

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

CERN's Maintenance Management Project

Available methods and tools to support LHC operation post LS1

Pierre Bonnal DG-DI
Christophe Delamare GS-ASE
Marine Gourber-Pace BE-CO
Damien Lafarge EN-HE
Christophe Mugnier TE-EPC
Goran Perinić TE-CRG
Régis Pilon TE-EPC
Ingo Ruehl EN-HE
Eric van Uytvinck EN-EL
David Widegren GS-ASE
Zornitsa Zaharieva BE-CO

**Maintenance
Management
Project**

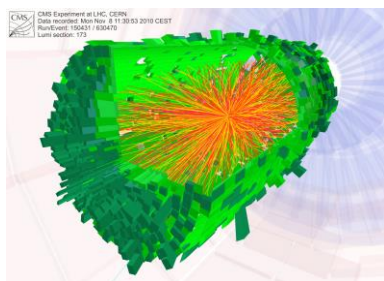
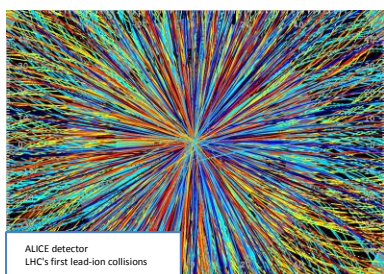
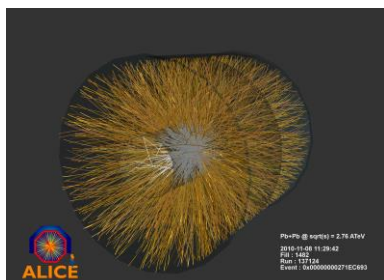
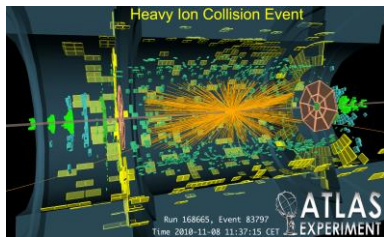
**Workshop on Machine availability
and dependability for post LS1 LHC**
28th November 2013

Agenda

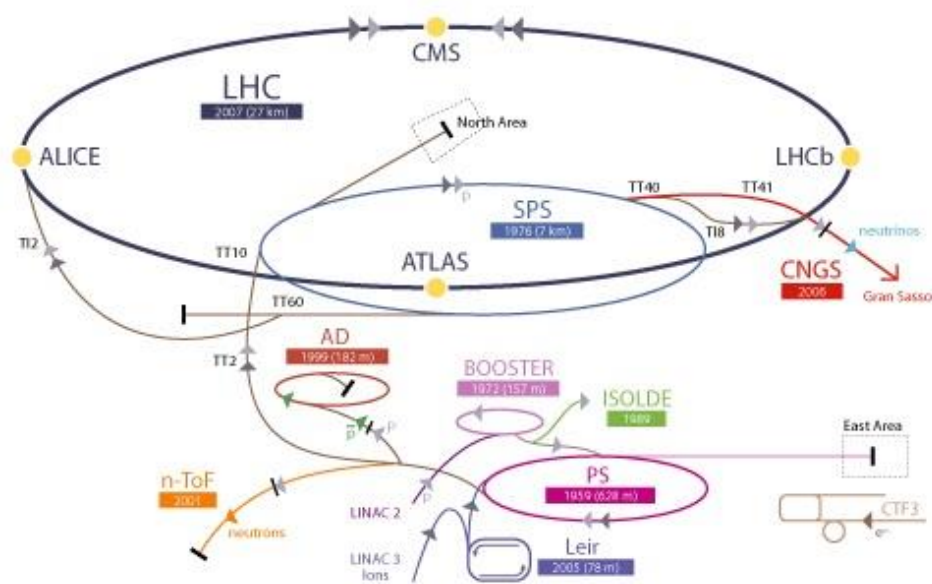
- Introduction
- Maintenance Management Project (MMP)
 - Launch of the Maintenance Management Project
 - Organizational structure of MMP/MFIO
 - Basic concepts
 - MMP/MFIO activities
- Issue management
 - Equipment group side: MMP issue management
 - CCC side : Operation issue management project (OPIM)
 - Infor-EAM as Computerized Maintenance Management System
- Conclusion

Introduction

With the first collisions in the LHC, CERN completed a long period of development and entered the operating phase in 2010.



CERN Accelerator Complex




▶ p (proton) ▶ ion ▶ neutrons ▶ \bar{p} (antiproton) ▶ neutrinos ▶ electron
 ↔↔↔ proton/antiproton conversion

LHC Large Hadron Collider SPS Super Proton Synchrotron PS Proton Synchrotron
 AD Antiproton Decelerator CTF3 Clic Test Facility
 CNGS Cern Neutrinos to Gran Sasso ISOLDE Isotope Separator OnLine DEvice
 LEIR Low Energy Ion Ring LINAC LINear ACcelerator n-ToF Neutrons Time Of Flight

Launch of the Maintenance Management Project

At the end of 2011, the 3 Accelerator Sector departments have launched the MMP project with the target to :

1. Develop a central data system to share technical information
2. Define and formalize a global approach to manage the maintenance activities: Tools and Methods

CERN CH-1211 Geneva 23 Switzerland	EDMS NO.	REV.	VALIDITY
	1173942	1.0	RELEASED
	REFERENCE		
	MMP/CR		
Date: 2012-06-27			
PROJECT REPORT			
MAINTENANCE MANAGEMENT PROJECT CONCEPT REPORT			
ABSTRACT:			
<p>This document is the Concept Report (CR) of the Modular Maintenance Management Framework (3MF) that is being developed for the Accelerators and Technology Sector. It aims at providing definitions to key maintenance management concepts, at describing the processes currently used, at proposing enhanced processes agreed by the stakeholders of the initiative, and at listing some users' requirements, toward the computerized maintenance management system (CMMS) and toward the framework itself. This CR shall serve as a basis for the development and implementation of the 3MF project that is on going at the date of release of this report.</p>			

The Concept report defines the Modular Maintenance Management Framework.

3MF = Methods + Roles + IT tools

Purpose, Objectives and Impact of the Project

Modular Maintenance Management Framework (3MF)

- Develop a **Modular MMF** - time target **end of LS1**

Assets, critical assets, spare parts and documentation

- Manage **50%** of assets, spare parts & their documentation through the 3MF
- Identify at least **95%** of the critical assets
- Review **maintenance requirements** for the identified critical assets

Key performance indicators (KPIs)

