSS**
  - Wearing personal ODH detector is **NOT** needed
  - Restricted access with prior authorisation to work on/or in vicinity of the Standalones, DFBs and QRL side
  - Controlled access to work everywhere else

- **IT**
  - Wearing personal ODH detector is **NOT** needed
  - Forbidden access
    - Derogation (exceptional) with special procedure and mitigation measures for very short interventions.

**Rmq:** Risk evaluation show that the failure mode identified is linked to presence of personnel since **ONLY** a human mistake can provoke the Helium Spill.
Annex A: Outcome from the Helium Spill WG

Examples of fragile cryogenic instrumentation and valves - QRL

Capillaries with ID of 6 mm for instrumentation
Annex A: Outcome from the Helium Spill WG

Examples of fragile cryogenic instrumentation and valves - DFBA, M, L

- SV & burst disk on sat. 4.5 K Helium
- Connectors on insulation vacuum
- Pressure sensor connection on sat. Helium (diam. 6)
- Instrumentation connector on service chimney
- SV & burst disk on D line connection
- Connector to pressurized 1.9 K
- Insulators on current leads
- He spill points
  - Connectors on vacuum

25 November 2014
Annex A: Outcome from the Helium Spill WG

Examples of fragile cryogenic instrumentation and valves - DFBX

Magnet instrumentation

Insulators on current leads

Current leads instrumentation

Insulators on current leads

Current leads instrumentation

SV on line D

Current leads

Pressure sensor on line D

SV on saturated 4.5 K He

25 November 2014
Human Resources & Training

TE (Staff) Activities 2014

- LHC (including LHC experiments, Operation, Consolidation and Spares), 42%
- Injectors (Including Consolidation), 19%
- General Support including electronics design, surface treatments, Infra. Cons., etc, 8%
- New Projects, 21%
- Administration, 5%
- Non-LHC Physics, 5%

25 November 2014
Human Resources & Training
2014 – Recruitment Numbers (Staff)

• LD Recruitment
  • No. posts open in TE : 23 Post, 28 Boards
  • No. candidates selected : 22
  • No. longlisted candidates : 1,253
  • No. candidates invited to interviews : 141

• IC Recruitment
  • No. posts open in TE : 20 Posts, 17 Boards
  • No. candidates invited to interviews : 34

• Internal Mobility : 20
• Appointments / Discussions with HRA : 291
## Human Resources & Training

### Slots for Indefinite Contracts (LD2IC)

<table>
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<th>Exercise</th>
<th># of slots</th>
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<td>CCRB nov’14</td>
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<td>CCRB nov’16</td>
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<td>TOTAL 2014-2016</td>
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Human Resources & Training

Arrivals in 2014

Staff Members: 23

BAJAS
BIANCHI
CORDOBES DOMINGUEZ
DE MALLAC
DE SOUSA PIMENTEL
DERKING
D’HULSTER
FLEITER
FRASER
GENTON
JOSIFOVIC
MAJOURNAL
MALMEDAL
MAUNY
ORMESHER
PAIVA E ROCHA
RAKOTONIaina
ROSAZ
SEQUEIRA LOPES TAVARES
SESTAK
UZNANSKI
YIN VALLGREN
YTTERDAL

HUGUES MARIE ALAIN
RAUL BRAIAN
RAUL BRAIAN
FELIPE
LOUIS
MARCO PEDRO
JAN HENDRIK
BENOIT
JEROME CHRISTOPHE
MATTHEW ALEXANDER
CHARLES-MATHIEU
IVAN
DIDIER JEAN MICHEL
MARGRETHE
REMI
LAUREN RIANNA
ANDRE MANUEL
NIRINA GABRIEL
GUILLAUME JONATHAN
SANDRA CRISTINA
JOSEF
SLAWOSZ
CHRISTINA
THOMAS MELCHIOR

Members of Personnel 2014

Arrivals - Total = "292"

Data hrt 11.11.2014

HDO Unit
## Human Resources & Training

### Staff Departures in 2014

### Retirements = 10

- ILIE
- PRIESTNALL
- VO DUY*
- GABORIT
- CALEGARI
- GIRARDOT
- WALCKIERS
- LEGRAND
- FISCHER*
- PIANFETTI

### LD Departures = 9

- PILON*
- GALLAGHER*
- MORELL*
- AGLIETTI
- DARRAS
- DE SOUSA LOBATO
- GRUFFAZ
- VASSAL
- DONNIER-MARECHAL

- SORIN DUMITRU
- KEVIN
- JEAN-LOUIS
- LUCETTE
- GERARD
- ROGER
- LOUIS
- DOMINIQUE
- KLAUS
- JEAN PAUL

- REGIS
- JOHN EDWARD
- FRANCIS MARIANO
- FEDERICO
- VINCENT FREDERIC
- JEAN-CHRISTOPHE
- FRANCOIS-ALEXIS
- GREGORY
- LUDOVIC
Human Resources & Training
Age and Career Path distributions (Staff Members)

Number of Staff Members by Age Bracket

Staff Members by Career Path

Number of Staff (Men/Women)

Data hrt 11.11.2014
Human Resources & Training
2014 MARS Exercise

TE step distribution

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<tr>
<th>Steps (in %) for TE</th>
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Career Path Changes
1 – A-B
1 – B-C
3 – C-D
0 – D-E
4 – E-F

Salary Band Changes
3 – c-e
11 – a-b
20 – b-c

48 Individual Premiums
32 team awards

Budget distribution by Career Path (no ASB budget this year)
## Human Resources & Training

### Resources (Manpower)

<table>
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<tr>
<th>Employed Personnel</th>
<th>Number</th>
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<td>Staff</td>
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<tr>
<td>Fellows</td>
<td>82</td>
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<tr>
<td>Apprentices</td>
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### Internal Collaboration

