HL Quality Plan and EDMS Insights

Hector Garcia Gavela on behalf of the PDQR Office

CERN – 23 Feb 2024

Introduction and Goals

- Introduction and information for Newcomers
- Refresh about HL Quality Plan
- Procedures in place for preparing, sharing and releasing documentation
- Guidelines for documentation and use of Tools (EDMS, MTF)
- Information Workflow – E-Groups/Distribution Lists
- Nonconformities

Goal of HL-LHC

From EC-FP7 HiLumi LHC Design Study application of 2010

The main objective of HiLumi LHC Design Study is to determine a hardware configuration and a set of beam parameters that will allow the LHC to reach the following targets:

A peak luminosity of L_{peak} = **5×10^{34} $cm^{-2}s^{-1}$ with levelling**, allowing:

An integrated luminosity of **250 fb^{-1} per year**, enabling the goal of

L_{int} = 3000 fb^{-1} twelve years after the upgrade.

This luminosity is more than ten times the luminosity reach of the first 10 years of the LHC lifetime.

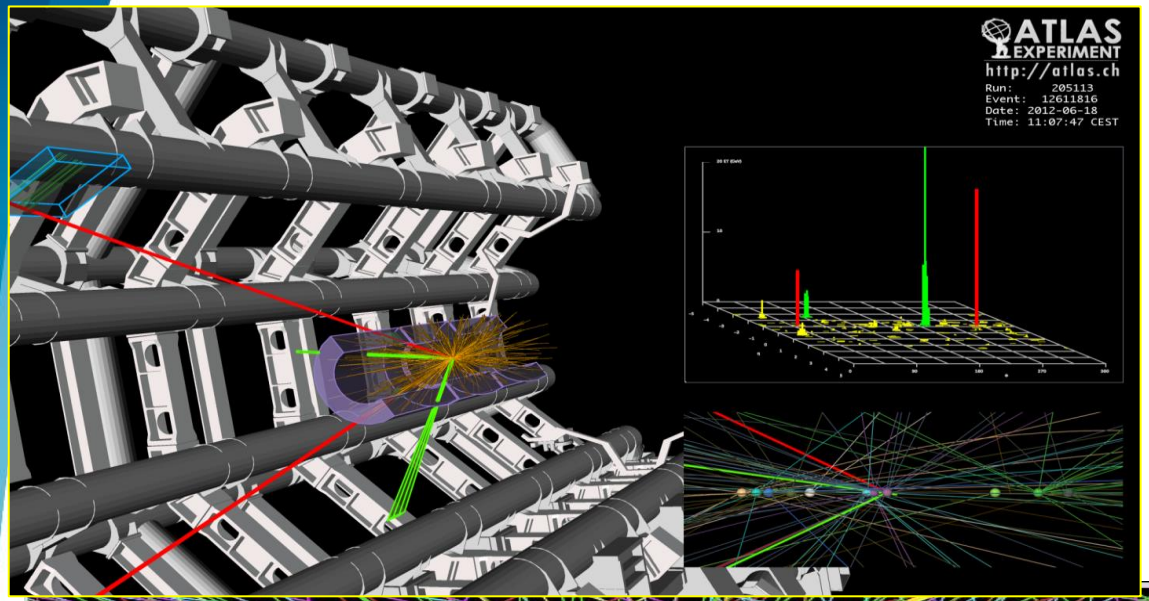
Ultimate performance established 2015-2016: with same hardware and same beam parameters: use of **engineering margins:**

$L_{peak\ ult} \cong 7.5\ 10^{34}\ cm^{-2}s^{-1}$ and **Ultimate Integrated $L_{int\ ult} \sim 4000\ fb^{-1}$**