- Provide through the 3MF KPIs for critical assets

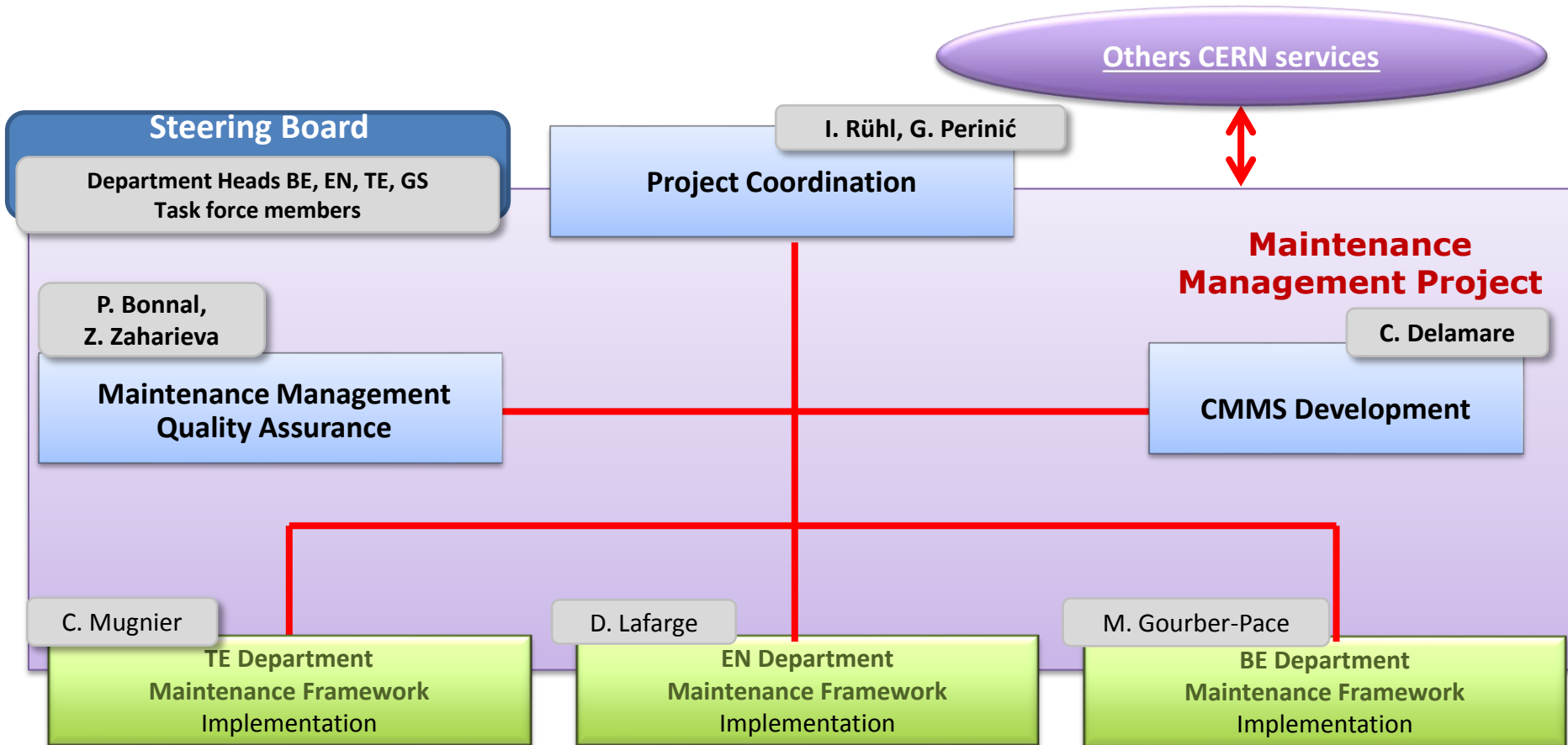
Maintenance management organization

- Design, develop and deploy an organization for addressing the **remaining assets**
- as from the end of LS1, and for **operating the MMF** on the longer term

- 16 groups of the 3 departments, are directly involved:
 - 4 groups already use the CMMS extensively and need new features
 - 12 groups have not or only partially implemented the CMMS