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<tr>
<td>Cooperation Associates</td>
<td>40</td>
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<td>Project Associates</td>
<td>47</td>
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### Exchange of Scientists

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<tr>
<td>SASS</td>
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<tr>
<td>VISC</td>
<td>14</td>
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### Training

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<tr>
<td>Students</td>
<td>74</td>
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<tr>
<td>Trainees</td>
<td>14</td>
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**TOTAL** 712

HRT As at 21.11.2014
Human Resources & Training

FSU resources evolution

2004-2011: S107, S108
July 2011 to today: S144, S145, S146

2015 per Department

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<thead>
<tr>
<th>Department</th>
<th>FSUnits</th>
<th>FTE</th>
<th>%</th>
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<tbody>
<tr>
<td>BE</td>
<td>5</td>
<td>55.5</td>
<td>13%</td>
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<tr>
<td>EN</td>
<td>7</td>
<td>72</td>
<td>17%</td>
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<tr>
<td>GS</td>
<td>4</td>
<td>48.0</td>
<td>11%</td>
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<tr>
<td>HSE Unit</td>
<td>1</td>
<td>11.0</td>
<td>3%</td>
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<tr>
<td>PH</td>
<td>4</td>
<td>37.0</td>
<td>9%</td>
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<tr>
<td>TE</td>
<td>13</td>
<td>194.0</td>
<td>46%</td>
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<tr>
<td>TOTAL</td>
<td>34</td>
<td>417.5</td>
<td>100%</td>
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</tbody>
</table>

D. Delikaris

LHC Installation

LHC LS1

CERN
Technology Department (TE)
Plenary Meeting Dec'14
25 November 2014
Human Resources & Training

Our personnel is our strength!

Learning & Development

<table>
<thead>
<tr>
<th>General Information</th>
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<tbody>
<tr>
<td>LEARNING &amp; DEVELOPMENT POLICY (13.09.2012)</td>
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<tr>
<td>LANGUAGE GUIDELINES (11.12.2013)</td>
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</table>

HR Training Programmes

- Language
- Management & Communication
- Technical

Other Training Programmes

- Academic
- Safety
- CERN Schools

Job Training & Coaching (by Groups / Teams)

- Technical Reviews
- Workshops
- Conferences
- Personal initiatives

https://hr-training.web.cern.ch/hr-training/

G. Hobgen (DTO)
Human Resources & Training

Training Investment (Internal & External) 1/2

963 courses followed

1790 days allocated to training

279K spent

*Budget code 98002, hrt as at 24.11.2014
Human Resources & Training
Training Investment (Internal & External) 2/2

Courses / person

CHF / person

Days / person

*Budget code 98002, hrt as at 24.11.2014

G. Hobgen (DTO)
Human Resources & Training
Corporate Training

From January 2015!

Centrally-defined

CORPORATE

Non centrally-defined

- Induction Programme
- *Language integration level
- *Core communication
- Leadership (CDPs)

- Safety training
- Language for role / function
- Technical Training & Technical Management
- Personal Development / Communication & Leadership

HR-LD – P. Goy Presentation
“Corporate Priorities Implementation”
Human Resources & Training
Corporate Training Pathways

New Fellows

*Induction Programme
Safety training
Technical training

Language Integration level

New Staff

Induction Programme
Safety training
Technical training

Language Integration level

Recruit – Yr 2
Yr 2 – Yr 3

Yr 3 – Yr 4

Current Staff

Prior or when supervisor

Com. Days - 3-4 CDPs

HR-LD – P. Goy Presentation “Corporate Priorities Implementation”

P. Goy (HR-LD)
Human Resources & Training

**TE Training Guidelines**

Training guidelines and budgets are now available at:

https://te-dep.web.cern.ch/content/training-guidelines
https://te-dep.web.cern.ch/content/organization-training-budget

<table>
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<tr>
<th>Training Type</th>
<th>CERN Status</th>
<th>Guidelines</th>
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<tbody>
<tr>
<td>LANGUAGE (Employed Members of Personnel)</td>
<td>MPE</td>
<td>Integration and up to 2 trimesters</td>
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<td>MPE &quot;Admin&quot; duties</td>
<td>Integration and up to 4 trimesters</td>
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<td>LANGUAGE (Associated, International Collaboration and Exchange of Scientists)</td>
<td>USER</td>
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<td>DOCT</td>
<td>Integration only</td>
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<td>TECH, ADMI, TRNE</td>
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<td>SUMM</td>
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Human Resources & Training
TE Human Resource Advisor (HRA)

- The HRA provides services in the following areas:
  - Day-to-day work and career concerns
  - Support to supervisors in their HR and people activities
  - Operationalization of the HR Strategy
  - Support to change management

This is the type of support that I provide to the TE employees:
- Welcome joiners and provide guidance on HR matters
- Individual support during probation and at the end of LD contract
- Respond to HR-related queries
- Advice on HR processes (MARS, promotions, CCRB, etc)
- Advice and mediate in Performance Management or Conflict
- Career Advice, support for Internal Mobility, feedback on interviews
- Support in case of personal issues or medical cases with an impact at work
- Advice and support for Special Leave
- Link between the department and all other HR Services

Isabel Pumares
CERN Ombud

VALUES
Code of Conduct
Ombud

CERN OMBUD

Informality
Confidentiality
Impartiality
Independence

→ the quicker an issue is addressed, the easier it is to resolve

Sudeshna Datta-Cockerill
Tel: 74127 (+41 22 767 4127)
Office: Bldg 500-1-004
eMail: Ombuds@cern.ch
Financial Statements
2014 Operation Budget (kCHF)

Initial Allocation

Carryforward + Receipts end 2013

Budget following TEEP

Industrial Support Commitment for the year
Financial Statements

2014 Projects Budget (Total ~60 MCHF)

* TE Infrastructure = Build 107, Upgrade He Infrastructure & Maintenance Management Project
Financial Statements

2015 Budget

Preliminary First Material Budget Release:

- ~37 MCHF for Operation Budget
  To be compared to 49 MCHF requested…

- ~86 MCHF for Projects

…preparing our future…
Financial Statements

Preliminary 2015 Projects Budget (~86 MCHF)
LS 1 from 16th Feb. 2013 to Dec. 2014

Status Report

21 months

16th Feb.  