More luminosity ⇒ increased collision rate

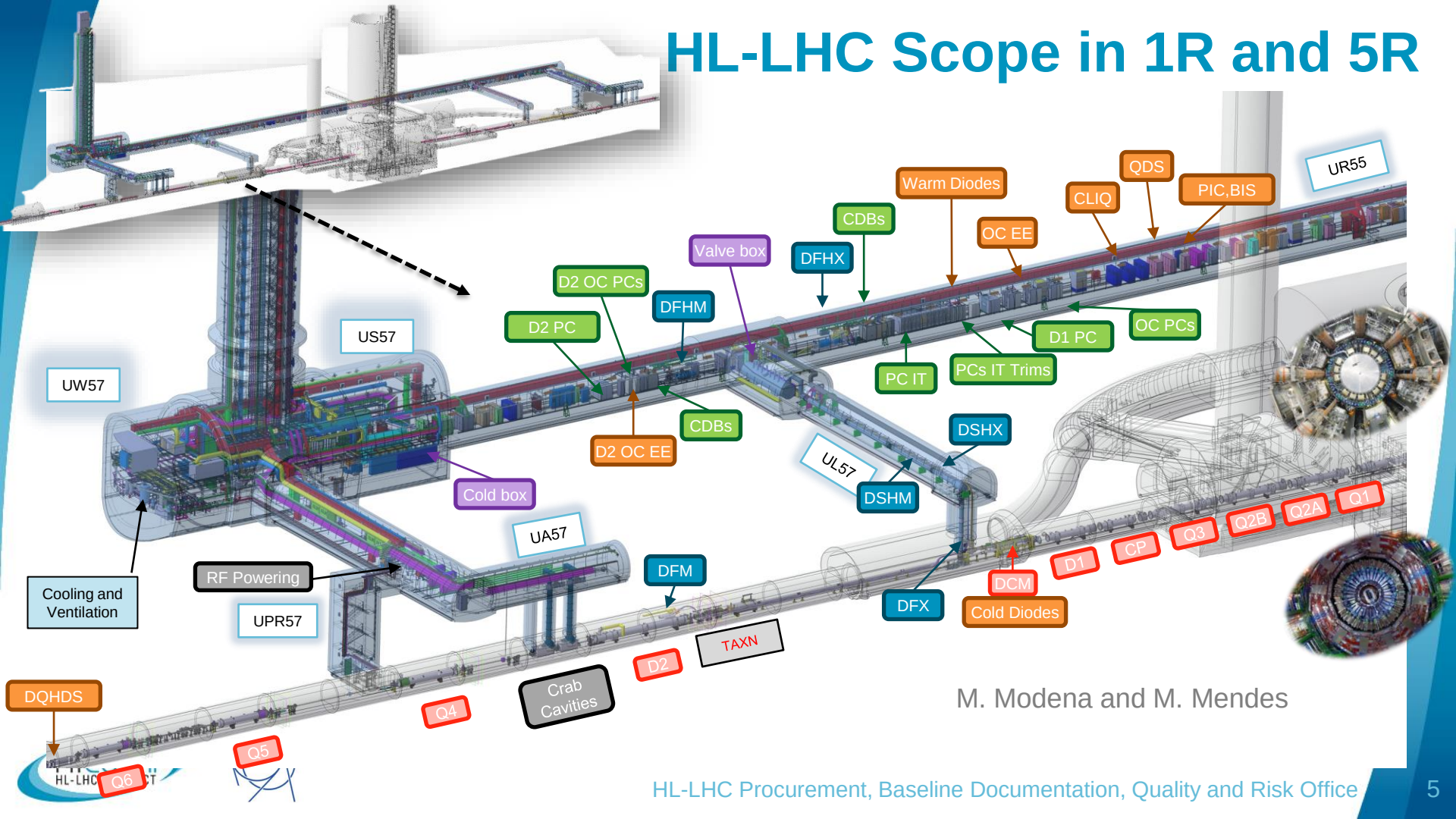
Higgs: the needle in the haystack

Picture repeated 40 millions times each second



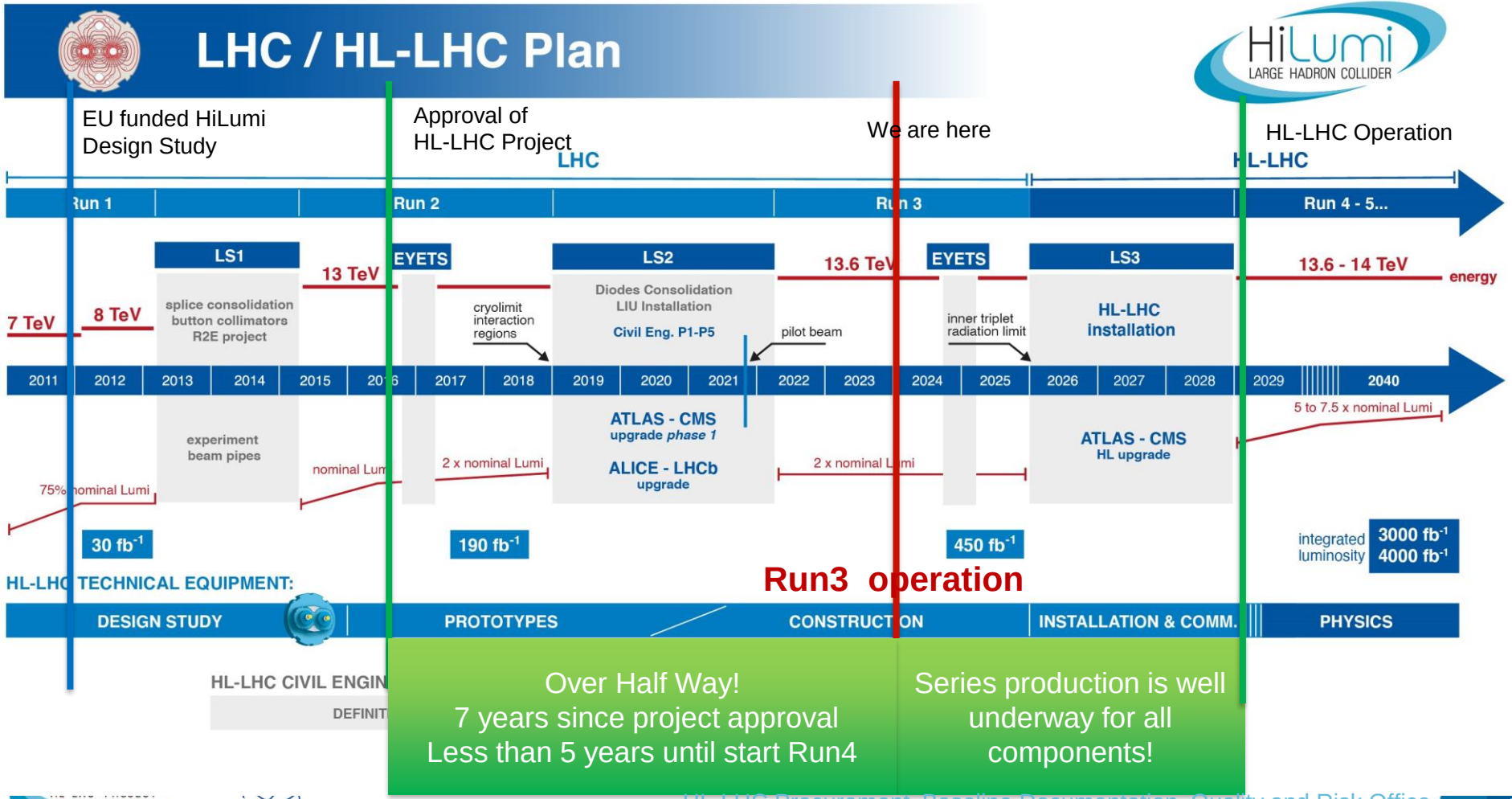
Z→ μμ event from 2012 data with 25 reconstructed vertices