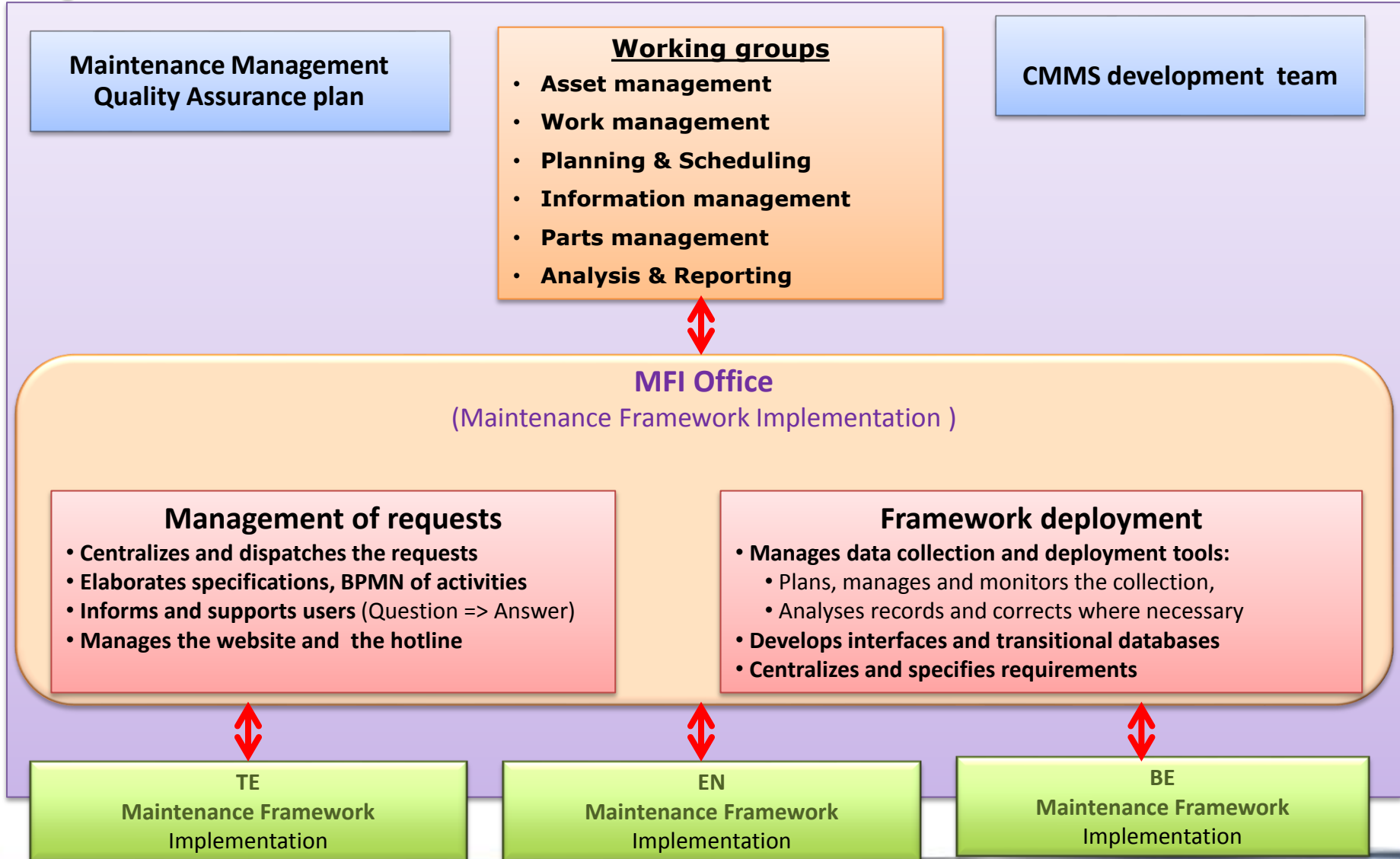
The MMP Project

Organizational Structure MMP/MFIO



The MMP Project

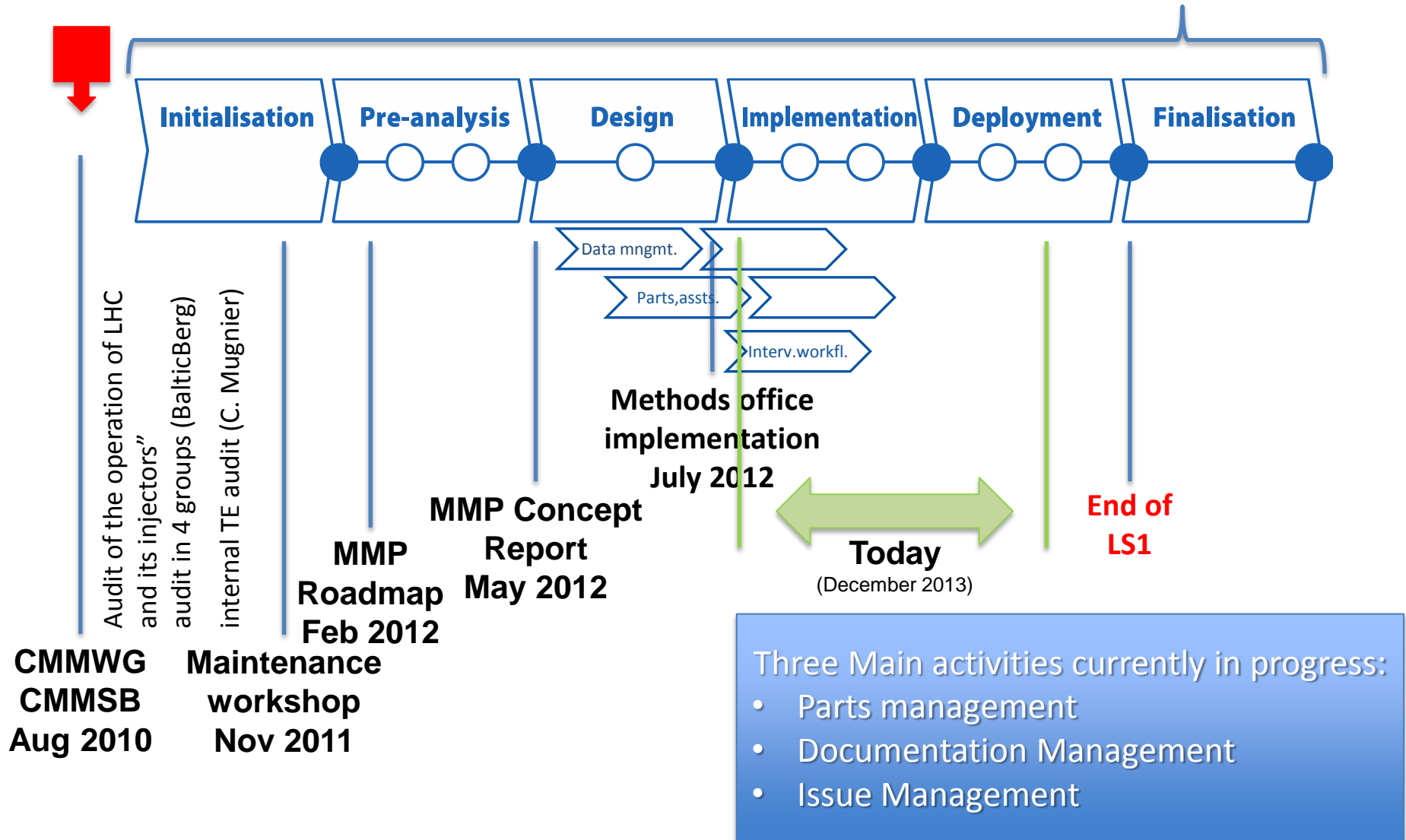
Organizational Structure MMP/MFIO



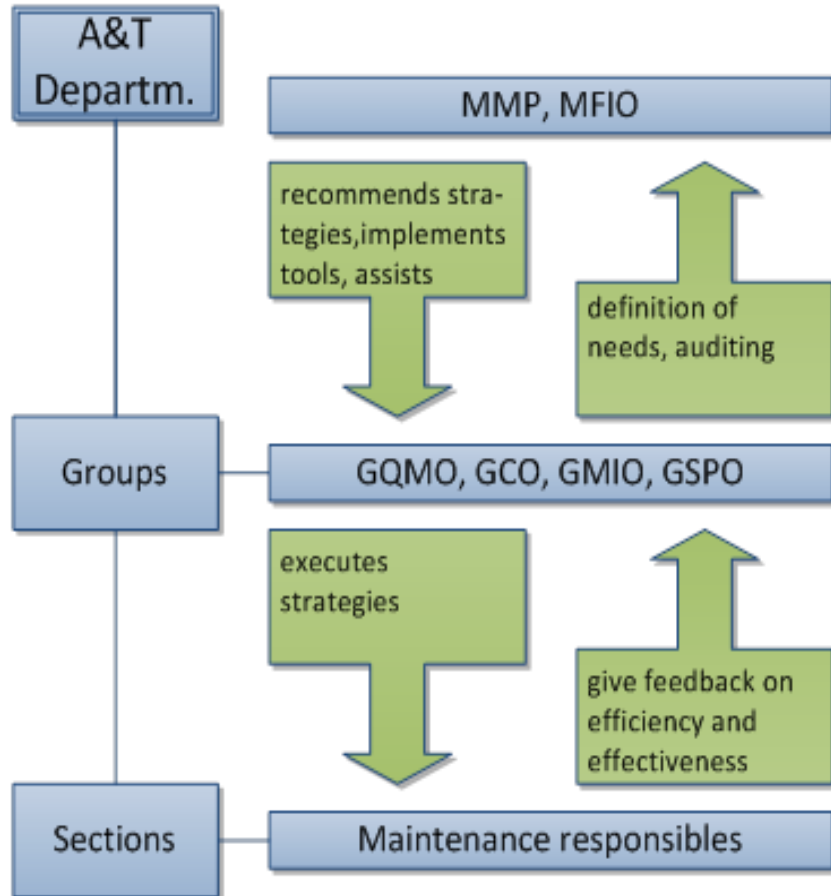
The MMP project

Hermes

project management method



The roles concept for a modern maintenance organisation

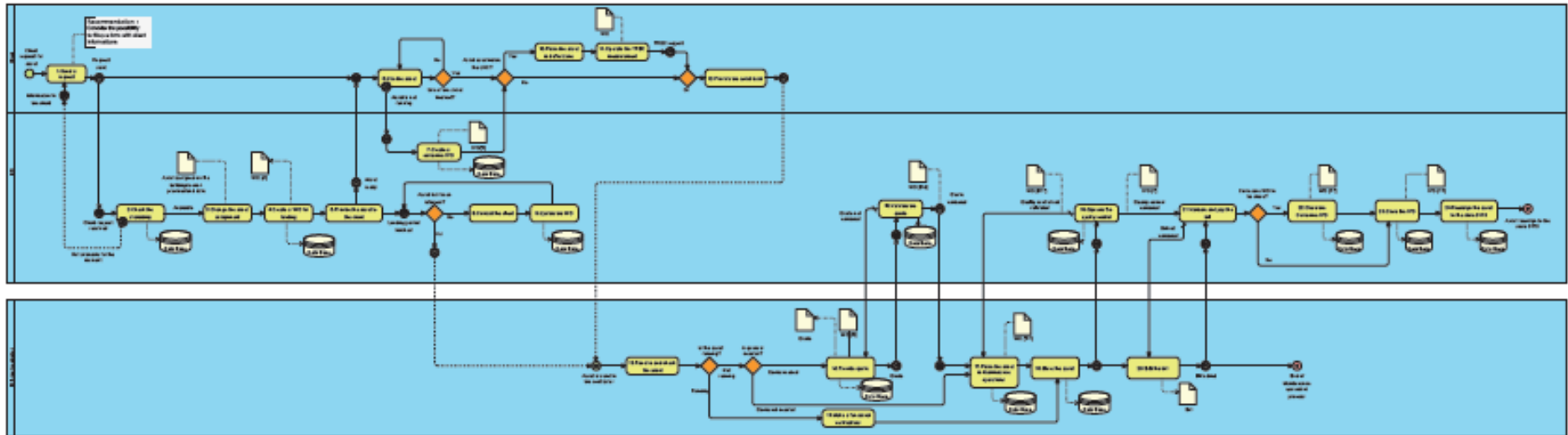


- A group **quality/methods officer** role (GQMO):
 - promoting policy, procedures and standards
 - implementing a QA system at group level
- A group **maintenance information officer** role (GMIO):
 - promoting good practices and guaranteeing coherent management of information and documentation
- A group **coding officer** role (GCO):
 - link person with naming service
 - promoting good practices 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

Basic concept for the definition of processes

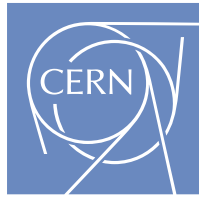
- Description of processes by BPMN:
 - All processes are described/documentated by « Business Process Diagrams »

Business Process Diagram - WO traceability



Documentation

- Business Process Diagrams are:
 - central part for the definition of the CMMS configuration
 - integrated to the Quality Assurance Plan