2013

1st December  

2015

| 2014 |


LHC

SPS

PS

PS Booster

beam to beam available for works

Physics

Beam commissioning

Shutdown

Powering tests

25 November 2014
LS 1 from 16th Feb. 2013 to Dec. 2014

PS Physics has started

- **nTOF planned for 15-07-2014**
  - Slightly delayed start for EAR2 installation work
  - **First beam on target 25-07-2014**
  - Since, physics during night and weekends and continuation of installation during daytime.

- **East Area planned for 15-07-2014**
  - First beam on 15-07-2014, physics start on 16-07-2014

- **AD beam**
  - In March 2014, beam on target delayed by 3 weeks due to Horn strip line problem new optimistic date for beam on target 01-08-2014
  - **First beam delivered on target 05-08-2014, physics start on 16-09-14**

- **Ion beam in preparation for 2015 run planed for 25-08-14**
  - Argon Ions were successfully injected, accelerated and extracted from PS on 26-08-2014
LS 1 from 16th Feb. 2013 to Dec. 2014

SPS: *start-up with beam more-or-less on schedule*

Beam was foreseen for Monday 8th September,

Despite…
- Conditioning of injection and dump kickers which took longer than foreseen after LS1
- Hardware testing of main circuits and debugging of converter software issues after updates during LS1
- Water leak on water cooled main bus bar in SPS point 3 was detected on 8th Sept.

1st beam on Saturday 13th September

**Today:**

Resume Physics fixed target at 400 GeV/c
Ready for LHC beams at 450 GeV/c
- “Fantastic” Scrubbing Run (25 ns)
- Beam knocked at LHC doors 10 days ago…
LS 1 from 16th Feb. 2013 to Dec. 2014
LHC Superconducting Magnets And Circuits Consolidation Dashboard

SMACC

Updated 30-Aug-2014

Baseline (14.03.2013)
Completed
Forecast
Thanks to a fantastic and super motivated team and to the SMACC Leader (Jean-Philippe Tock)
LS 1 from 16th Feb. 2013 to Dec. 2014

Cool-down of LHC sectors

Slow-down during weekends

4 sectors @ 1.9 K
2 sectors under 3 K filling
1 sector under 20-4 K CD
1 sector under CSCM test

CSCM

ITR8 intervention
<table>
<thead>
<tr>
<th>Week</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
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</table>

LHC schedule V4.1

1st beam on week 11 (starting 9th March 2015)

Safety First, Quality Second, Schedule Third
Machine Protection and Electrical Integrity Group (MPE)
Highlights of 2014 Activities

A. Siemko on behalf of TE-MPE Group

Secretariat: S. SAPOUNTZI

Electronics for Protection EP
R. DENZ
N.F. BELLEGO
F. BOISIER
D. CALCOEN
V. FROIDIBISE
S. GABOURIN
S. GEORGAKAKIS
C. MARTIN
K. PRIESTNALL
J. STECKERT

Magnet Powering Interlocks & Software MS
M. ZERLAUTH
Y. BASTIAN
P. DAHLEN
J.-C. GARNIER
R. MOMPO
I. ROMERA RAMIREZ
J.-L. VO DUY

Electrical Engineering EE
K. DAHLERUP-PETERSEN
M. BEDNAREK
G.-J. COELINGH
G. D’ANGELO
A. DINIUS
M. FAVRE
J. MOURAO
S. PEMBERTON
G.J. SEWERYN

Performance Evaluation PE
R. SCHMIDT
B. AUCHMANN
Z. CHARIFOUILLINE
M. JONKER
A. VERWEIJ
D. WOLLMANN

Electronics Modules EM
M.-E. MAGNIN
R. BERBERAT
R. COUITTI
S. EXCOFFIER
S. KAUFMANN
M. TUUVA
N. WAUQUIER
CERN-wide Service for Electronic Module Design and Production

Distribution of jobs across the departments and TE groups (total of 537 jobs in 2014)
CERN-wide Service for Electronic Module Design and Production

Production examples

- **TE-ABT**: Design of a HV Switch Board for SPS

- **TE-CRG**: Production of 800 sets of boards
  Beam Screen Heater Powering Card
  1.2kV TT Insulated Card

- **TE-MPE**: Production of 1300 assemblies of DQLIM crates and several series of boards for DQLPU crates
New Warm Magnet Interlock Systems brought into service in injectors

- **BOOSTER**
  - New WIC in operation since May 2014 (largest system deployed so far)

- **SPS**
  - New WIC in operation since July 2014

- **HIE-ISOLDE**
  - Final SW tests in lab on-going
  - Installation scheduled for December 2014

*Stage 1*
Machine Performance Studies

**Availability Studies**

- **Superconducting circuits**
  - Development of novel framework for modelling superconducting magnets circuits, including protection studies for Nb3Sn magnets and HTS elements
  - Uses tools such as PSPICE, MATLAB (Simulink), COMSOL, FLUKA, ...
  - Collaboration with German universities
  - CLIQ – a new method to protect superconducting magnets

- **Radiation to Electronics (R2E)** – from mitigation to prevention
- **Understanding radiation fields** (monitoring, simulations)
- **Tracking of faults and their improved understanding**
- **Electronic systems to be replaced** (ageing, obsolescence)
- **Improved communication links to equipment in tunnel**
- **Use synergies between teams and collaborate with PH → possibility of development of common radiation tolerant/hard components**
Example of R&D - 15 kA IGBT-based Extraction Switch for SM18 Test Facility

**Basic parameters and characteristics:**
- 8 parallel water-cooled IGBT branches, each rated 2 kA, 1500 V
- Capacitors at each busbar level for inductance compensation.
- Triple, laminated, water-cooled busbars
- Drivers: One master, three slaves per column.