HL-LHC Scope in 1R and 5R



M. Modena and M. Mendes

LHC / HL-LHC Plan

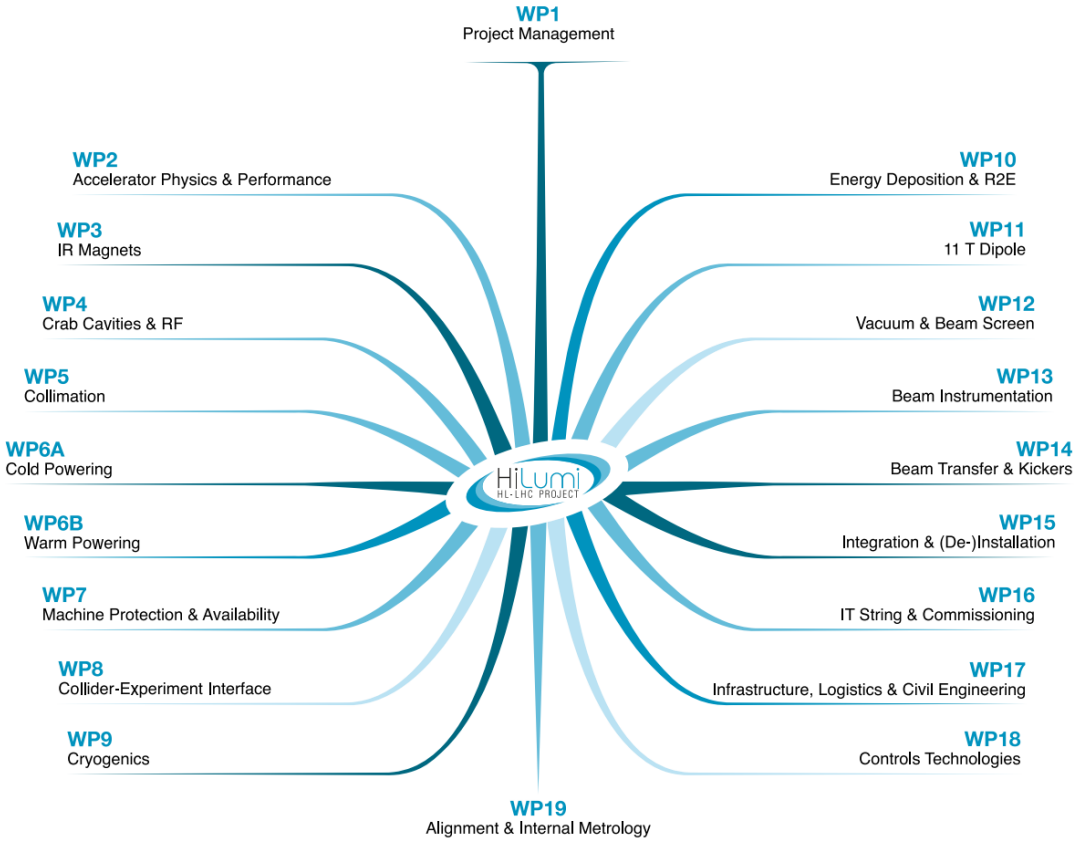


Run3 operation

Over Half Way!
7 years since project approval
Less than 5 years until start Run4

Series production is well underway for all components!

HL-LHC Project



HIGH LUMINOSITY LHC PROJECT

HL-LHC Project Office

Cécile Noels

Communications & Outreach Office

Project Support

Irene Garcia Obrero

Michela Lancellotti

PROJECT MANAGEMENT

HL-LHC Project Leader

Oliver Brüning

Deputy & Configuration Office

Markus Zerlauth

Thomas Otto

Christelle Gaignant

Safety Office

Michel Bonnet

PLANNING

Monitoring & Control Office

Giovanna Vandoni

Maria Barberan

Thomas Bauler

Lidia Brozda

Sarah Fleury

Lars Jensen

Laura Martins

Evan Vedzessou

Estrella Vergara

Collaborations Office

Lars Jensen

Cécile Noels

Laura Martins

New Infrastructures WP17

Laurent Tavian

Henry de Maynard

Thomas Bauler

Lidia Brozda

TECHNICAL COORDINATION

Procurement, Documentation, Quality & Risk Office

Hector Garcia Gavela

Victor Guillen

Gorana Prica

Integration & Installation Office

Paolo Fessia

Michele Modena

Miguel Navarro

Francesca Nicoletti

Darshana Ramrekha

HL-LHC Quality Plan

EDMS NO. 1513591 | REV. 2.0 | VALIDITY VALID

REFERENCE : LHC-_-QA-0001

PLAN

HL-LHC QUALITY PLAN

Abstract

The HL-LHC project is committed to be a project of excellence respecting the best practises in project and quality management. The adoption of a quality management system is a strategic decision that aims to improve overall performance and provide a sound basis for sustainable development initiatives.

This document provides an overview of the processes and procedures implemented on the HL-LHC Quality Management System (QMS).

https://edms.cern.ch/document/1513591/2.0

TRACEABILITY

Prepared by: I. Bejar Alonso	***Date:*** 2018-02-28
Verified by: H. Gacia Gavela, Project Office	***Date:*** 2018-03-14
Approved by: I. Bejar Alonso, L. Rossi, Department Heads, F. Bordry	***Date:*** 2018-04-20
Distribution: Public	

Rev. No.	*Date*	*Description of Changes (major changes only, minor changes in EDMS)*
2.0	2018-04-20	Version post FP7 replacing version 1 and the EU deliverable [1]

This document is uncontrolled when printed. Check the EDMS to verify that this is the correct version before use

2 SCOPE

The quality policies, pro
documentation hereafter)
systems, from R&D to prep
it is understood the LHC e
documentation produced b

External contributors are
However all HL-LHC project

The quality documentation
Quality Assurance Plan [2].

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4.3.3 *Control o*

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Quality Commitment

At the HL-LHC Project Office, Quality Assurance is a matter of highest priority. The HL-LHC Project Leader, Steering Committee and all remaining members of the Project Office ensure the development, implementation and continuous improvement of the HL-LHC quality management system.

As a project we shall meet all requirements and expectations from CERN Council, stakeholders and other LHC users through optimization of the available resources. As part of this commitment, we strongly believe that the definition of a HL-LHC quality policy and its implementation are of highest importance.

Oliver Brüning

HL-LHC Project Leader

Lucio Rossi

Former HL-LHC Project Leader

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Pragmatic approach

External contributors are governed by the quality management however **all HL-LHC with the HL-LHC**