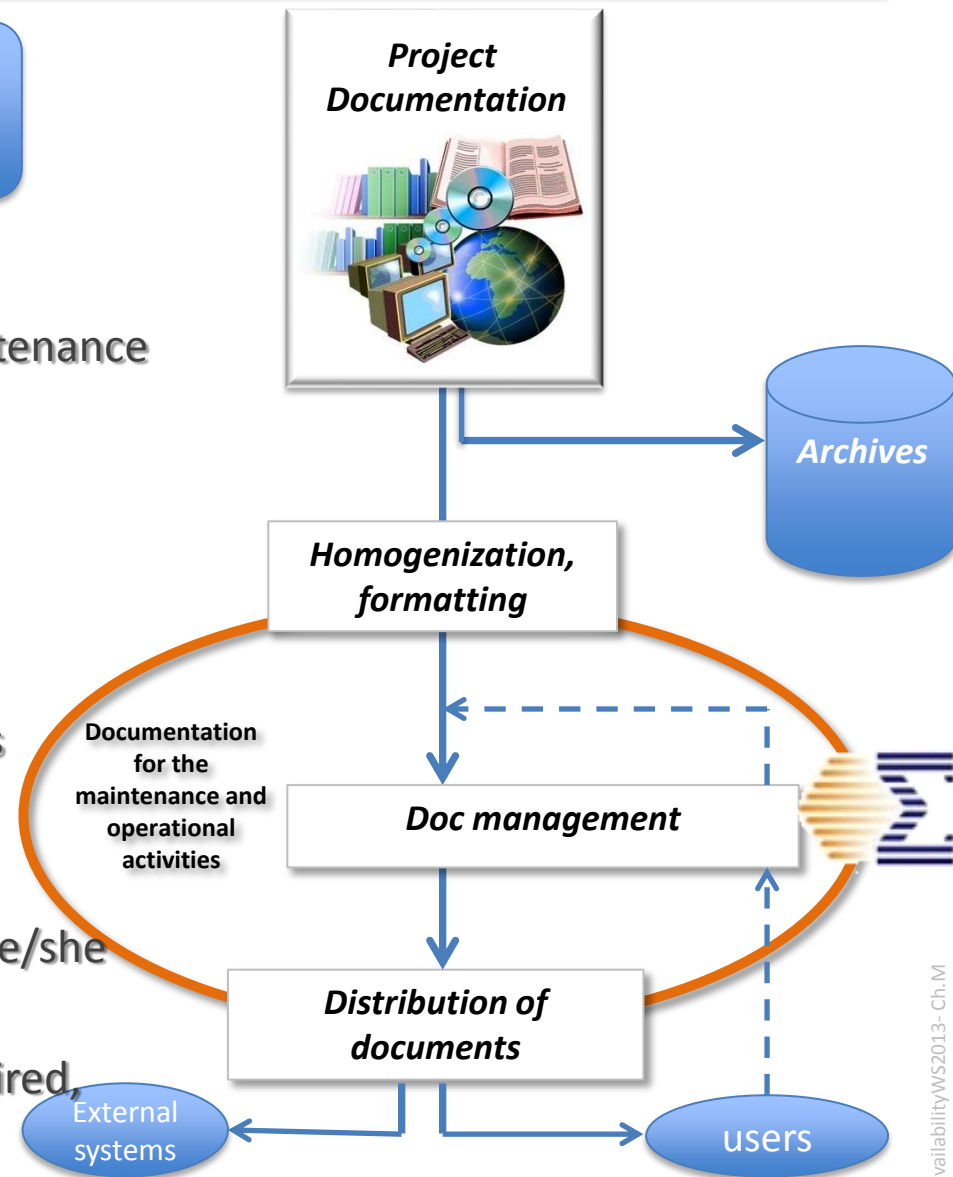
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MMP/MFIO activities

1) Documentation management: Strategy

*Objective:
Constitute the maintenance
documentation*

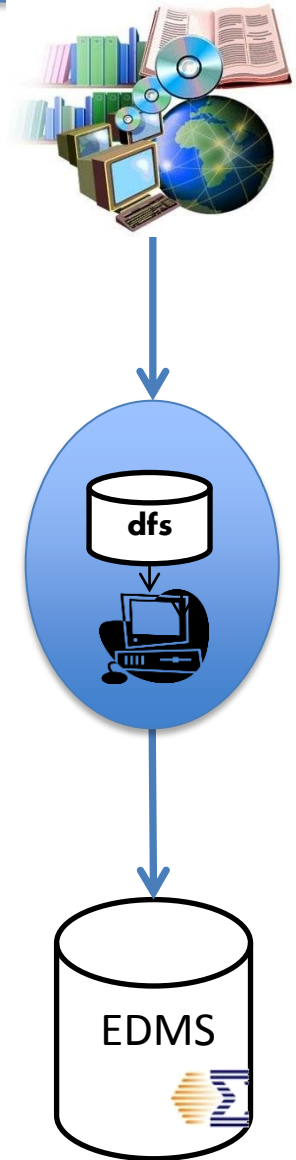
- A well defined perimeter
 - Documentation mainly dedicated to maintenance activities
- Specific treatment
 - Documents and files are:
 - Formatted, clearly identifiable
 - Stored in EDMS with predefined keywords
- Documentation Management
 - GMIO* is in charge of the management, he/she disposes of the required IT tools
 - Documents and files are updated as required, easily accessible



*Group Maintenance Information Officer

1) Documentation collection: Process

- 1st : treatment of documentation in DFS
 - Establishing the functional breakdown of the equipment (assemblies, parts, assets)
 - Collecting, sorting, cleaning, formatting of documents and files
 - Classification, metadata filling and storage of documents uniformly in DFS
- 2nd : massive and automatic upload into EDMS
 - Creation of empty EDMS documents
 - Insertion of the EDMS number into the PDF file (stamp)
 - Upload of metadata and files into the prepared EDMS documents
- Support provided by MFIO
 - A team of 2 experts to train and support the GMIO
 - A set of specific IT tools to treat documents
 - A set of methods and processes



Documentation collection Process: e.g. EN-HE group

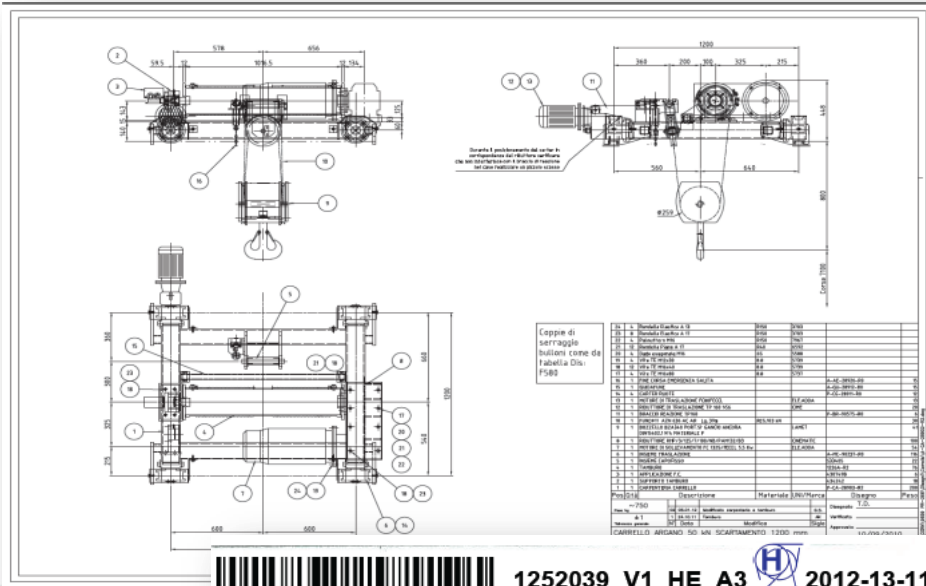
HE EQUIPMENT DOCUMENTATION

- HRH - Remorques
- HCS - Chariots Speciaux
- HLV - Elevateurs Monte-charge
- HPA - Palans
- HPR - Ponts Roulants
- HPO - Portes Motorisees
- HR - Palonniers
- HRH - Remorques
- HRTH - Tracteurs Lourds
- HRTL - Tracteurs Personnes