IGBT radiator and emitter / collector laminated busbars with integrated cooling for continuous DC operation.

IGBT branch with air-cooled flexible busbars

Power connections
Example of R&D – Development of an Automatic Test System for Remote Commissioning of the 600 A Energy Extraction Systems

**Purpose:** To be able to perform the Hardware Commissioning **WITHOUT** human presence in LHC underground.

The testers were successfully used for commissioning of sectors 67 and 81. After the preventive breaker cleaning no human presence in the tunnel was needed.

2 new test systems are in production (Nov. 2014) in order to cope with the pick work-load expected early next year.
Completion of the Warm Busbar Measurements

Interconnecting busbar segment data from across sector 81

Results of warm magnet resistance measurements across sector 81. After LS1 upgrade.

Results from the complete LHC dipole circuit, except S67

Board A: Busbar segments only

Board B: Busbar + diode branch

All results of busbar segment resistances vs. temperature.

Busbar segment normalized differential resistances

Busbar segment normalized differential resistances – Board A (no diode branches)
Hardware Commissioning Major Progress in 2014

- IST completed for 13kA and 600A Energy Extraction Systems
- Re-installation ad connection of DYPB racks (*yellow racks*) in all sectors was completed on time
- IST for Quench Protection System advancing along with the needs for every new sector under powering tests
- C SCM tests have been done for 7 out of 8 sectors and successfully
- Three sectors have been or are in Powering Phases I or II (67, 81 and 12), one sector (56) imminently joining the group

<table>
<thead>
<tr>
<th>SECTORS -&gt;</th>
<th>12</th>
<th>23</th>
<th>34</th>
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end 04/12/14
CSCM campaign results

CSCM at 9 kA in S-23 **BEFORE** consolidation of the 13 kA joints, clearly showing a runaway after a few seconds at 9 kA.

CSCM at 11.1 kA in S-23 **AFTER** LS1, clearly showing stable voltage behaviour.
Main MP3 activities in 2014

- Revision of all the powering procedures.
- Documentation of the NC’s affecting the powering of the SC circuits.
- Analysis and signature of the HWC tests.
- Automation of the analysis of the HWC tests of all 60 A and 80-120 A circuits.
First dipole training quench after LS1

First training quench in S-67 at 9779 A (equiv. to almost 5.8 TeV), with secondary quenches in adjacent magnets at 4282, 4235 and 381 A. The magnet that quenched was the magnet in S-67 with the lowest first training quench in SM-18 (8391 A).

All systems (converter, quench detection, quench heaters, energy extraction system, ...) behaved as they should.
Vacuum, Surfaces and Coatings Group (VSC)

Highlights of 2014 Activities

P. Chiggiato on behalf of TE-VSC Group
LS1: installation of the experimental vacuum chambers
Remote handling in radioactive areas

- For future proton accelerators, the collective radioactive dose will be mitigated by the use of remotely operated robots.
- The mechanical design of vacuum systems will facilitate and accelerate the robot intervention.
- Studies are ongoing in VSC for the HL-LHC project.

Leak detection by helium with a robot in the SPS

Flange sealing of kicker magnets by robot
HIE-ISOLDE cavities production

→ 5 cavities ready for cryo-module assembly

RF data courtesy Pei Zhang CERN/BE/RF

→ 14 runs diode baseline coating recipe
→ 14 layers FIB-SEM cross section:

STEM HAADF image courtesy B.Bártová CERN/EN/MME and D.T.L. Alexander EPFL/CIME
Preliminary Design of the shielded HL-LHC beam screens

The beam screen system has to be optimized with respect to mechanical loads (54 ton/m during a magnet quench) and heat transfer (20 W/m).
Copper plating on X-FEL coupler

Challenges:
- Plating on stainless steel;
- Complex geometry. High radial ratios associated with confined volumes (bellows);
- Components already with brazed parts;
- Low tolerances for plated thickness and defects

On-going:
- Mock-up trials
- Production of plating tools
- Technical support to X-FEL contractor

Ready for production at CERN as from 02/2015
Carbon coating of 12 dipoles + 2 quads for the SPS

Max SEY ($\delta_{\text{max}}$) versus time of air exposure

Cathode: graphite targets (cells)

MBB type dipole

Threshold for electron multipacting in the SPS
Production matches the planning End of production in December.
TE-VSC coating systems for MAX IV
KEK collaboration
New photon line for desorption studies

First photons in CERN vacuum chamber: October 26
Deformable RF fingers

Mechanical simulation and fatigue life assessment

Set-up for RF and impedance tests

2 convolution prototype

Set-up for fatigue tests
Vacuum simulations: Molflow+

Two examples of Molflow+ test-particle Monte Carlo simulations:
- Left: superconducting spoke cavity model
- Right: RF-shielded pumping port
Vacuum simulations: Synrad+

- Two examples of SYNRAD+ synchrotron radiation Monte Carlo simulations:
  - Left: VC1-VC2 dipole chamber for MAX-IV; source is SOLEIL wiggler; the e- beam trajectory is visible on the lower right corner; these are the source points for the photons.
  - Right: same as previous with ray-tracing of the photon paths. Real scattering probability is applied to the walls, assumed to be made out of copper
Identification of the pollution in the river at Point 6 (in less than 2 hours)

Unknown pollution in the river at point 6 of LHC

Organic contaminant extraction with n-hexane (salts stay in aqueous phase)

Extraction of residues via evaporation of $C_6H_{14}$.