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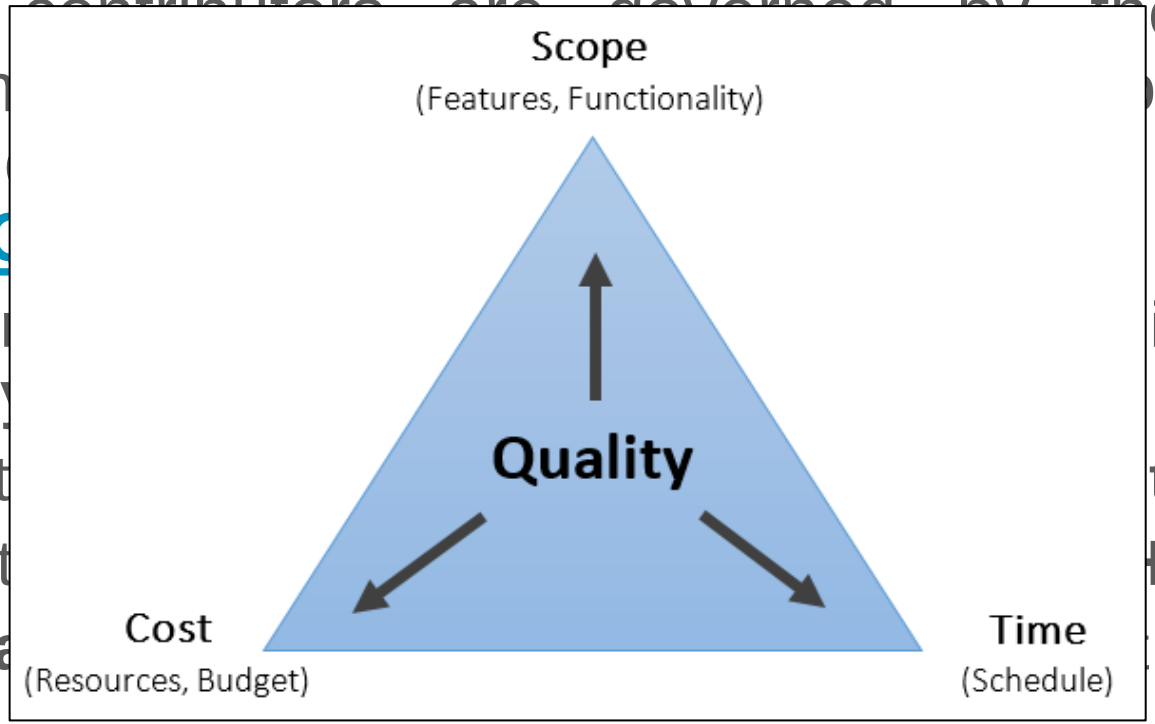
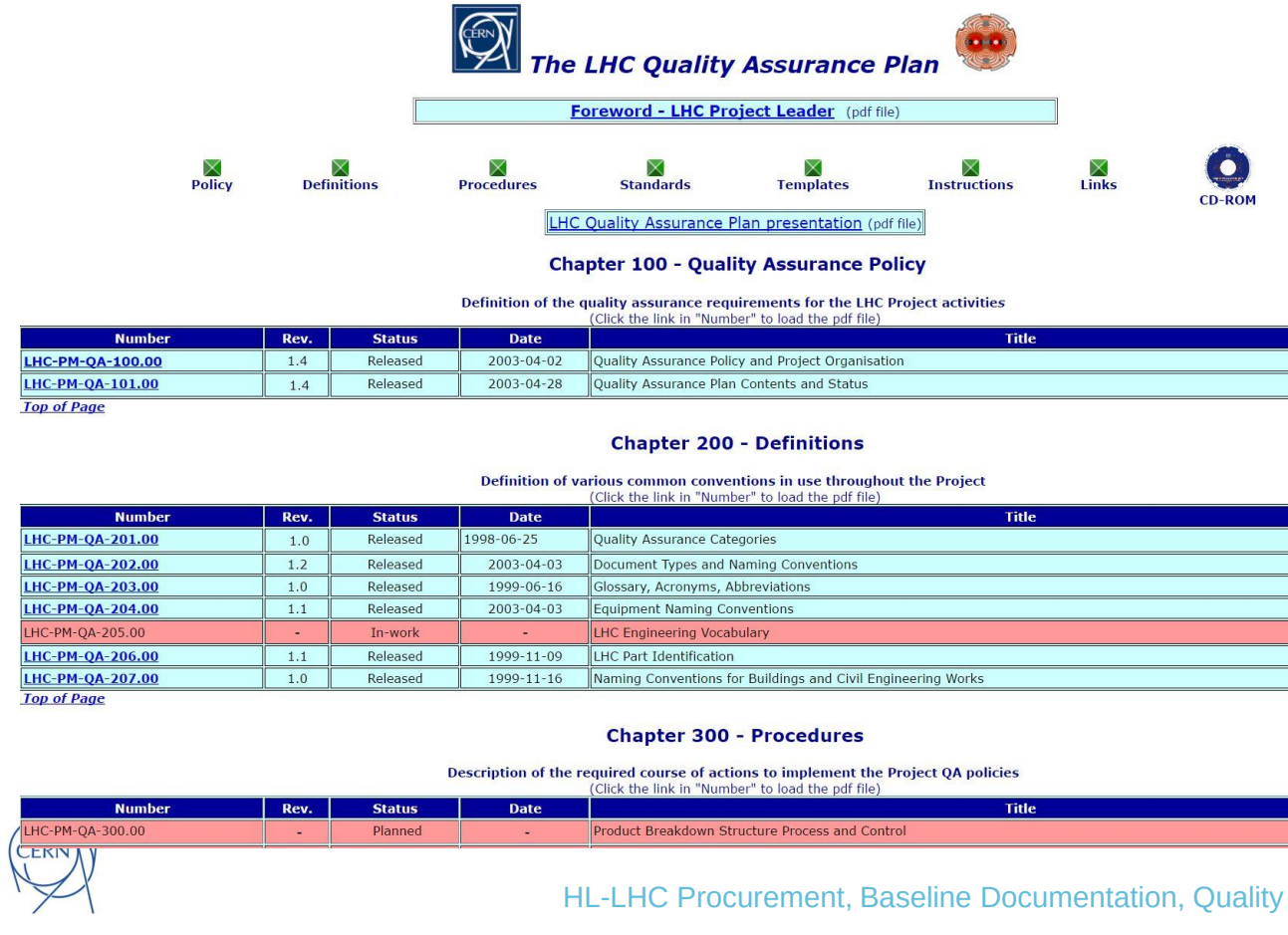
- Fabricat **t)**
- Project t **Hilumiers”**
- **Corpora**



HL-LHC is an upgrade of an existing machine



The LHC Quality Assurance Plan

Foreword - LHC Project Leader (pdf file)

Policy | Definitions | Procedures | Standards | Templates | Instructions | Links | CD-ROM

LHC Quality Assurance Plan presentation (pdf file)

Chapter 100 - Quality Assurance Policy

Definition of the quality assurance requirements for the LHC Project activities
(Click the link in "Number" to load the pdf file)

Number	Rev.	Status	Date	Title
LHC-PM-QA-100.00	1.4	Released	2003-04-02	Quality Assurance Policy and Project Organisation
LHC-PM-QA-101.00	1.4	Released	2003-04-28	Quality Assurance Plan Contents and Status

Top of Page

Chapter 200 - Definitions

Definition of various common conventions in use throughout the Project
(Click the link in "Number" to load the pdf file)

Number	Rev.	Status	Date	Title
LHC-PM-QA-201.00	1.0	Released	1998-06-25	Quality Assurance Categories
LHC-PM-QA-202.00	1.2	Released	2003-04-03	Document Types and Naming Conventions
LHC-PM-QA-203.00	1.0	Released	1999-06-16	Glossary, Acronyms, Abbreviations
LHC-PM-QA-204.00	1.1	Released	2003-04-03	Equipment Naming Conventions
LHC-PM-QA-205.00	-	In-work	-	LHC Engineering Vocabulary
LHC-PM-QA-206.00	1.1	Released	1999-11-09	LHC Part Identification
LHC-PM-QA-207.00	1.0	Released	1999-11-16	Naming Conventions for Buildings and Civil Engineering Works