1) The functional breakdown is set-up in DFS

2) EDMS functional breakdown is automatically created from DFS

- HCHHLPR251 PONT ROULANT BONFANTI 5T
- HCHHLPR256 PONT ROULANT BONFANTI 4T
- HCHHLPR263 PONT ROULANT BONFANTI 5T
- HCHHLPR266 PONT ROULANT BONFANTI 5T
- HCHHLPR757 PONT ROULANT KONE 20T
- PONT MONOPOUTRE BONFANTI 4T
- PONT BIPOUTRE KONE 20T SH8
- PONT ROULANT PELLEGRINI 5T



EDMS Document Information Page

Number: 1252039 v.1
EDMS ID: 1252039 v.1
Status: In Work

Description, External Reference and Keywords
Description: Fiche caracteristiques techniques possibilites dimensionnelles
External Reference: XTRF BRUN
Keywords: H PRIN OPERATION CRANE

Files of the Document
1252039_V1_Datasheet_pont_roulant_Note.pdf (114 kb)

Associated URL (CAD Drawing Folder, Library...)

Context
What's next ? Change Status action expected from the originator, once all the files have been uploaded.
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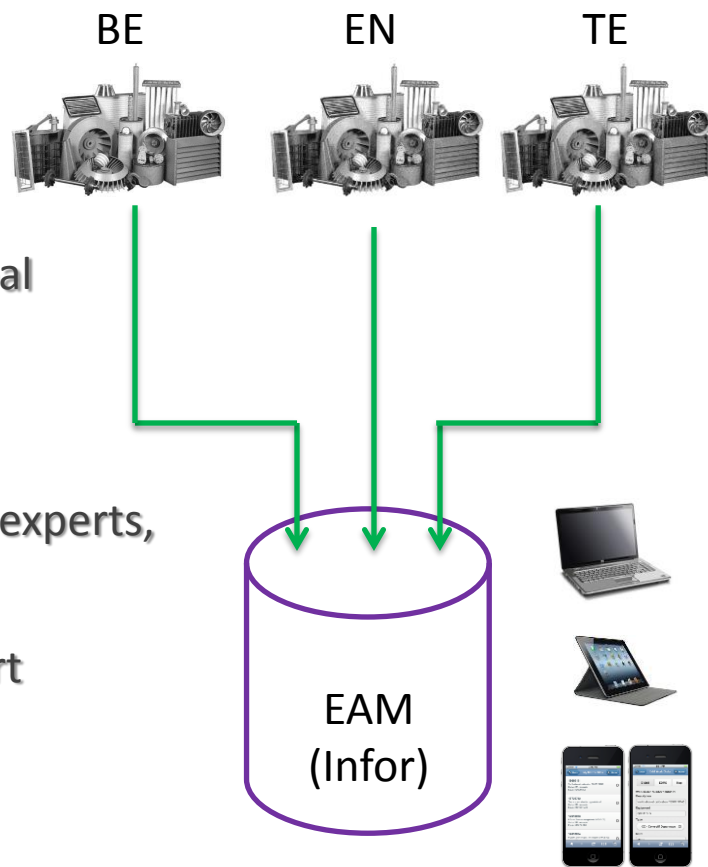
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1252039 V1 HE A3 2012-13-11

2) Parts management: Strategy

*Objective:
Constitute a global catalogue
of parts across departments*

- **Perimeter**
 - BE/TE/EN global rules and codification, to allow a global view across department and groups
- **Specific treatment of data**
 - Classes and customs fields are proposed by a panel of experts,
 - Collection process is unified and well defined (BPMN)
 - All records are validated (by automatic means or expert checking)
- **Part Management**
 - GCO* and GSPO* roles are essential to manage parts at group level
 - EAM provides functionalities and specific user interfaces to manage stores and to guarantees the part traceability.

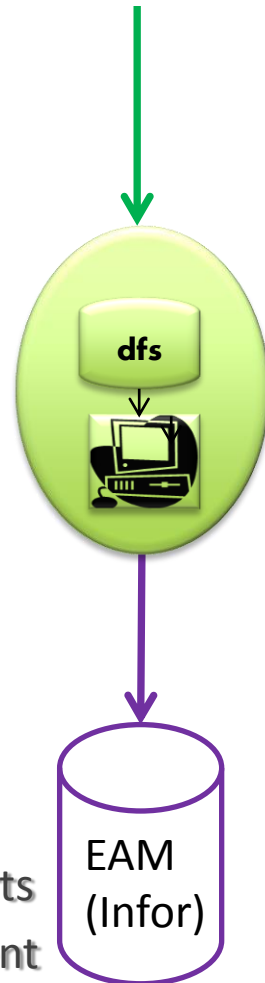
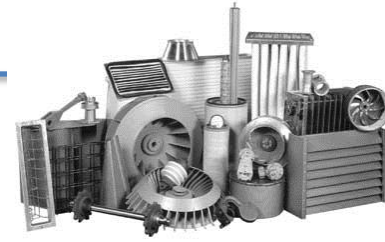


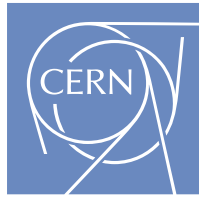
*Group Coding Officer

*Group Part Officer

2) Parts collection: Process

- 1st : treatment of records in an external system
 - Predefining and formatting classes and custom fields
- 2nd : in the field
 - Collecting, sorting parts and record the characteristics and pictures in the external system
 - Attribution of MFIO temporary codes for provisional labelling
- 3rd : setting up store management with EAM
 - Formal code attribution by Naming Service
 - Massive upload into EAM by the means of web services
 - Implementation of an EAM integrated solution for store management, labelling and traceability
- Support provided by MFIO
 - A team of 2 people to support and train the Group Part Officer (GSPO)
 - A set of specific IT tools to define classes and custom fields and to record parts
 - Methods and processes well defined for part recording and store management