FT-IR Analysis of the extraction

Pure Breox oil
Residues extracted

Residues extracted
Pure Breox oil

FT-IR Analysis of the extraction

Quantification via gravimetric analysis and report **EDMS 1406622** (in less than 24 hours)

10 ml of river water
Evaporation of water $2H$ à 95°C

$C_6H_{14}$

Addition of $C_6H_{14}$

Liquid phase transfer and $C_6H_{14}$ evaporation

[Breox] = 5 g/L

1000
1500
2000
2500
3000
3500
4000

Wavenumber cm$^{-1}$

60
65
70
75
80
85
90
95
100

Transmittance [%]

H$_2$O Pure
H$_2$O Polluted

Polyethylene surface

Lowering of the surface tension
Foam in the river

Stable emulsion in the water due to the formation of micelles (hydrogen bonds)
Setting the future of the hardware for vacuum control systems

- New sector valve card
- New Interlock crate
- Standardise (PS, SPS, LHC)

New gauge controllers
- LSS: Have an alternative design
- ARC: Transmission 4-20mA

New Ion Pump controller
- Switching mode PS + profibus

New gauge controllers
- Standardise (PS, SPS, LHC)

New turbo ctrl & local crate
- Standardise types

Field bus for mobile ctrl
- Evaluate a wireless solution
Electrical Power Converters Group (EPC)
Highlights of 2014 Activities

J-P. Burnet on behalf of TE-EPC Group
SPS consolidation during LS1

The main power converters of SPS was largely consolidated during LS1

- New 70km of 18kV cables (EN-EL)
- New 68 transformers
- New 68 thyristor stacks
- New 18kV earthing switches
- New Acquisition system, DCCT and ADC
- New CIS (CCC application software for SMD&SMQ)
- New FGCD software for all power converters

Main objectives

- Improve reliability
- Improve performance
- Reduce maintenance workload
- Reduce electrical consumption
SPS hardware consolidation during LS1

18kV cables  
trenches  
transformers

18kV earthing switches  
Thyristor stacks  
All in operation since September!
SPS software consolidation during LS1

- New FGCD software to replace obsolete ROCS
- New functionalities like COAST
- New automated energy saving
  - Saving for external conditions
  - No beam detected, no cycle
  - Pulse converters only for selected destination

FGC builds dynamic economy function with parameter $t_1$.

Corresponds to the time when the economy function should join the original one again.
LHC SVC consolidation during LS1

All LHC SVCs were largely consolidated during LS1
- New PLC control system for remote control
- New acquisition system for remote diagnostic
- New redundant 400V auxiliary supplies
- New protection relays
- New earthing switches
- Refurbishment of cooling units
- Replacement of ageing capacitors
- Replacement of ageing coils

SVC will be critical for 6.5TeV operation

- Improve reliability
- Improve operability
- Ease diagnostic & repair
LHC SVC consolidation during LS1

- PLC system
- Remote control
- Acquisition system
- Protection relays
- Earthing switches
- Capacitors
- Coils
Capacitor accelerated life testing

- High efficiency power systems need local energy storage.
- Only capacitors can survive millions of discharge cycles.
- However, POPS capacitors showed some unpredictable ageing signs when operated with DC offset and AC superimposed (not understood by suppliers).
- Need to qualify right capacitor technology for energy storage
- Construction of a capacitor accelerated life testing
  - Overstress in temperature, Heat capacitors (50-80°C)
  - Overstress in DC voltage (+50%)
  - Apply the same AC waveform than in operation
  - Obtain the life expectation of the device in one month

Main objectives

Qualify capacitors for PSB2GeV
Monitor POPS capacitors
Capacitor accelerated life testing

Electrical test

Capacitor test stand

Capacitors under test

In operation since November
Power converters for HIE-ISOLDE

- All 34 CANCUN received ±50A/±30V

- 49 COBLAT to deliver by February 2015 200A/50V

- 7 COMET_2P to deliver by March 2015 ±500A/±120V

Installation on going

Ready for hardware commissioning
Power converters for LINAC4

- All power converters delivered and installed.
- All control electronics delivered.
- FGC3 software close to completion.

Main EPC objective for 2014

End of LN4 (for project phase)
Cryogenics Group (CRG)

Highlights of 2014 Activities

L. Tavian on behalf of TE-CRG Group

TE-CRG

Cryogenics Staff Members

L. TAVIAN Group Leader
D. DELIKARIS Deputy

J. BREMER - Detectors; Cryogenic Safety Officer
S. CLAUDET - Safety link-person Officer
K. BARTH

Secretariat: S. JUVET

Controls & Electrical Support
CE
M. PEZZETTI
C. BATAULT
R. BAUD
J.F. BEL
A. CALORE
B. D'HULSTER
C. FLUDER
V. INGLESE
B. IVENS
S. MARTIN
A. TOVAR-GONZALEZ

Cryolab & Instrumentation
CI
J. BREMER
J. CASAS-CUBILLOS
L. DUFAY-CHANAT
F. HAUG
T. KOETTIG
J.M. QUETSCH
N. TRIKOUPIIS
A. VACCA
R. VAN WEELDEREN
N. VAUTHIER

Mechanical & Engineering Support
ME
O. PIROTTE
V. BENDA
C. BERTHELIER
P. CHAMBONDET
J.M. DEBERNA
N. DELRUE
J.M. DERKING
S. JUNKER
L. LE MAO
A. LEES
J. METSROTH
F. MOREL
J. MOUREY
L. STEWART

Methods & Logistics
ML
S. CLAUDET
N. BONETTI
S. KNOOPS
A. PERIN
L. SERIO
Z. SIPOS