Top of Page

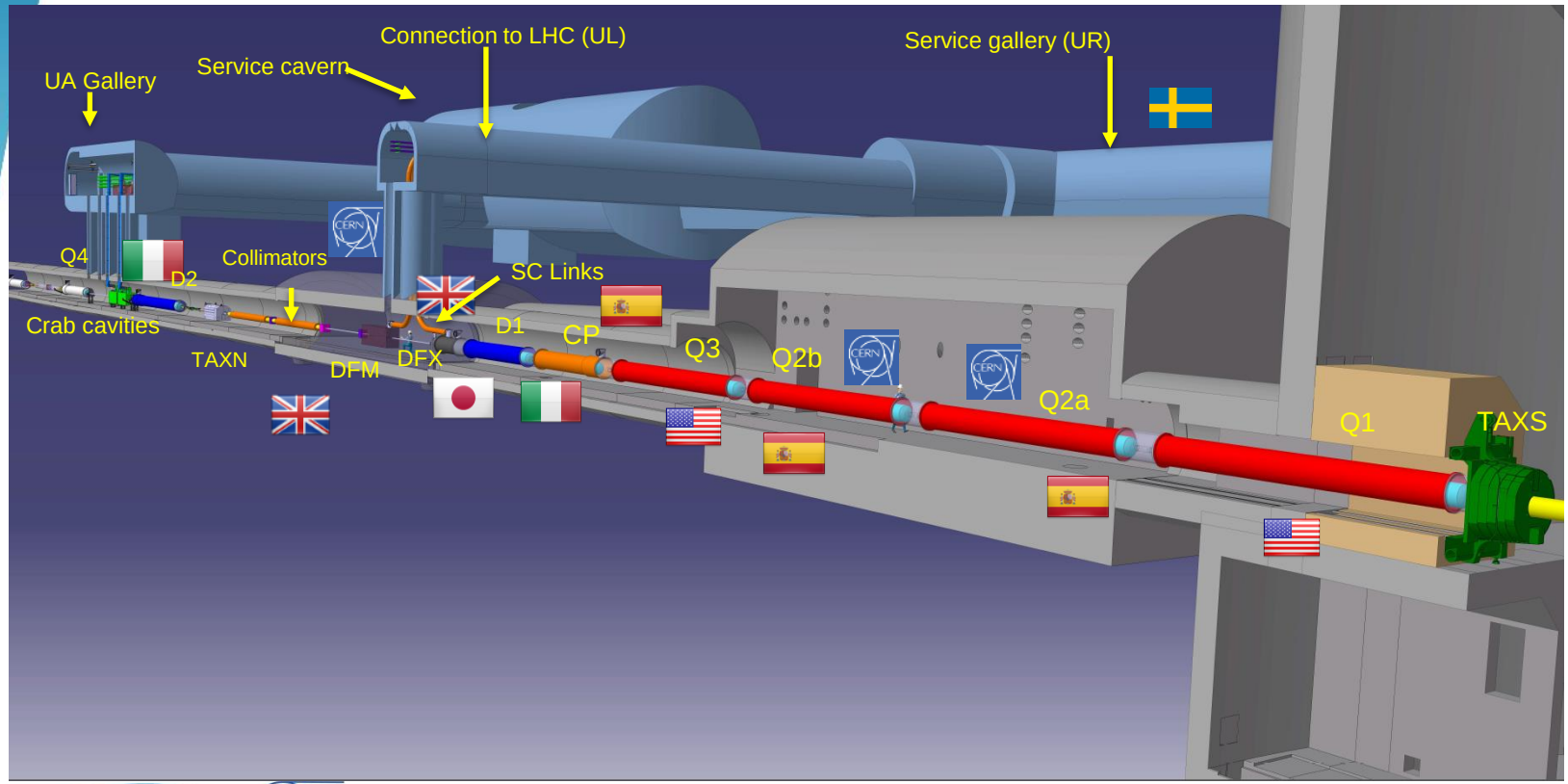
Chapter 300 - Procedures

Description of the required course of actions to implement the Project QA policies
(Click the link in "Number" to load the pdf file)

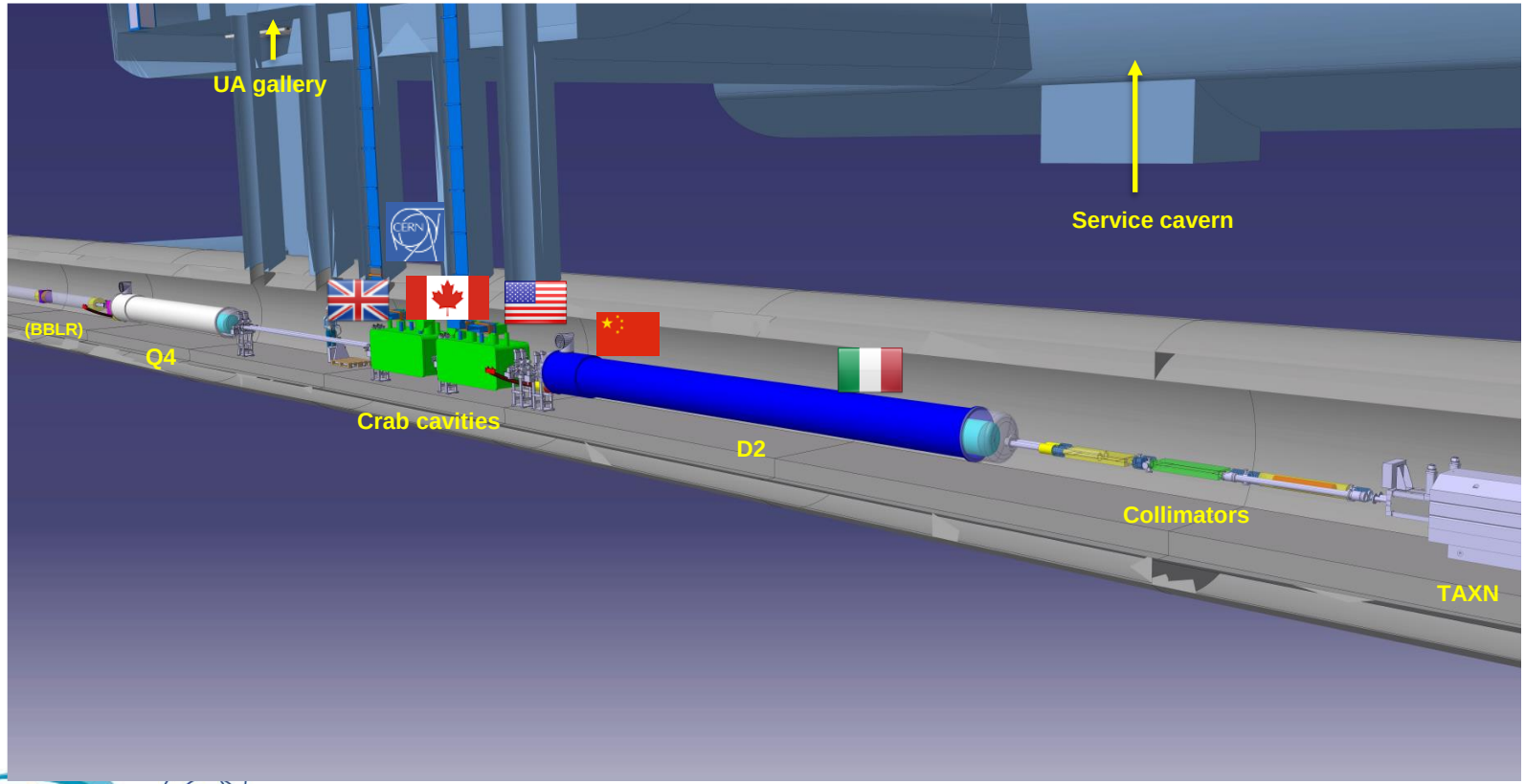
Number	Rev.	Status	Date	Title
LHC-PM-QA-300.00	-	Planned	-	Product Breakdown Structure Process and Control

