



Organisation Européenne pour la Recherche Nucléaire
European Organisation for Nuclear Research
Laboratoire Européen pour la Physique des Particules
European Laboratory for Particle Physics

Maintenance Management Project

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**Maintenance
Management
Project**

A&T Seminar
7th February 2013

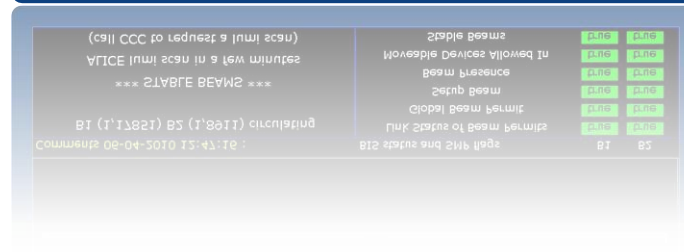
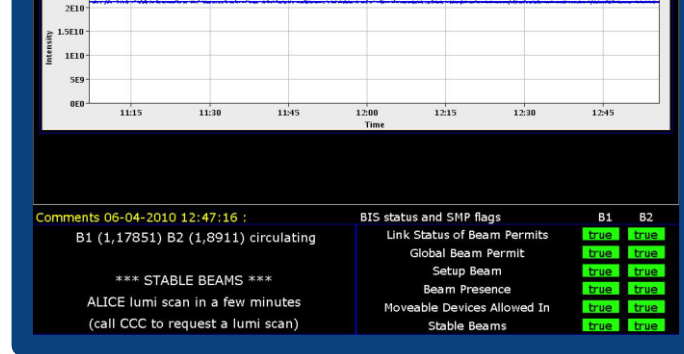


Contents

Can we still improve maintenance at CERN?

The Maintenance Management Project (MMP)

All clear?



less downtime

less breakdowns

repair efficiently

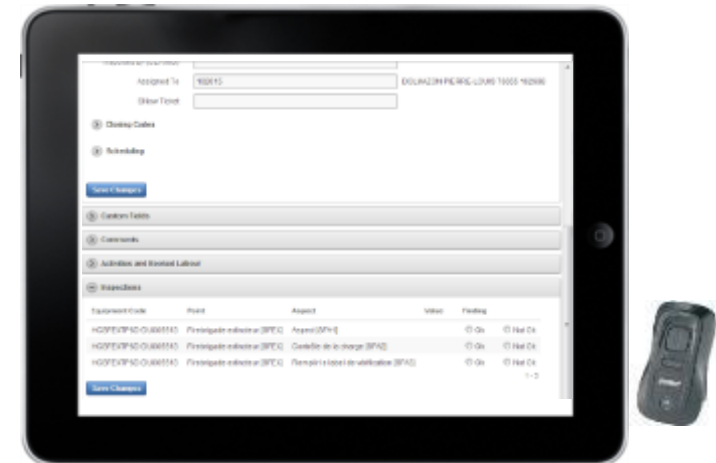
OR: Do any of these problems sound familiar to you?

MODULAR MAINTENANCE MANAGEMENT FRAMEWORK

DEMONSTRATION

FROM THE PERSPECTIVE OF THE INTERVENING PERSON

- Start – problem identified – WO or intervention ticket created e.g. by control room staff
- Step 1 – checking the WO or intervention ticket
- Step 2 – checking the information for the equipment
- Step 3 – closing the WO or intervention ticket after repair/intervention



Mobile device connected by
WLAN or GSM.

Application running in browser.

Platform independent!

Building blocks

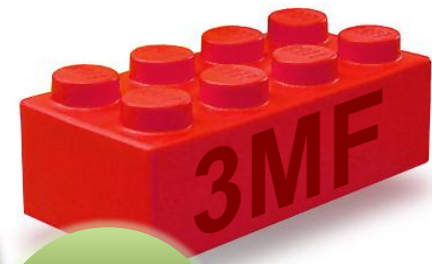
1. Register your equipment

Collect and register your spare part data

repair efficiently

have the right spares

have the data in a common DB



Accelerators Entities and Signals NAMING PORTAL

Home Signal Simple Extraction Signal Experts Interface LHC Equipment Codes SPS Equipment Codes PS Equipment Codes Print Help