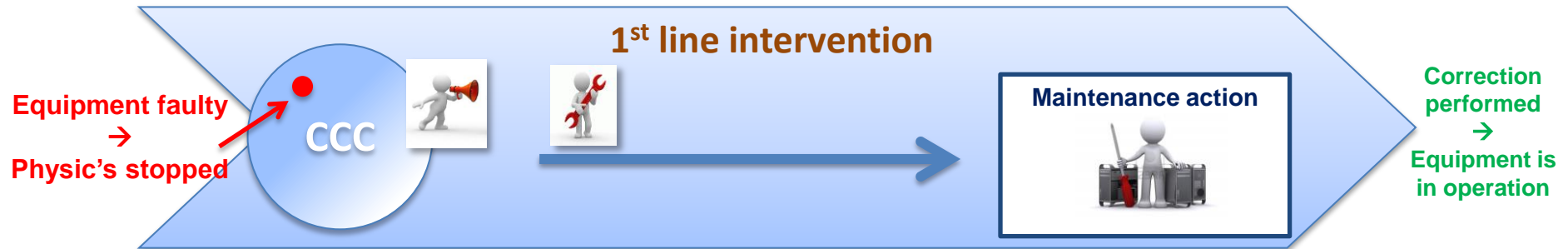




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Issue Management

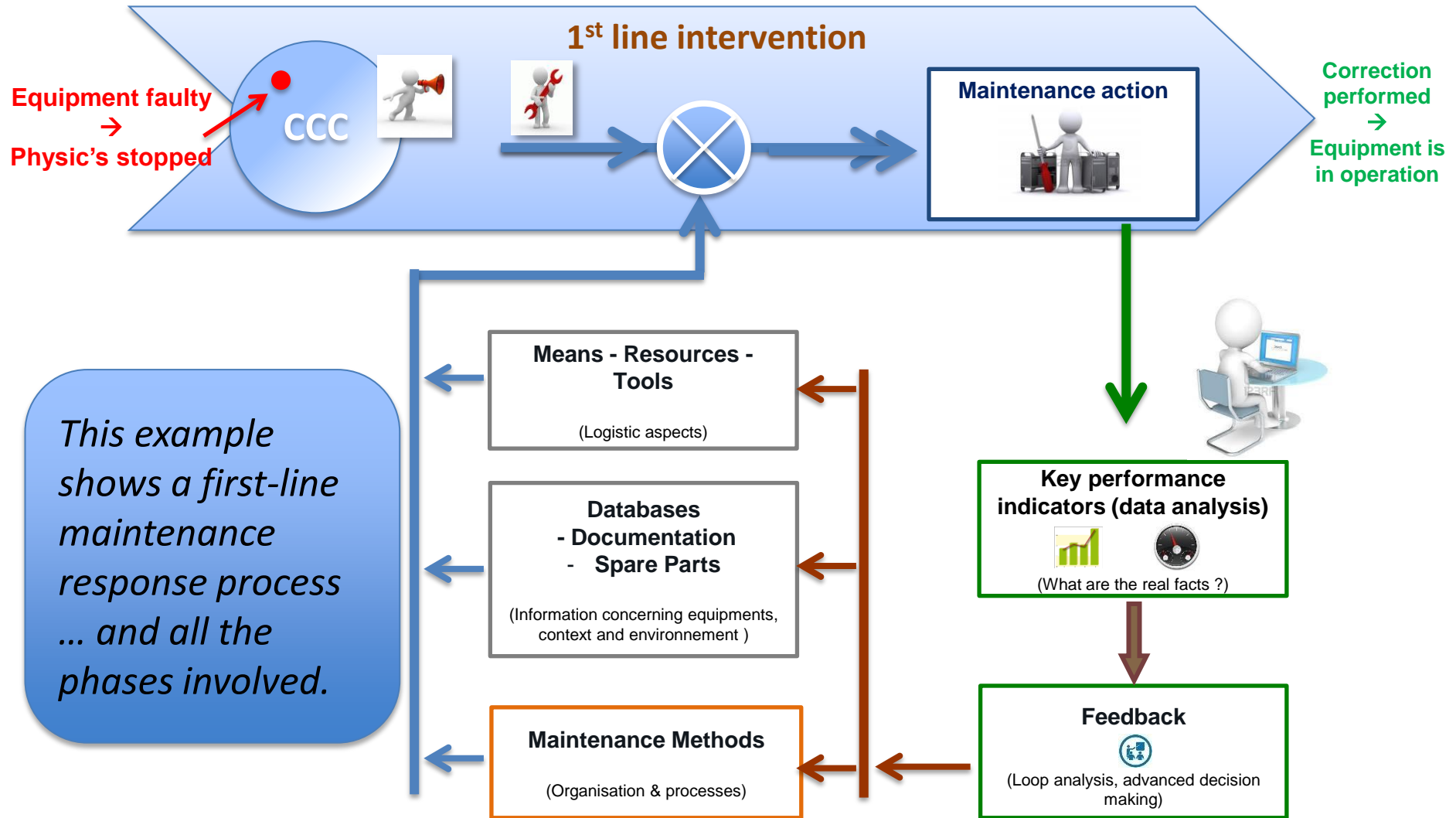
Issue Management: Objectives



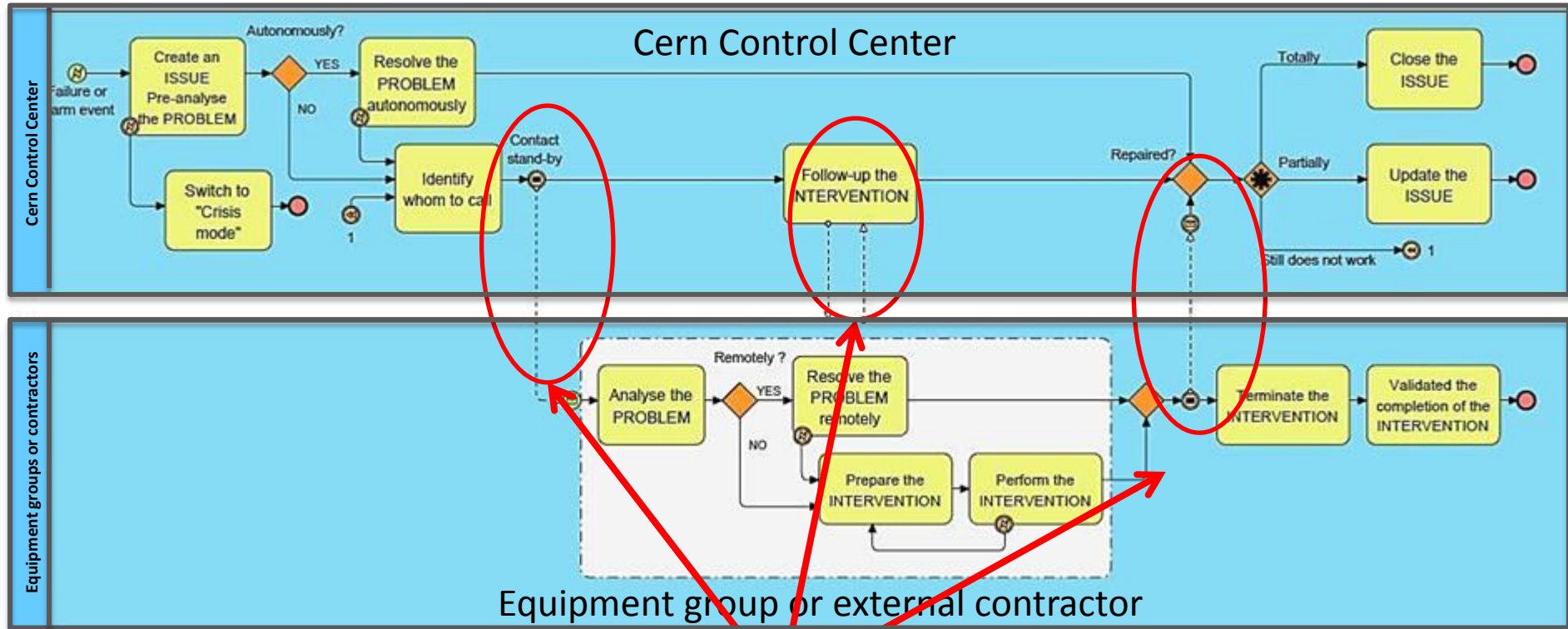
- Objectives through the equipment groups:

- Define a common process for first line interventions
- Provide a shared computerized tools that allows to follow and trace the interventions
- Manage the exchange of information between CCC and equipment groups
- Provide a central repository of information concerning the interventions in order to enable feedbacks and allow the performing of analysis and decisions .