HL-LHC - A truly collaboration project

The Insertion Region (up to Q4)



The MS region with in-kind contributions

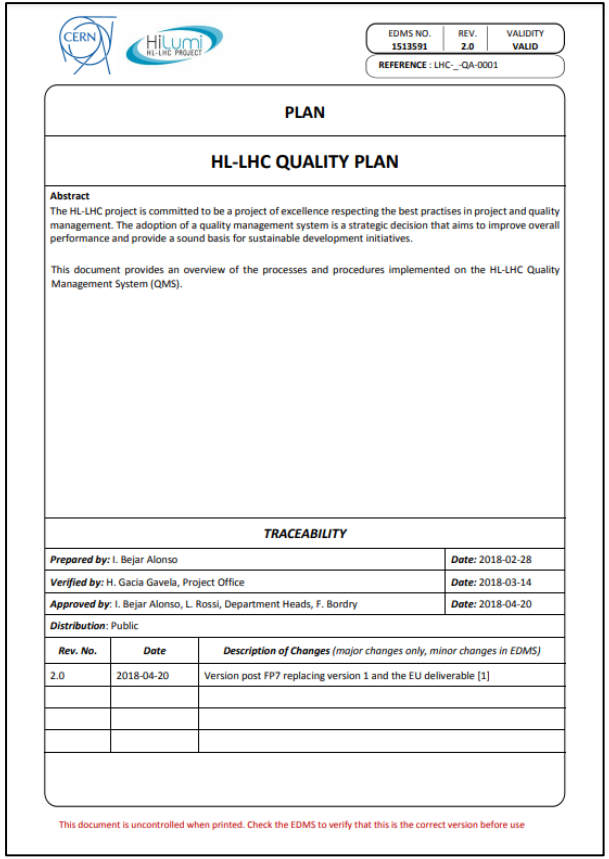


Pragmatic approach

External contributors are governed by the quality management plans of their home institute, however **all HL-LHC deliverables shall be compatible with the HL-LHC Quality plan**

- Hardware baseline documentation stored in **EDMS (primary tool for documentation at CERN)**
- Fabrication records in **MTF (Asset management)**
- Project technical information **accessible** to all "**Hilumiers**"
- **Corporate image** when representing the project

HL-LHC Quality Plan



EDMS NO.	REV.	VALIDITY
1513591	2.0	VALID

REFERENCE : LHC-_-QA-0001

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2.0	2018-04-20	Version post FP7 replacing version 1 and the EU deliverable [1]

This document is uncontrolled when printed. Check the EDMS to verify that this is the correct version before use

2 SCOPE

The quality policies, procedures, guidelines, plans and templates (also referred to as quality documentation hereafter) outlined in this document apply to all phases of the HL-LHC project and its systems, from R&D to preparation for dismantling of the future facility –in this context, as future facility it is understood the LHC equipment under the scope of the HL-LHC project-. This applies as well to documentation produced by third parties under the scope of the project.

External contributors are governed by the quality management systems of their home institution. However all HL-LHC project deliverables shall be compatible with what is stated in this Quality Manual.

The quality documentation presented in this Quality Manual complements/replaces the LHC Project Quality Assurance Plan [2].

4.3.2 ***Control of Documents***

The procedures [11] and [12] describe how to handle HL-LHC documentation within the HL-LHC project.

EDMS is the tool used for the control of engineering documents and presentations. CDS is the tool used for the control of scientific documents and graphic records.

4.3.3 ***Control of Records***

The HL-LHC Records Management [13] procedure describes how to handle the records established to provide evidence of compliance with the requirements and the effective operation of the quality management system.

All records related to Fabrication, Assembly and Verification of equipment belonging to HL-LHC, as well as those related to Installation and Commissioning, shall be stored by default until the dismantling phase. MTF is the tool used for the control of records.

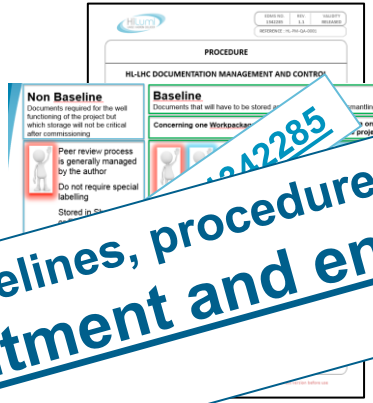
HL-LHC Quality Plan:
https://edms.cern.ch/document/1513591

HL-LHC Quality – Some pillars

HL Quality Plan

It provides the procedures to be used and it explains how quality is manage
for HL-

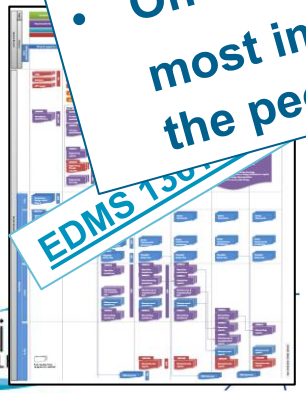
Doc. Management & Control



oring of documentation

- On top of the Quality Plan, guidelines, procedures and tools, the most important is the **commitment and engagement** of the people for these activities