Operation for Accelerators
OA
G. FERLIN
S. BRESSON
K. BRODZINSKI
F. CHEVET
M. COMBE
L. DELPRAT
S. DEMAS
E. DURET BOURGOZ
A. ESQUEIRE
C. GUILLOU
K. HAFI
L. HERBLIN
M. MALMEDAL
R. MORGAN
A. PERRIER-CORNET
N.G. RAKOTONIAINA
E. ROGEZ
A. SURICI
A. YAHIC
T.M. YITTERDAL

Operation for Detectors & Test Areas
OD
U. WAGNER
L. ALAUX
S. BARBERIS
R. CONSENTINO
T. DUPONT
C. FABRE
J. HEBERT
J.P. LAMBOY
D. MAJORAL
R. MAUNY

DECEMBER 2014
LHC cool down LN₂ 2014

Originally 480 trucks planned (60 trucks per sector). 9600 tons of LN2 in March 2014. 433 trucks delivered by the end of October 2014.
8660 tons of LN2. Average 54 trucks per sector.
LHe deliveries 2014

Virtual storage: 94 tons returned by 8th July.

New molecules: 83 tons delivered (8 tons apart from contracts).
ATLAS upgrade

- **10,000L Dewar for Solenoid**
  - Dewar, Valvebox & TL’s installed and pressure tested in July 2014.
  - TL3-VB & TL5 connections performed within the 2 max. requested weeks.
  - Electrical & controls system
CMS compressor station upgrade

Before: 09/10/2003

After: 02/06/2014

In operation since October.
- 3 weeks CD
- Nominal operation 27 Oct’14 to 14 Nov’14
- CMS detector testing.
P4/R2E: Relocation of sensible equipment in UL

behaviour, H4IRAD
the P8 relocation exp

UX45

US45

QURCA-EM02
QURCA-EMC1-4
QY01/02
QUCP-QRC-EM03
QUCA-EM02
QURCB-EM02
QURCB-EMC1-4
QUPC
Consolidation of insulated channels

According to TE-TM54: Increased withstand level for DFBs consolidation:

- HTS 13kA: 128 channels, 100% done-OK
- HTS 600A: 1528 channels, in progress 94% done-OK
- HTS 120A => 152 channels, 100% done-OK
Electrical Heaters for the Beam Screen

For the LHC beam screen, the electronic cards can provide regulated DC power up to 30 W and AC power up to 200 W (for beam screen regeneration/bake-out).

484/485 channels operational. (Only the LQATH_20L2_EH847 is not operational due to a fault to earth inside the machine).
HIE-ISOLDE Cryogenics

- Compressor station
  - Mechanically installed, cabling in progress
- Cold Box
  - ALEPH cold box being refurbished by LINDE, back to CERN by 25 Nov 2014.
- Cryo-distribution
  - Under manufacturing @ Criotec (delivery CW2)
DFBX controls of conventional leads
He II – Oscillating Super-leak Transducers (OST)

- Measured nonlinear effect of second sound at high heat fluxes of up to 700 W/cm²
- Improved capability of Quench spot localization at complex geometries (CRAB cavity)
ATLAS - Forward calorimeter mock-up

Sample from Univ. of Arizona and components from TU Dresden

Test of the thermal performance of a FCAL mock-up in subcooled LAr bath

- Vapor pressure regulation
- Constant LAr level in the cryostat
- Subcooling Loops using pressur. LN₂

Rotatable sample support to simulate all FCAL orientations
Accelerator Beam Transfer group (ABT)

Highlights of 2014 Activities

B. Goddard on behalf of TE-ABT Group
TL Test 22/23-Nov-14
LHC Kicker/LBDS synchronisation and TL Aperture

Involved from TE:
TE-ABT
TE-EPC
TE-MPE
TE-MSC
TE-VSC

LHC MKI kick delay adjustment

Measurements of the TL apertures with phase oscillation knobs

All TL magnets working & powered fine

LBDS: Inject&Dump, new BIS signal directly into retriggering line introduced by TE/MPE in LS1
TL Test 22/23-Nov-14
Dispersion

- Orbit/trajectory after 1300Hz trim on LHC frequency
- Dispersion measurement in SPS and TI 8
**LHC Upgrades**

**TCDQ** - single sided mobile graphite diluter

Block upgraded from 6 m to 9 m
- Bakeout procedure/design to review with VSC.

New controls architecture, SW and sensors

---

**POSITIONING DATA**

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<tr>
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<th>UPSTREAM</th>
<th>DOWNSTREAM</th>
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<tbody>
<tr>
<td>Actual Position w/ MDC System (in mm)</td>
<td>+15.00</td>
<td>+14.99</td>
</tr>
<tr>
<td>Actual Position w/ PRS System (in mm)</td>
<td>+15.00</td>
<td>+14.92</td>
</tr>
<tr>
<td>Difference Position PRS-MDC (in mm)</td>
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<td>+0.91</td>
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<tr>
<td>Delta Position on MDC System (in mm)</td>
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**OPERATING SETTING**

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<tr>
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<td>MDC - Demanded Position (in mm)</td>
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New electronics and controls for SPS dump

Consolidation during LS1

- Power distribution
- Slow control (Siemens PLC)
- Thyratron heating system
- MKDV HV power supplies (60kV / 300mA)
- Capacitor bank earthing & discharge switches (fail-safe implementation)
- BA1 cabling
- Migration to FESA3
- Implementation of additional diagnostic and monitoring functionalities

New Beam Energy Tracking System (BETS)
ELENA

• Finished design of electrostatic quadrupoles and steerer unit - ready for call manufacture
• Ion switch manufacture ongoing in Main Workshop

HV testing of feedthrough samples

Fast deflector drawings being prepared
LIU-SPS MKE kicker impedance reduction

Final serigraphed MKE kicker installed in LSS4 in LS1

- All 8 magnets now treated – program complete (took 12 years)
- MKE heating no longer limited SPS scrubbing – proved in scrubbing run

Attention now switches to MKP….next limit!
LIU-PSB 2 GeV extraction/recomb Septa

BE.SMH –Extraction septum
Cooling and bus bar cross section upgrade completed on spare.