- ENTITIES & SIGNALS
 - Signals (Parameters) - Simple Data Extraction Interface
 - Entities and Signals (Parameters) - Experts Interface
- DOCUMENTATION
 - CERN Equipment Identification
 - LHC
 - LHC Quality Assurance Plan
 - Equipment Naming Conventions
 - LHC Part Identification
 - General rules for naming of equipment and signals
 - Detailed rules for naming of equipment and signals
 - Naming of Hardware Equipment in the Controls Topology (draft version)
 - Practical Guidelines for Equipment Codes in the CO group
 - SPS
 - Conventions for naming of equipment
- EQUIPMENT CODES CATALOGUES
 - LHC Equipment Codes catalogue
 - SPS Equipment Codes catalogue
 - PS-Complex Equipment Codes catalogue
- Excel Templates for DATA IMPORT
 - Equipment Codes (Entity Codes)
 - Entities
 - Quantities Codes
 - Quantities
 - Signals
 - Signals, Quantities Codes and Quantities
- NEWS
 - 29-01-2013
 - No news available

Codes Search

MBE%

Search Clear results

Naming DB

- Eqp. codes LHC - 1 entries found
- Eqp & entity code
- Eqp & entity
- Entities - no
- Signals - no

Layout DB

- Functional po



	A	C	D	E	F	G	H	I
	ENTITY_CODE	ENTITY_CODE_DESCRIPTION	EQUIPMENT_CODE	EQUIPMENT_CODE_PARENT	RESPONSIBLE	CERN_GROUP	DESIGNER	
9	CKPSU	Kicker magnet Control - Power Supply Unit	Y	CK	Tony FOWLER	AB-BT-KPS		this is an example
10								
11								

MBE 610430 Bending magnet, MBE 610430 - - SP DAVID TE-MS



Building blocks

1. Register your equipment
Collect and register your spare part data
2. Format and upload documentation

repair
efficiently

have the
right
spares

have the
data in a
common
DB

have the
documen-
tation



Version	Document Title	Document Type
1249570 v.1	Rapport de réception et d'inspection - Document Folder	
1249572 v.1	Général - Document Folder	
1249575 v.1	Levage - Document Folder	
1249574 v.1	Direction - Document Folder	
1249573 v.1	Translation - Document Folder	
	Arms électriques - Document Folder	
	Armes et commercial - Document Folder	

1252039 V1 HE A3 2012-13-11

Building blocks

1. Register your equipment
Collect and register your spare part data
2. Format and upload documentation
3. Benefit from CERN workflows