Baseline Do



uments that need to be issued and stored up to the dismantling of the machine

Tools for HL

Tools available at CERN to manage documentation

All processes documented

Quality Document	Document Type				Stage of Use				Process			
	Procedure	Template	Plan	Guideline	Concept	Development	Production	Support & Use	O	T	P	A
Make or Buy	X	X	X			X						X
Administrative Acquisition	X					X						X
Guidelines: Specification Committee Process				X		X						X
Guidelines on How to Use EDH for Launching the Procurement				X		X						X
Contract Management Process	X					X	X	X				X
Supply Chain	X		X				X	X				X
Re-baselining and Assessment: Budget, Schedule and Scope	X				X	X	X				X	
Scheduling Process	X				X	X	X				X	
New Resources Allocation Process: M+M4P	X				X	X	X		X			
Technical Reviews Process	X				X	X	X	X			X	
Risk Management Process	X				X	X	X	X			X	
Risk Register: What if?		X			X	X	X	X			X	
Crisis Communication Management Plan			X		X	X	X	X			X	
Adverse Events Identification		X			X	X	X	X			X	
Options management	X	X			X	X	X	X			X	
Configuration Management Process	X				X	X	X	X			X	
Engineering Change Request		X				X	X				X	
Product Identification and Traceability Procedure	X										X	
Issues and Problems Reporting		X			X	X	X	X			X	
Documentation Management	X				X	X	X	X	X			
Non-conformity Process	X	X				X	X		X			
Deviation Process	X	X					X		X			
Engineering Specification Drafting		X				X				X		
Quality Management Plan			X		X	X	X	X	X			
Fabrication, Assembly and Verification Plan			X			X	X			X		
Communication Plan (Int. and Public Information Program Plan)			X		X	X	X	X	X			
Manage Stakeholders					X	X	X	X	X			
Quality Management Review Process	X				X	X	X	X	X			
Identification of Infrastructures Needed for HL-LHC		X				X	X		X			
Who is Who: name + role		X			X	X	X		X			
Definition of Roles				X	X	X	X		X			
Identification of all training processes by role				X	X	X	X		X			
Auditing Procedure	X				X	X	X				X	

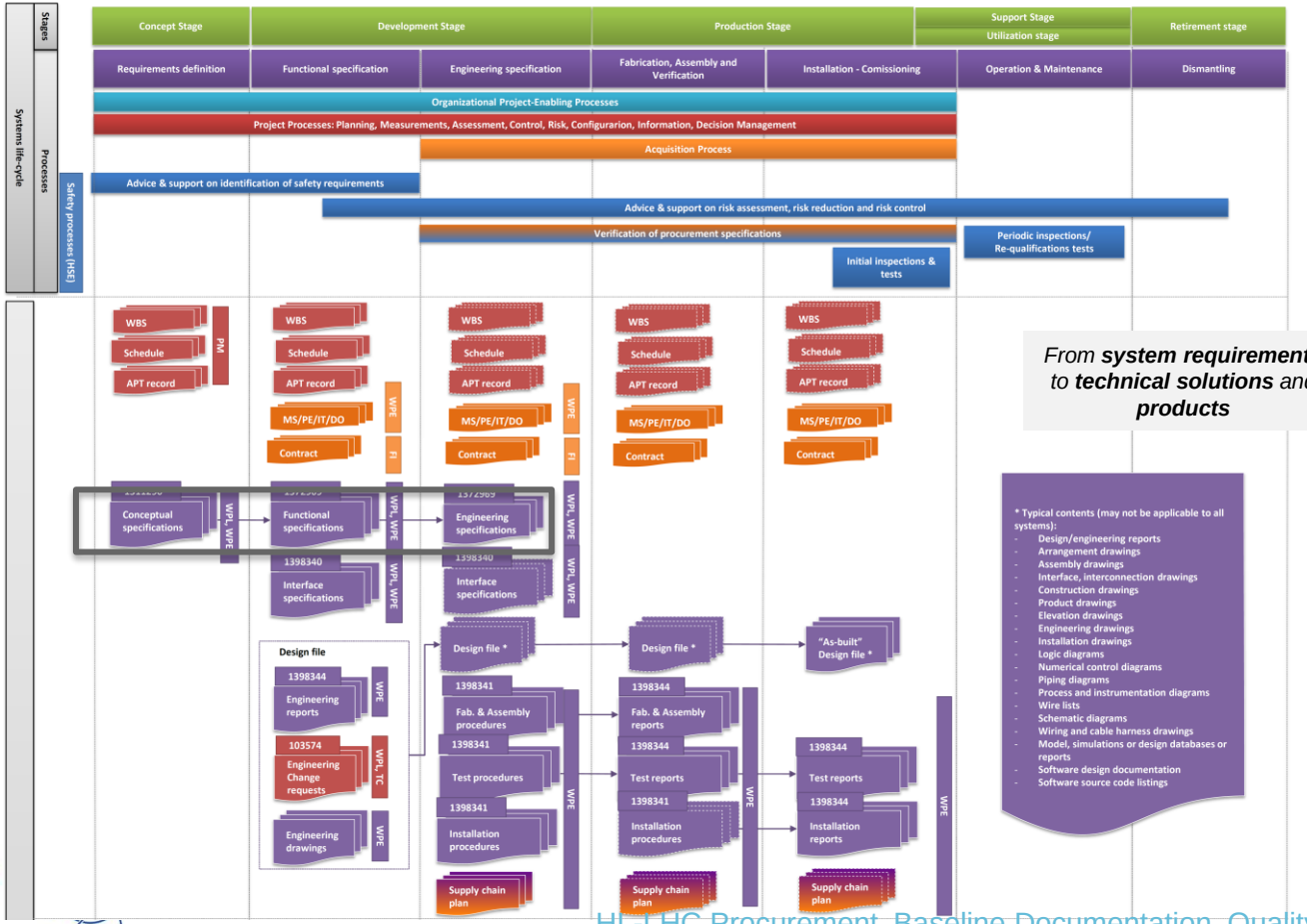
(HLCB) - HL-LHC MoU Annex 2, EDMS 1767465

MS 1518364

[52] Deviation Procedure, EDMS 1506723

[53] Deviation Request Template, EDMS 1506726

Long term documentation (1/2)