BT.SMV10 (2 GeV) – Recombination septum
3D models of assembly including magnets - OK.

BT.SMV20 (2 GeV) – recombination septum
Concept established, magnet identical to SMV10.
Magnets, Superconductors and Cryostats (MSC)

Highlights of 2014 Activities

L. Bottura on behalf of TE-MSC Group
First CERN 11 T model
11 T performance

- Good first result, no issues of ramp-rate and stable steady state operation (excellent!), but marginal quench performance for the LHC
D2 and Q4 H/V correctors

Large saturation and cross-talk between apertures

16 mm collar thickness
SM18-UPG: Horizontal test stations

- Re-install equipment on Cluster C
- Water-cooled cables in Cluster A
- New connection adapters
- Testing of LHC magnets restarted

MB2377 [E2]: Warm test done, disconnected and stored in SMS18

MB1088 [B2]: successful cool down even the CFB leak. Tests @ cold in progress

MB2353 [F2]: Tests at warm in progress: cool down scheduled next week

MB2372 [E2]: Arrived today in SM18
Polymer laboratory
Magnet infrastructure (927)
Magnet infrastructure (180)
Magnet infrastructure (181)
Nb₃Sn wire procurement

Total procurement = 30 t
CM assembly infrastructure and specific tooling

Main assembly tooling (design & procurement: EN-MME+TE-MSC)

Multi-purpose trolley (top plate preparation)

Cavity/Solenoid trolley (delivered today)

Assembly frame
HIE-Isolde Cryomodule

Adjusters
Chimney
Thermal shield
Vacuum vessel
Top plate
Cavity
Frame
Helium vessel
Solenoid
Magnets

Pre-series dipole yoke before painting

Production completed in 2014

Pre-series quadrupole (#1)

Series quadrupole (#3)
Production completed by end of February 2015

Series quadrupole (#2)

Steerer dipole
All magnets at CERN
AD presently decelerators antiprotons to 5300 keV
ELENA will allow further deceleration to 100 keV

Achievements
- Dipole prototype magnetically measured, final design tuning performed and order placed (iron dilution TBD)
- Quadrupole prototypes measured
- Magnetic and mechanical design of all ELENA magnets finished
- Procurement phase has started
SESAME Synchrotron-light for Experimental Science & Applications in the Middle East

32 QD (-10.2 T/m)
32 QF (17 T/m)
16 BENDING (1.46 T) + QD (-2.8 T/m)
32 SD/Vcorr (220 T/m²)
32 SF/Hcorr

bending angle: 22.5°, 16 cells
Bore 70...75 mm
Bore 40 mm

All contracts for magnet production placed and running in UK, Spain, France, Cyprus, Turkey, Pakistan

Booster in the SESAME hall

TE-MSC Group
SESAME magnets: a wide effort

FRANCE
420 sextupoles

UK
17 dipoles

PAKISTAN
33 sextupoles

SPAIN
66 quadrupoles

CYPRUS
33 sextupoles

TURKEY
280 quadrupole coils
‘Maquettes’ for exhibitions

- Fabrication, preparation for transport, and dispatch

Interconnect mock-up
Piazza de Ferrari
Genoa

Short Straight
Section
Trento

Exhibition area B180
Interconnect & dipole mock-up
Medium & Long-term objectives

The CERN Medium Term Plan approved by June’14 Council, implements the European Strategy including a long-term outlook.

The scientific programme is concentrated around four priorities:

1. **Full LHC exploitation** – the highest priority - including the construction of the High Luminosity Upgrade until 2025
2. **High Energy Frontier** – CERN’s role and preparation for the next large scale facility
3. **Neutrino Platform** – allow for to contribute to a future long baseline facility in the US and for detector R&D for neutrino experiments
4. **Fixed-target programme** – maintain the diversity of the field and honour ongoing obligations by exploiting the unique facilities at CERN
European Strategy: “CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines.”

*FCC: Future Circular Colliders
Medium & Long-term objectives

LHC roadmap: schedule beyond LS1

LS2 starting in 2018 (July) => 18 months + 3 months BC
LS3 LHC: starting in 2023 => 30 months + 3 months BC
Injectors: in 2024 => 13 months + 3 months BC

(Extended) Year End Technical Stop: (E)YETS

30 fb⁻¹

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Medium & Long-term objectives

Why High-Luminosity LHC? (LS3)

Goal of HL-LHC project:
- 250 – 300 fb⁻¹ per year
- 3000 fb⁻¹ in about 10 years

By implementing HL-LHC
Almost a factor 3
By continuous performance improvement and consolidation
Around 300 fb⁻¹ the present Inner Triplet magnets reach the end of their useful life (due to radiation damage) and must be replaced.

L. Rossi (HL-LHC PL)
Medium & Long-term objectives
The HL-LHC Project

- New IR-quads Nb$_3$Sn (inner triplets)
- New 11 T Nb$_3$Sn (short) dipoles
- Collimation upgrade
- Cryogenics upgrade
- Crab Cavities
- Cold powering
- Machine protection
- ...