repair efficiently

have the right spares

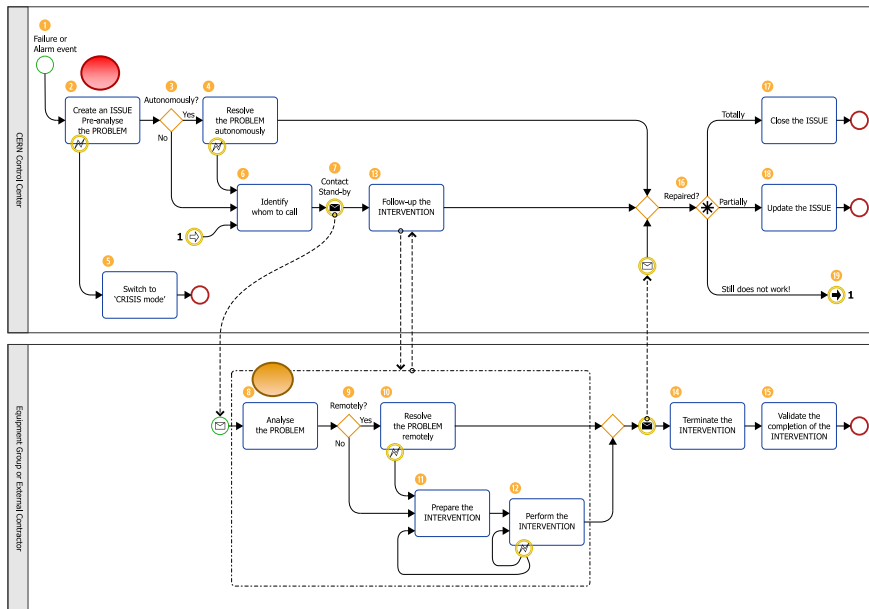


have the data in a common DB

have the documentation

know the equipment history

have efficient processes





corrective
maintenance

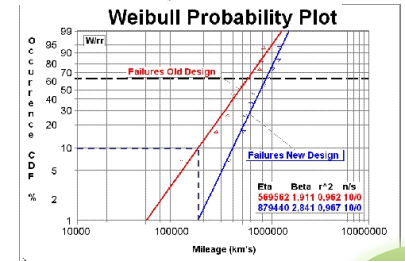
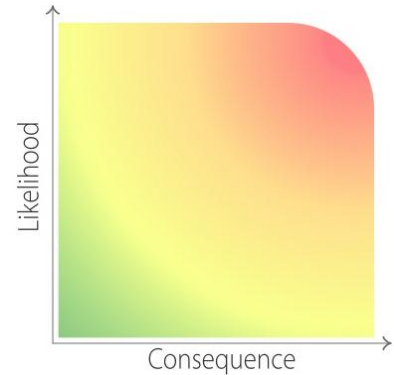
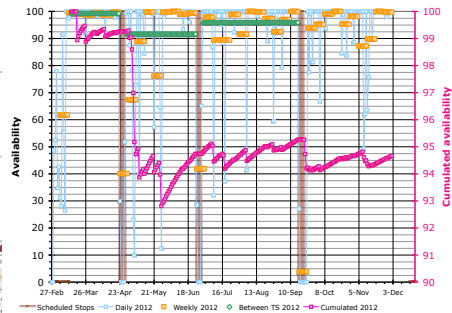
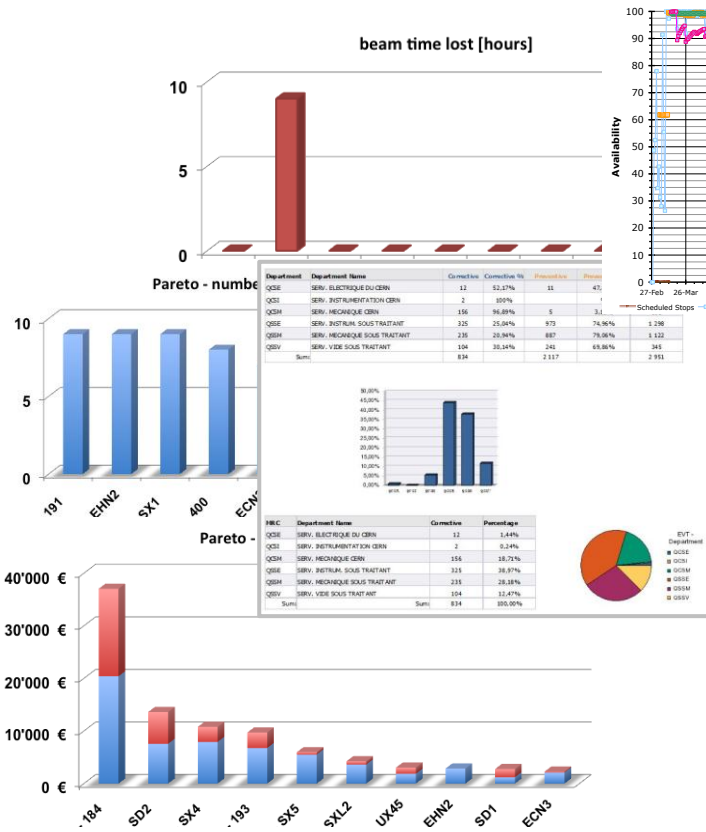