Issue Management: Objectives

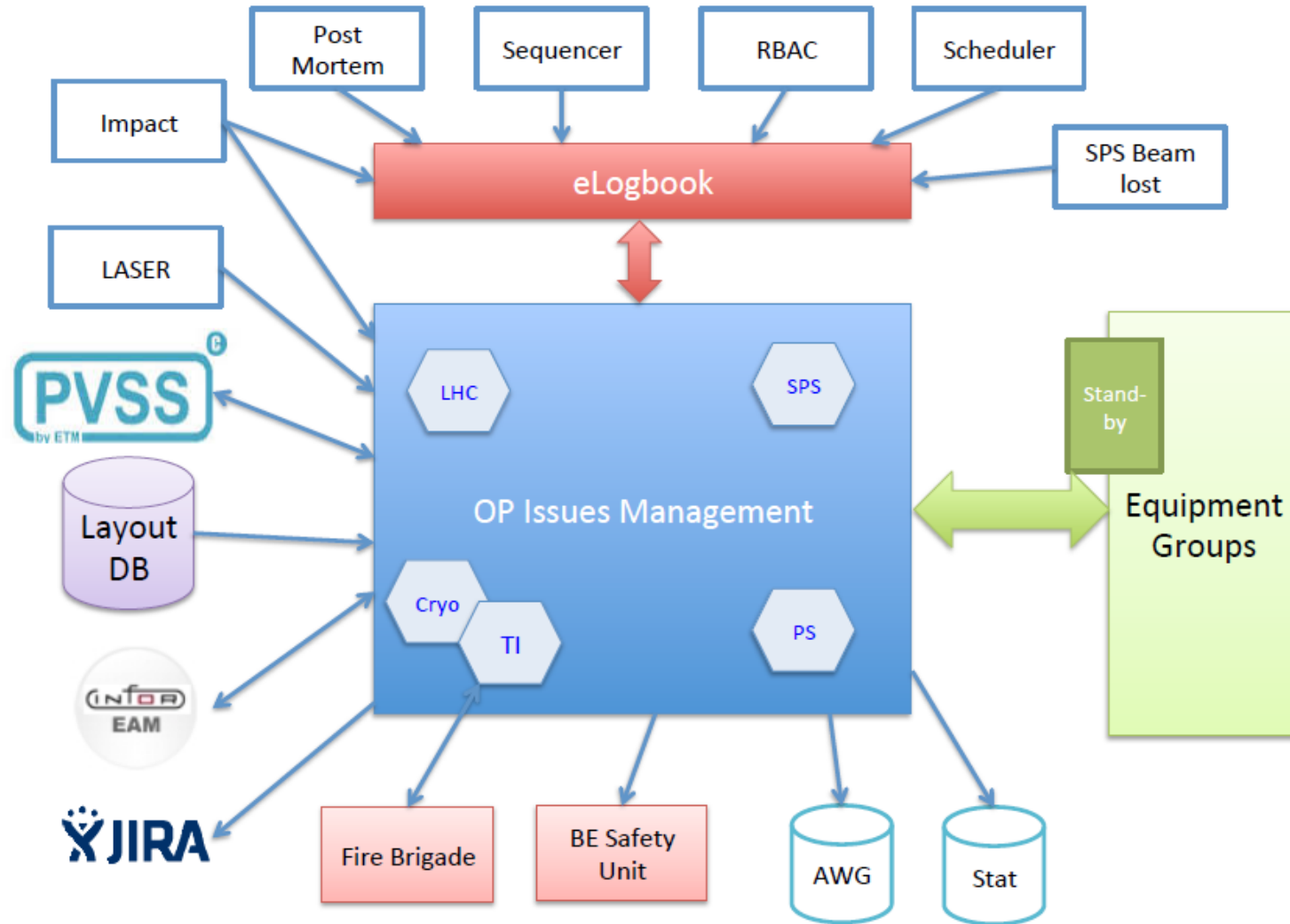


Common processes for first line intervention



A collaboration with CCC and equipment groups is important in order to achieve to define the various interactions between the both processes

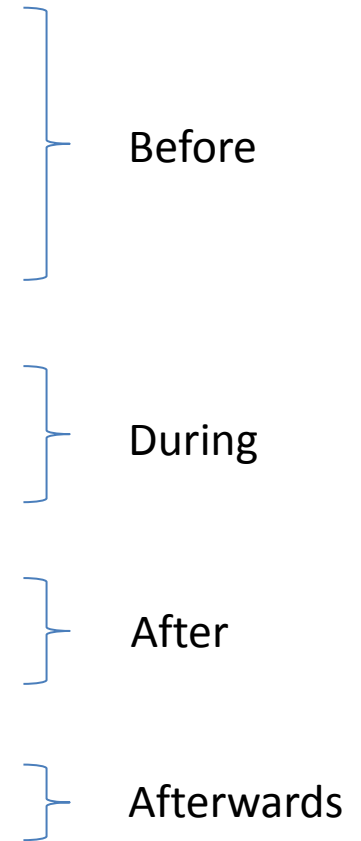
OP issues Management Project (OPIM)



I. Laugier BE-OP-TI Juillet 2013

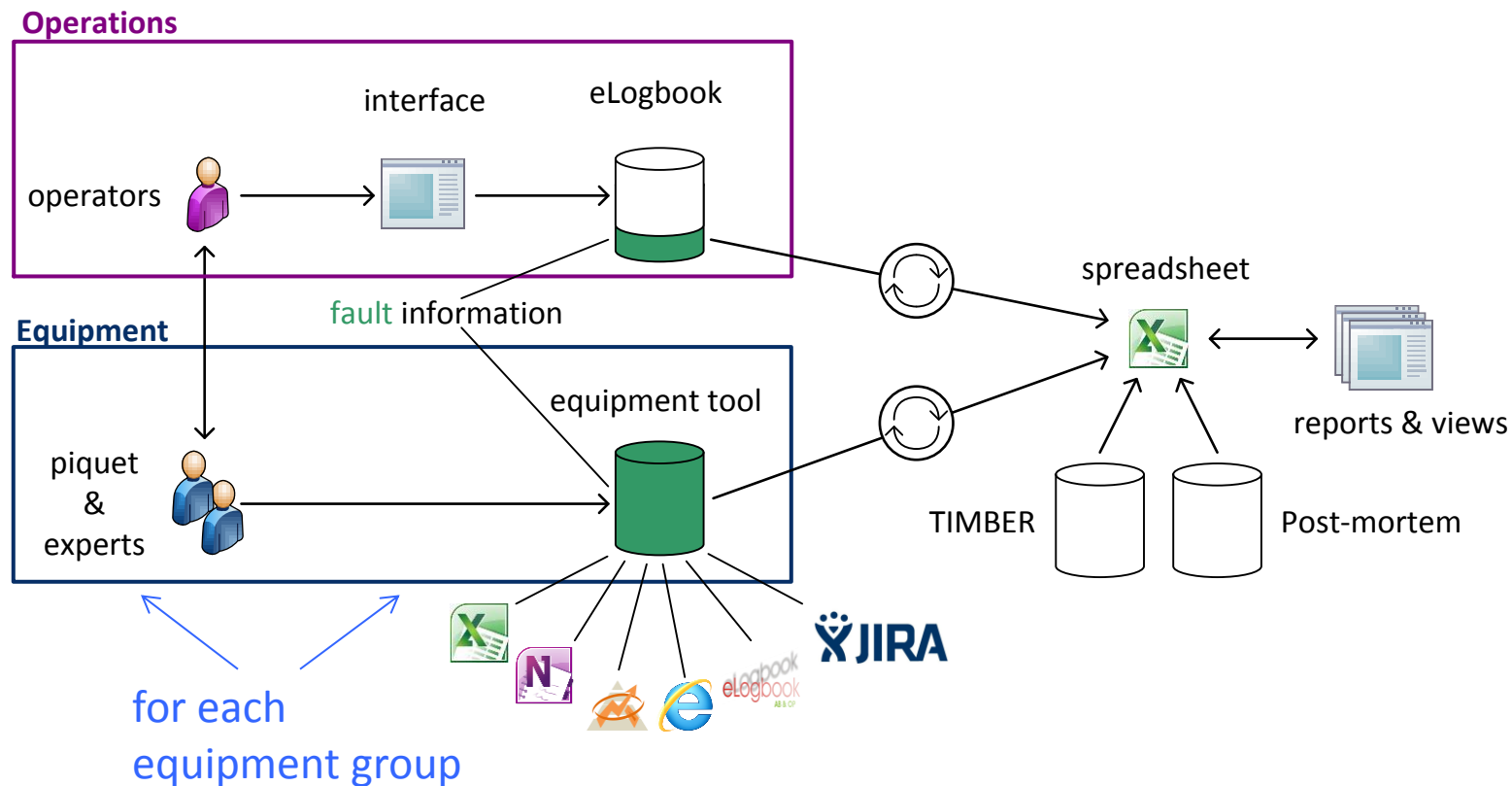
Common processes for first line interventions: objectives