Major intervention on more than 1.2 km of the LHC
Medium & Long-term objectives

The HL-LHC Project: a zoo of magnets

Triplet QXF (LARP and CERN)

Orbit corrector (CIEMAT)

Separation dipole D1 (KEK)

Skew corrector (INFN)

Recombination dipole D2 (INFN design)

Q4 (CEA)

Corrector sextupole (INFN)

Corrector octupole (INFN)

Corrector decapole (INFN)

Corrector dodecapole (INFN)

Cross-sections to scale, by courtesy of E. Todesco
Medium & Long-term objectives

The HL-LHC Project: an international dimension…

HL-LHC systems are entering detailed integration phase

New baseline expected within a few months (changes of the order of 2 m)
Medium & Long-term objectives

The HL-LHC Project: new cable developments…

Nb$_3$Sn cables

QXF cable

11 T cable

Local RRR measurements

Mechanical modelling of Rutherford cable (collaboration with EN-MME)

A. Ballarino
Medium & Long-term objectives
The HL-LHC Project: new cable developments…

MgB$_2$ SC cable
\( \Phi = 19.5 \text{ mm} \)

Demonstration of the ability to transfer high-current in cables made from MgB$_2$ round wire, both for accelerator applications and for electrical power application

Launched procurement of 150 km of MgB$_2$ wire

\( L = (2) \ 20 \text{ m} \)
\( \Phi_{\text{ext}} = 163 \text{ mm} \)
\( I = 20 \text{ kA @ 24 K} \)
\( B_{\text{peak}} = 1 \text{ T} \)
Forced flow He gas

A. Ballarino
“CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines.”

Highest possible energy $e^+e^-$ with CLIC (CDR 2012)

Multi-lateral collaboration
Future Circular Collider Study - SCOPE
CDR and cost review for the next ESU (2018)

Forming an international collaboration to study:

- **pp-collider (FCC-hh)** →
  defining infrastructure requirements

  \[ \sim 16 \text{ T} \Rightarrow 100 \text{ TeV } pp \text{ in } 100 \text{ km} \]

  \[ \sim 20 \text{ T} \Rightarrow 100 \text{ TeV } pp \text{ in } 80 \text{ km} \]

- **e^+e^- collider (FCC-ee)** as potential intermediate step

- **p-e (FCC-he)** option

- **80-100 km infrastructure** in Geneva area

---

M. Benedikt (FCC Study Coordinator)
The FCC playground

LHC
27 km, 8.33 T
14 TeV (c.o.m.)
1300 tons NbTi

HE-LHC
27 km, 20 T
33 TeV (c.o.m.)
3000 tons LTS
700 tons HTS

FCC-hh
80 km, 20 T
100 TeV (c.o.m.)
9000 tons LTS
2000 tons HTS

FCC-hh
100 km, 16 T
100 TeV (c.o.m.)
6000 tons Nb₃Sn
3000 tons Nb-Ti

M. Benedikt (FCC Study Coordinator)
Space Management & Strategy

Table of contents

• Approved par ED
  • Polymer Lab (IPP-2014-11)
  • Building 311 (IPP-2014-08)
  • Refurbishment of SM18
  • Refurbishment of Bld.180

• Pending validation by ED
  • Prévessin space reallocation in Bld.865 & 866

• Proposals
  • Bld.101 coating lab (IPP-2014-15)
  • Reshape bld.150, 272, 287, 866-B
Space Management & Strategy

Polymer Lab (IPP-2014-11)

- New 400 m² Polymer Laboratory close to 927
- Final cost estimate: 3,000 kCHF
Space Management & Strategy

Magnetic Measurement Workshop (Bld 311 IPP-2014-08)

Final cost estimate: 9,500 kCHF
Space Management & Strategy
Magnetic Measurement Workshop (Bld 311 IPP-2014-08)

Details of the internal lay-out
Construction of a special magnets test station in B180 (initially to be used for magnets for the FAIR S-FRS)

Procurement starting; commissioning planned for summer 2016
Space Management & Strategy
Large Magnet testing Hall (Bld. 180)

Cost estimate: 11,700 kCHF
Upgrade of superconducting test facilities in SM18 (B2173)

Civil engineering for new vertical magnet test station starting

Tent to protect against dust

Side view
Space Management & Strategy

Prévessin space reallocation

- Pending ED approval

- Re-allocation as per Memo to FB, EDMS 1414517

- TE dept. extra space = + 242 m²
  - EPC extra space = + 143.4 m² in 866
  - ABT extra space = + 98.3 m² in 865

- Start moving
  - January 2015
Conclusions
CERN Medium & Long-term objectives

- with the European Strategy, approved by Council May 2013,
- with the P5 recommendations, approved by HEPAP in the US,
- with the Japanese roadmap,

CERN has (for the first time) a global vision for our field going beyond regional boundaries...

CERN is playing a major role in this global endeavour and the Medium Term Plan approved by June’s Council reflects this role.

Collaborations with Institutes of CERN Member States and Worldwide are essential to prepare the technologies needed for the future generation of particle accelerators...
Conclusions

Perspectives for the Technology Department

CERN Technology Department is and will be playing a major leading role in many domains and projects:

- Resuming operation of the LHC;
- Completing HIE-ISOLDE and ELENA Projects;
- Maintain efforts towards Consolidation of existing Accelerators and related Infrastructures;
- Preparing Technologies and Infrastructures for HL-LHC, AWAKE and Neutrino Platform;
- Searching new Technologies for potential future projects such as CLIC and FCC.

- We know what we have to do…
That’s the end for 2014…

Acknowledgements

• Many thanks to all for contributing to the completion of the LS1 and resuming the operation of CERN accelerators: Staff and Fellows, Associates and Students, Industrial Support and Contractors.

• Thanks also to TE Safety Actors, TE Management and Supervisors, Administrative Support.

• Special thanks to my Deputy Dr. Volker Mertens for his support and role in Projects’ and Infrastructures’ follow-up.

• Wish you a Merry Christmas
  • Relax and Keep Safe…
Merry Christmas & Happy New Year
Joyeux Noël et Bonne Année !