preventive
and
predictive
maintenance

repair efficiently

improve the reliability

Key Performance Indicators and Criticality Analysis



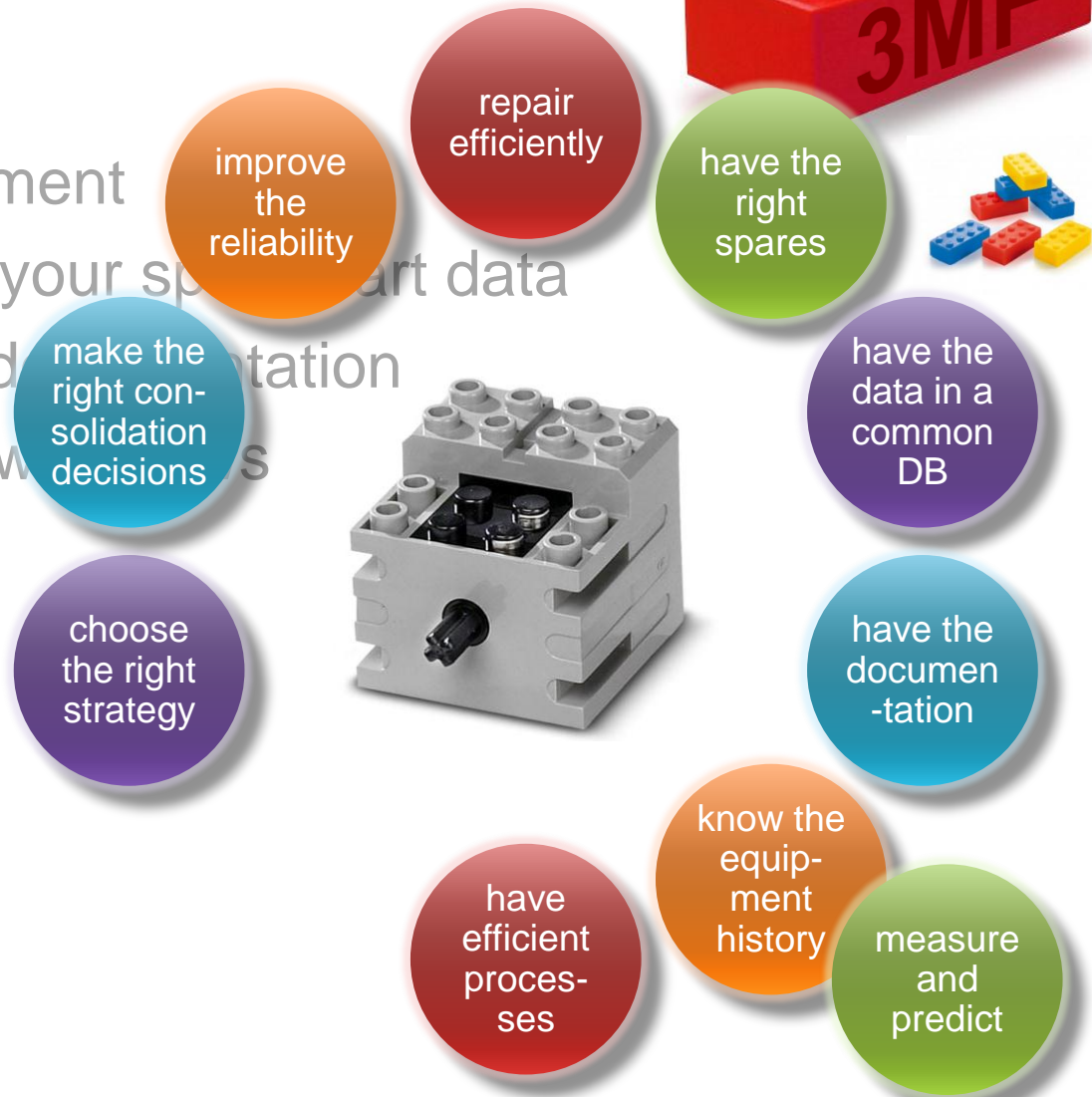
need for data

measure and predict



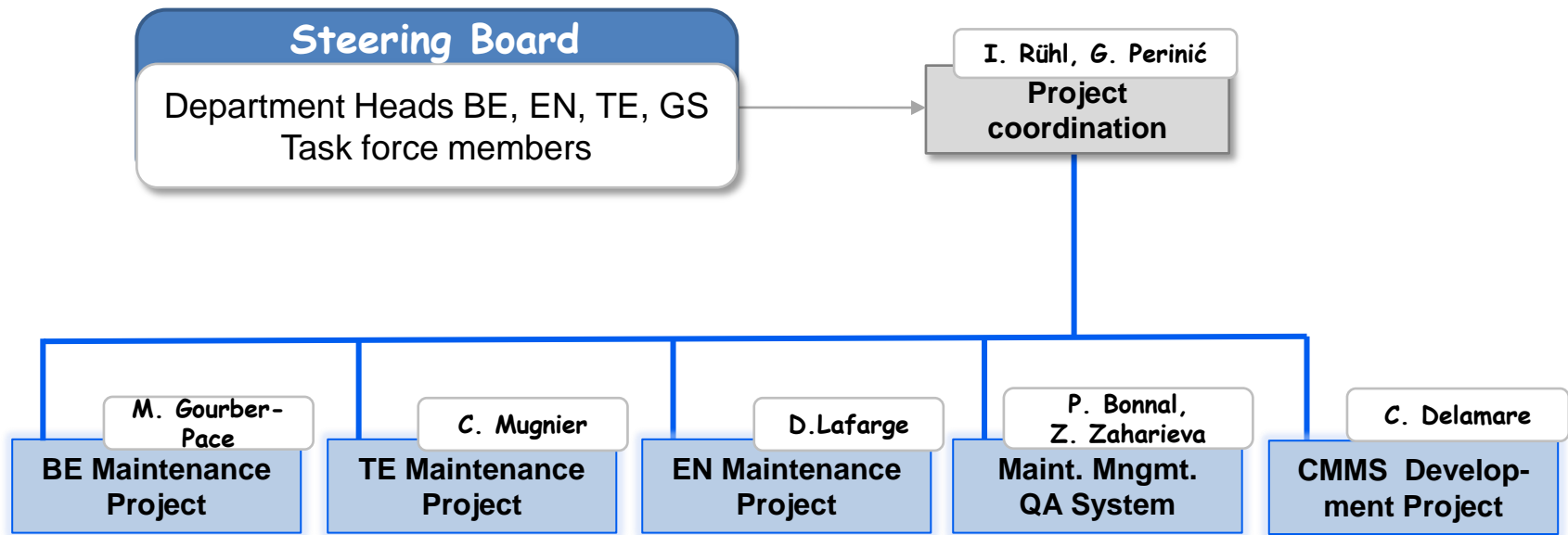
Building blocks

- Register your equipment
- Collect and register your spare part data
- Format and upload data for consolidation
- Benefit from CERN workshops
- **Choose strategy**
 - Run to failure
 - Preventive maint.
 - Predictive maint.
 - Consolidate