- Optimization of first line interventions in terms of call and action.
- Determine and provide to the CCC, means (tools, information) to:
 - Perform the appropriate diagnostic,
 - Call the relevant piquet/specialist when necessary,
 - Prepare interventions (token, access, synchronization with other accelerators...),
 - Undertake the 1st actions to postpone the intervention,
- Ensure the follow up and coordinate interventions in case of major event,
- Realize tests and restart of equipment
- Report the progress of the intervention,
- Analyze, gather feedbacks



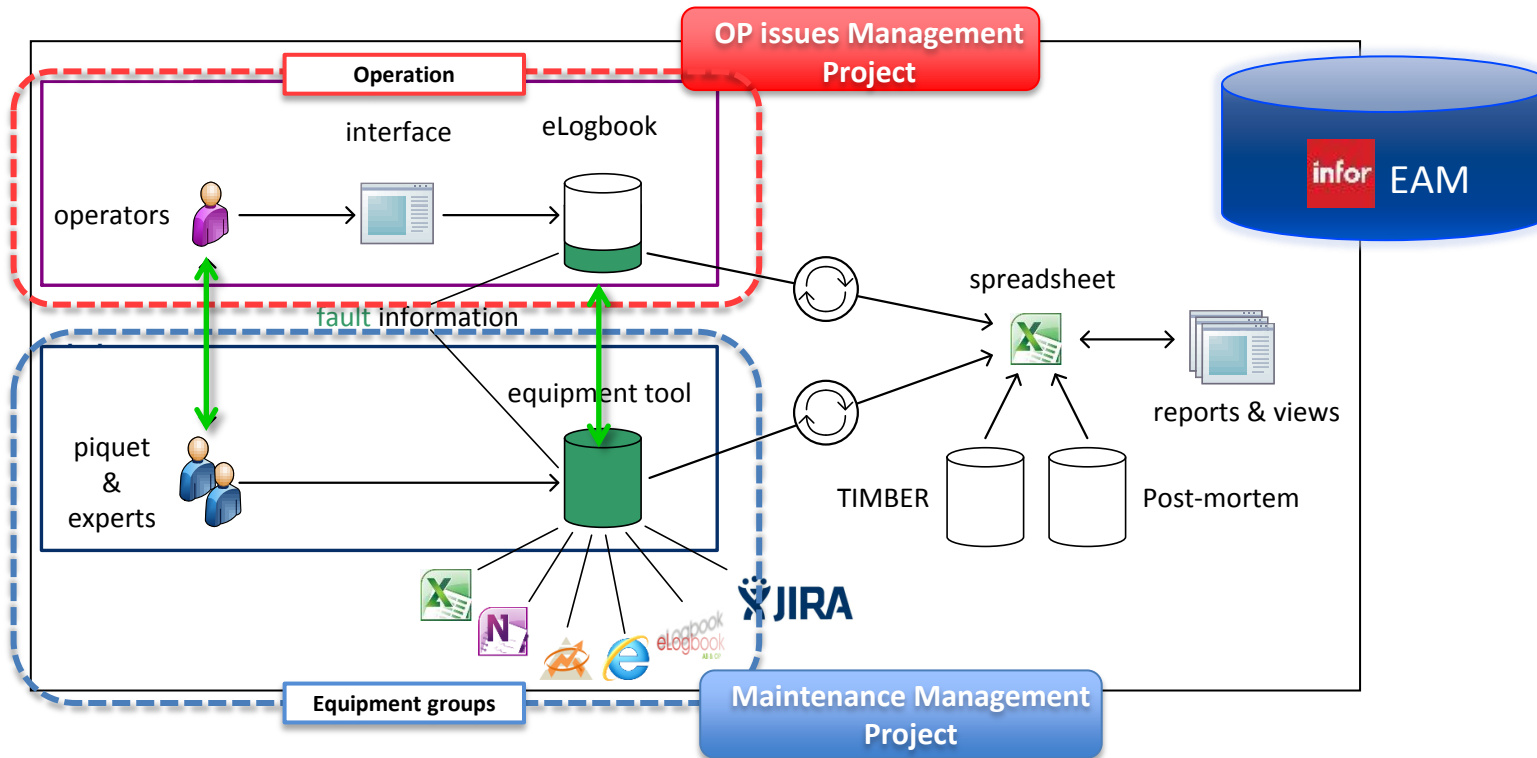
Availability WG needs

Fault / Event Information Flow



According B. Todd presentation

AWG Needs: Fault / Event Information Flow



Requested in the framework of AW:

General

- Unique ID
- Start time (s or ms)
- End time (s or ms)
- System and/or equipment Group (from a list),
- Sub-system and/or equipment Group (from a list),
- Fault or Event

Linked issues :

- Children (ID or table)
- Parents (ID or table)

Serial issues :

- Parts ID
- Part end time (s or ms)
- Part status

Infor EAM as CMMS

EAM Light



Control room (TI-OP Logbooks)



EDMS



Manufacturing & Tests



CERN EAM Mobile



TREC



GIS

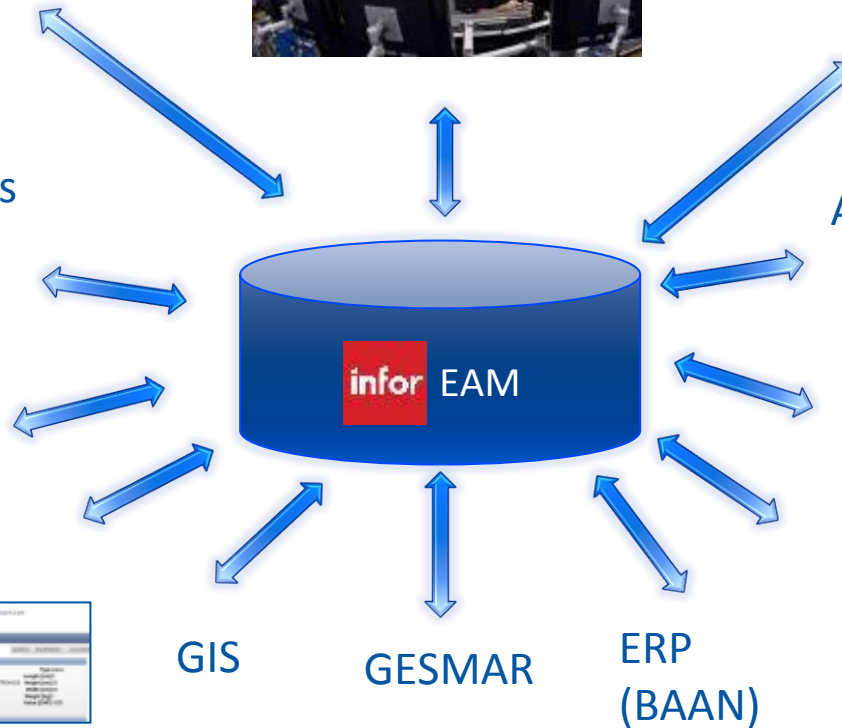
GESMAR

ERP
(BAAN)

Accelerators Layout DB

IMPACT

Reporting tools

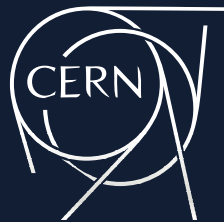


Slide provided by D.Widegren

Conclusion

- 3MF is a specific set of methods, roles and tools for the management of maintenance activities. Its aim is to give means to share data and information, and to provide a global view of the operation of the accelerators.
- Currently, we (MMP/MFIO) are giving a support to Groups to:
 - perform the functional breakdown of their facilities
 - do inventory and codification of equipment/parts / assets of all installations
 - constitute the dedicated documentation for the maintenance activities.
- We make the definition of specific workflows as “Issue management” that will be set up in the CMMS. As equipment groups, AWG is welcome to help us to identify their needs.

Thank you for your attention



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