MAINTENANCE MANAGEMENT PROJECT

Organization of the MMP



Main objectives of the MMP

Asset management

- Identify & manage **95%*** of A&T sector's critical equipment and **50%*** of all A&T sector's equipment

Information management

- Define and manage the documentation and data that is necessary for the maintenance of above equipment

Work management

- Implement harmonized workflows

Maintenance planning

- Implement maintenance plans for critical assets

Reporting and analysis

- Provide KPIs for the critical assets

- Integrate 3MF with CERN's IT tools and DBs
- Apply principle of coherent data
- Stay in line with existing QA plans
- Complete by the end of LS1
- Ensure sustainability

Impact of the MMP

THE PROJECT IS

simplifying
work in the
field

improving
AVAILABILITY
of CERN's
equipment and
facilities

harmonizing
data collection

promoting
best practices

developing a
common
maintenance
language

reaching a
higher maturity
level in
maintenance

creating
communities

-
facilitating
transfer
of know-how

doing
maintenance
better at the
same cost

helping you to
take the
right
decisions

implementing
your
requirements



A further motivation

Excerpt of the audit report entitled "Audit of the operation of LHC and its injectors"
(ref. DG-IA/10-R5 20th Dec. 2011) where maintenance issues are referred.

§1. Audit scope and objective – p.1

- Are priorities between the necessary maintenance of the injectors, the maintenance of the LHC machine, compliance to the safety rules and the beam availability managed to ensure the right balance between the achievements of the 7
- Is the maintenance of the LHC machine and its injectors reliable operation for LHC physics in the next 20 years?

§3. Executive summary – pp.10-11

- Is the maintenance of the LHC machine and of its injectors reliable operation for LHC physics in the next 20 years?

While the maintenance of LHC equipment is, in general, coherent, there is no common, coherent and reliable operation of the LHC machine and its injectors. The maintenance of the LHC machine and its injectors is performed as a series of

The cycle of long runs (2/3 years) which are not planned to be interrupted. This has an impact on the reliability of the LHC machine and its injectors. To ensure the reliable operation of the LHC machine, it is necessary to carefully plan the main events. It must be carefully planned to ensure that the maintenance interventions must be well planned and coordinated with the main events. In addition, proper maintenance of the system for stopping the LHC machine is extremely important. The maintenance of the system for stopping the LHC machine is extremely important. The maintenance of the system for stopping the LHC machine is extremely important.

The Organization has equipped the LHC machine with a fully controlled maintenance system (CMMS), initially used to manage the maintenance of the LHC machine and its injectors. The CMMS is a fully controlled maintenance system (CMMS) which is used to manage the maintenance of the LHC machine and its injectors. The CMMS is a fully controlled maintenance system (CMMS) which is used to manage the maintenance of the LHC machine and its injectors. The CMMS is a fully controlled maintenance system (CMMS) which is used to manage the maintenance of the LHC machine and its injectors.

Ten of the 20 groups responsible for the maintenance of the LHC machine and its injectors are actually using the CMMS for the maintenance of the LHC machine and its injectors. Only 4 make a more advanced use of the available functionalities of the CMMS.

I have taken note that, since July 2010, the Department Heads of BE, TS, FN and SN have set up a forum which includes a working group and a steering committee, to encourage best practices across CERN for equipment maintenance and to steer the development of the CMMS software.

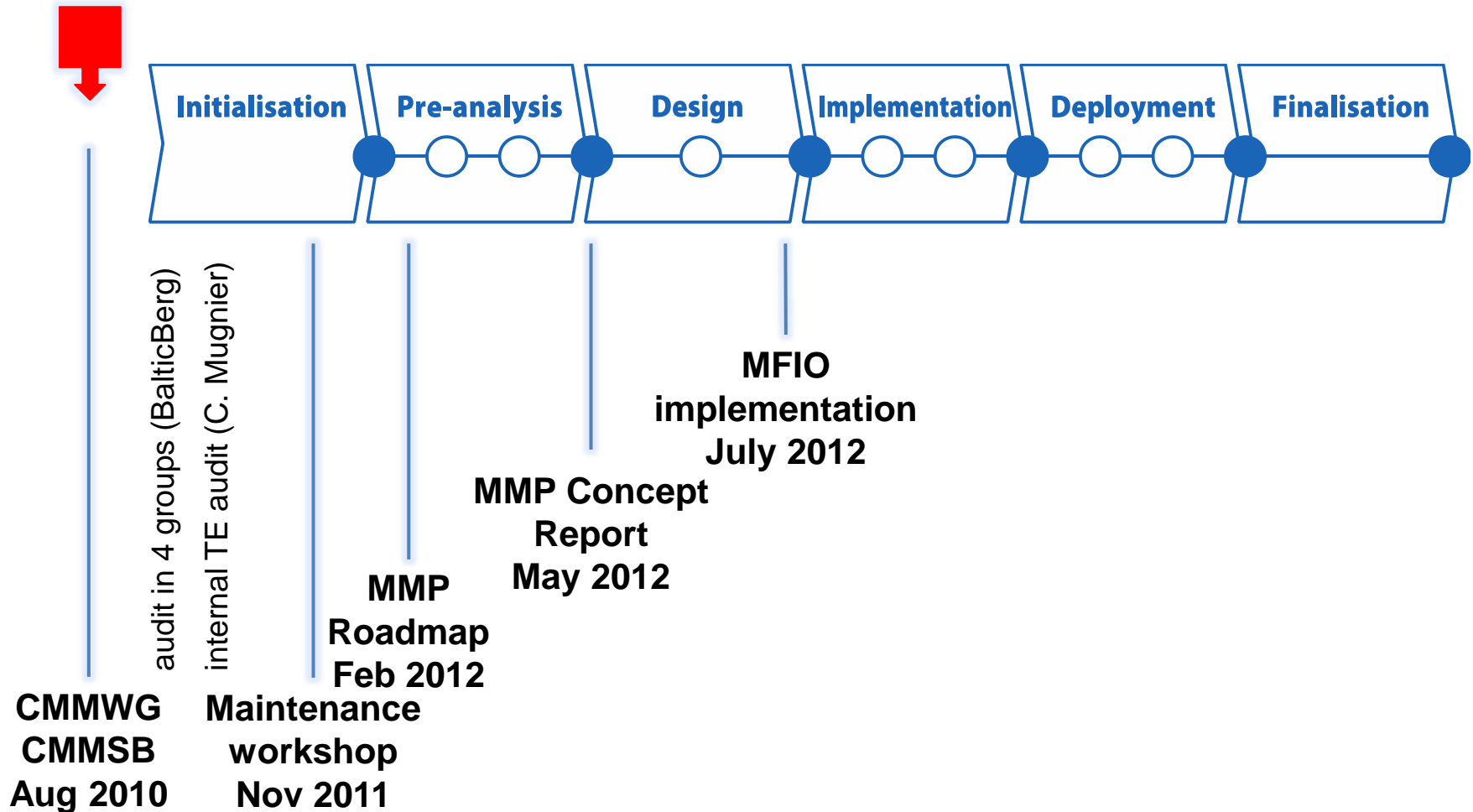
In order to provide to the Director of A&T an overview of a fully controlled maintenance of the LHC machine and its injectors during the life of the LHC for the next two decades, all equipment groups should follow well defined and coherent procedures for planning and performing maintenance and for storing maintenance data in a centralized system. To achieve this objective, the CMMS should be further configured and developed to match the requirements of equipment groups. In line with the directions provided by the CMMS steering committee, in parallel, equipment groups should be motivated to make full use of the CMMS software available and centrally supported at CERN.

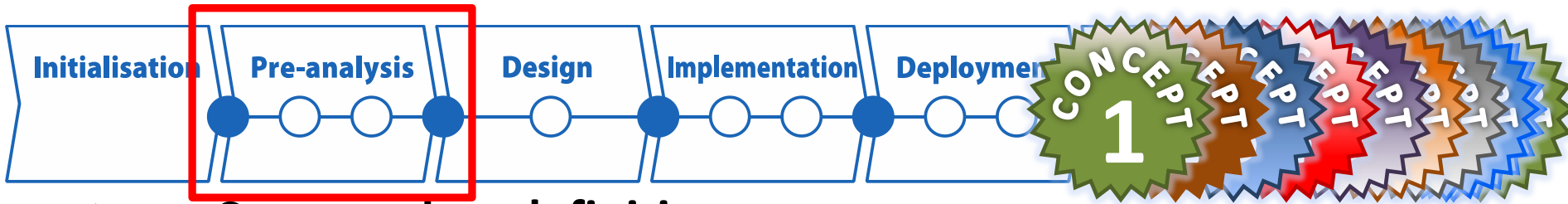
"[...], there is no common, coherent approach to maintenance across groups, to ensure a reliable operation of the LHC machine and its injectors [...]"

"[...] all equipment groups should follow well defined and coherent procedures for planning and performing maintenance and for storing maintenance data in a centralized system. [...]"

"Audit of the operation of LHC and its injectors"
(ref. DG-IA/10-R5 20th Dec. 2011)

Status of the MMP in HERMES





- Common **key-definitions**



- A common **naming/coding** reference



- Description of maintenance processes in **BPMN**



- The **issue** concept



- The maintenance **information** concept



- The metadata and **search** concept



- **Criticality** ranking system

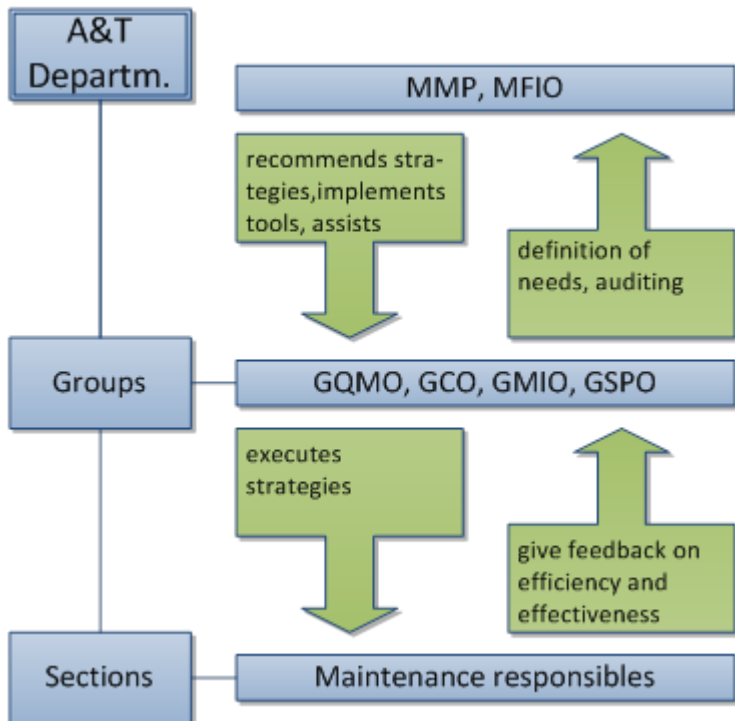


- The **roles** concept



- The **Maintenance Framework Implementation Office** concept

The **roles** concept for a modern maintenance organisation at CERN



- A group **quality/methods officer** role (GQMO): Promoting policy, procedures and standards for maintenance management and implementing a QA system at group level.
- A group **maintenance information officer** role (GMIO): Promoting good practices. Guaranteeing that all the maintenance information (document and data) is coherently managed.
- A group **coding officer** role (GCO): Link person with the Naming Service for attribution of equipment codes. Promoting good practices in matter functional position, item/part and asset coding and guaranteeing that coding is coherently implemented at group level.
- A group **spare part officer** role (GSPO): Promoting good practices. Providing support for managing spare part processes and ensuring that spare parts are coherently managed at group level.

The roles concept for a modern maintenance organisation at CERN



	BE department			EN department						TE department												
	BE-CO			EN-CV		EN-EL	EN-HE		EN-MEF	EN-STI	TE-ABT		TE-CRG		TE-EPC			TE-VSC				
implementation & deployment in groups	Sylvestre CATIN	Claude DEHAVEY	Zory ZAHARIEVA	Guillermo PEON	Soren POULSEN	Eric VAN UYTVINCK	Damien LAFARGE	Jean Maurice CHEVALLEY	Samy CHEMLI	Oliver ABERLE	Tony Fowler	Remy NOULIBOS	Nicolas BONETTI	Sigrid KNOOPS	Ludovic Germain-Bonne	Marc BOMONT	Patrice BAILLY	Régis Pilon	Alexandre SINTUREL	Eric PAGE	Fabien ANTONIOTTI	Jaime PEREZ E.
group coding officer	X	s		X		X	X		X	X	X		X			X		X	X	X	X	X
group maint. information of.	X	s		X		X	X				X		X	X	X					X		X
group quality/methods officer			X				X											X				
group spare part officer	X	s		X			X						X		X							



Courses, seminars and workshops

- **Maintenance management course**

Day 1

- 1) Introduction to maintenance, strategies and tools
- 2) Maintenance organization
- 3) Maintenance and reliability improvement projects
- 4) Preventive maintenance basics
- 5) Spare parts and maintenance supply chain management

Day 2

- 1) Asset management basics
- 2) Maintenance information and documentation management
- 3) Maintenance performance measurement and analysis
- 4) Analysis tools in maintenance and reliability - basics
- 5) Hands on workshop - Criticality analysis

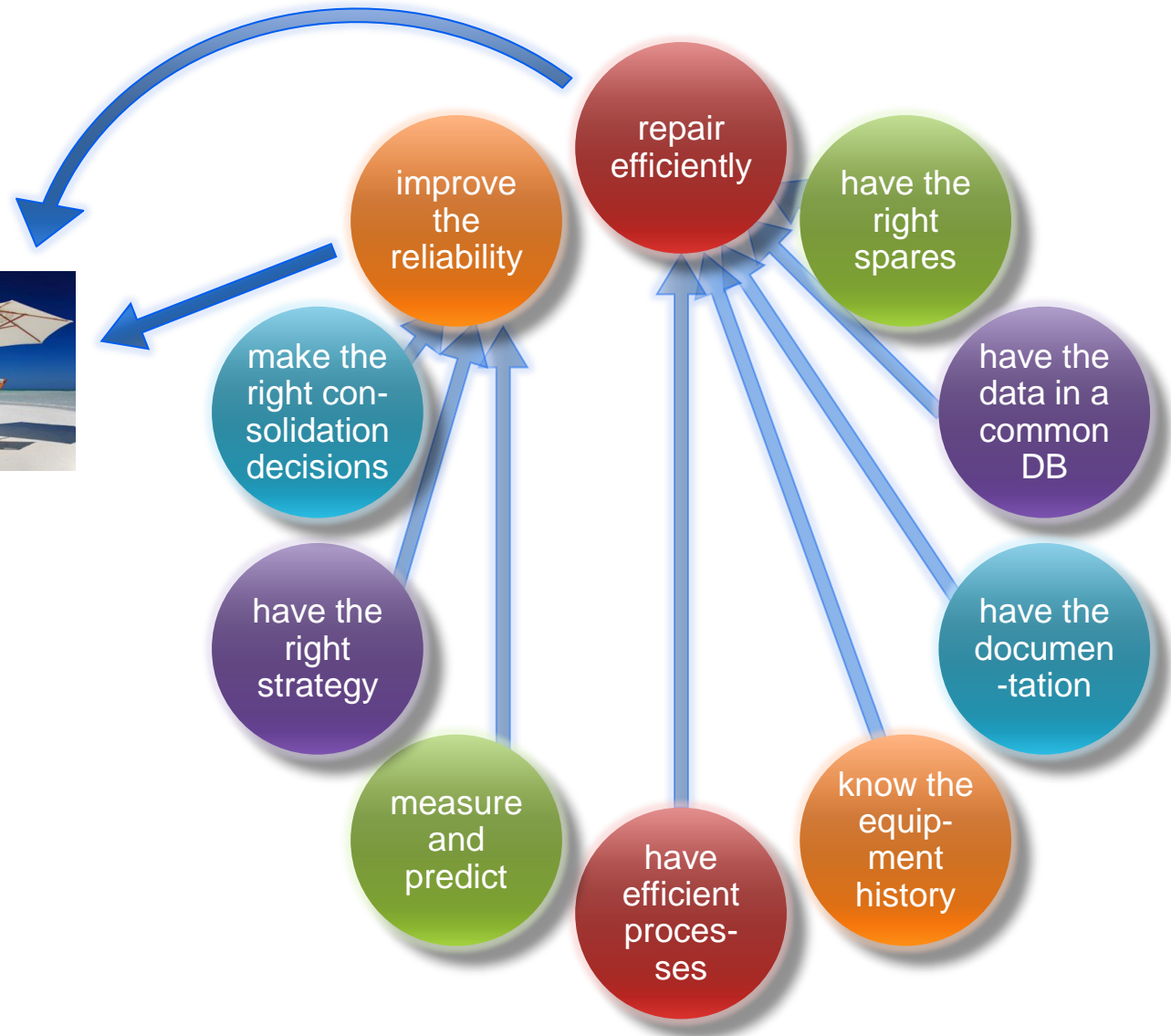
- **Presentations in SLMs**

- **Asset and maintenance management workshop for international research laboratories at CERN**

13th -15th November 2013

→Target: European accelerator, fusion and large scale laboratory community

MODULAR MAINTENANCE MANAGEMENT FRAMEWORK



We are there to help you!

Your first line of contact is the
Maintenance Framework Implementation Office

mfio@cern.ch

<http://cern.ch/maintenance>

Further support will be provided as required by:

Layout and naming service:

Accelerators-Naming.Service@cern.ch

<http://cern.ch/service-acc-naming>

EDMS:

EDMS.support@cern.ch

<http://cern.ch/edms-services>

CMMS:

CMMS.support@cern.ch

<http://cern.ch/cmms-service>



www.cern.ch