EDMS #1361462

*From **system requirements** to **technical solutions** and **products***

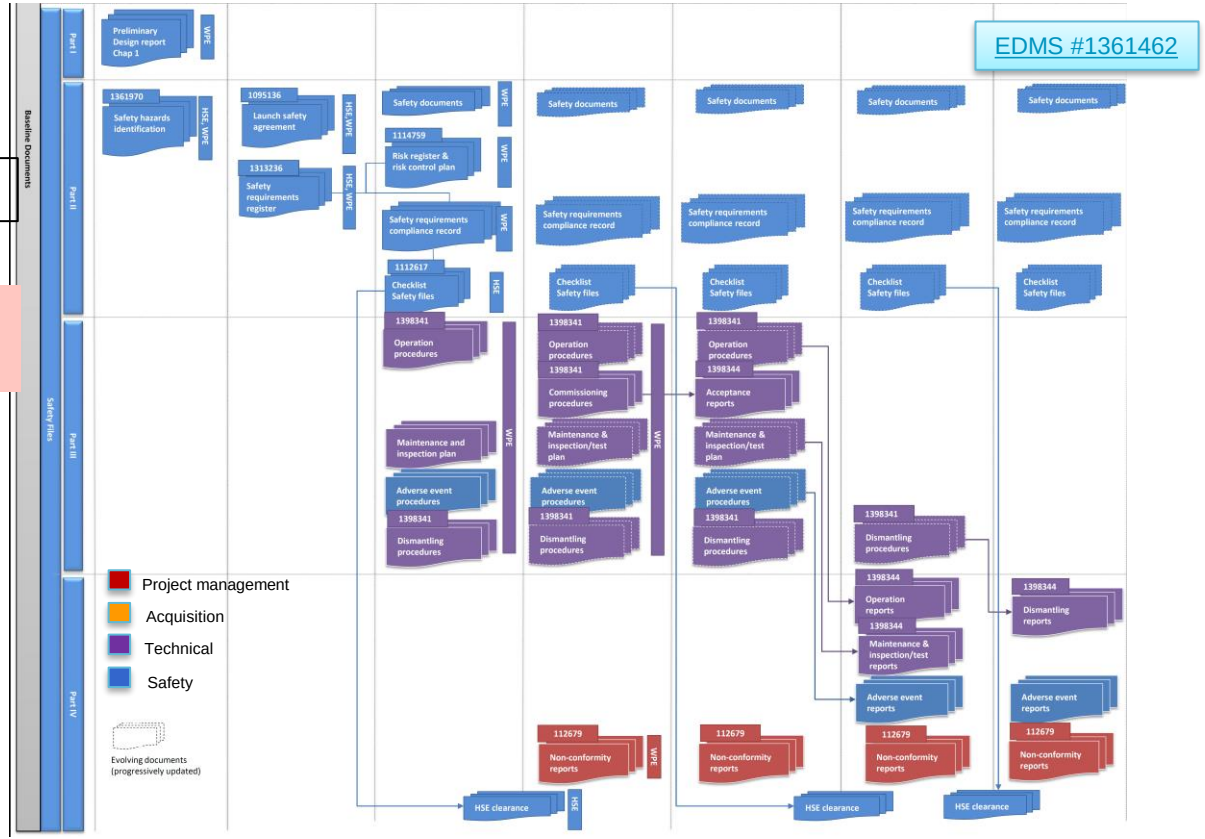
Project management
Acquisition
Technical
Safety

Long term documentation (2/2)

Safety File

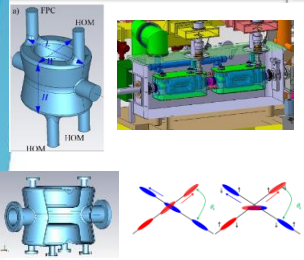
Links to already existing documentation will be made, whenever required

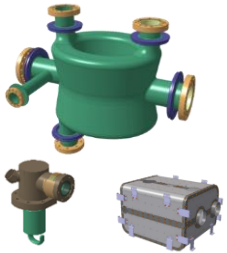
EDMS #1361462

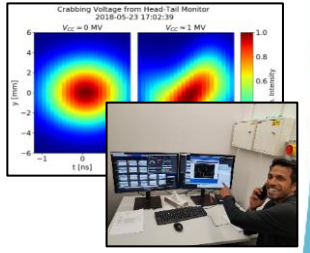


When – The full HL-LHC life-cycle

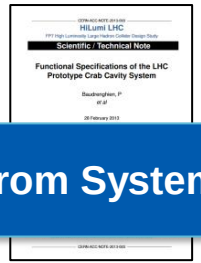
Concept Stage	Development Stage		Production Stage	Support Stage / Utilization stage	
Requirements definition	Functional specification	Engineering specification	Fabrication, Assembly and Verification	Installation - Comissioning	Operation & Maintenance

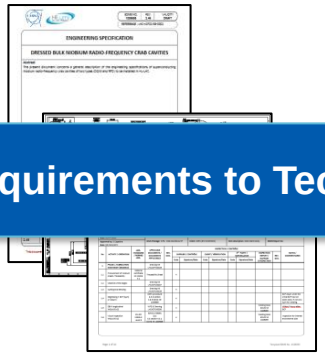


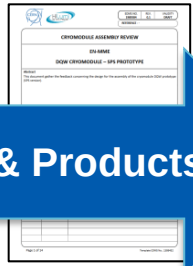


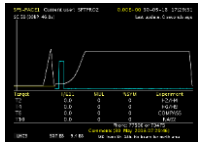


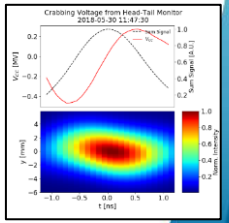
2011	2012	2013	2014	2015	2016	2017	2018











From Systems Requirements to Technical Solutions & Products

HL Quality Plan and EDMS Insights

Hector Garcia Gavela on behalf of the PDQR Office

CERN – 2nd Feb 2024 – EDMS 3027418

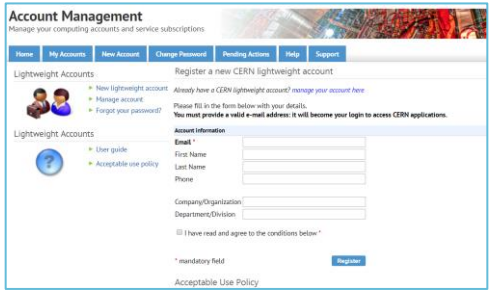
How – CERN Tools integrated and supported

SmarTeam/CATIA	•Used to extract BOMs and check some assemblies by the QA •Used thoroughly by the designers that make the 3D and 2D models
CDD	•Used for all internal drawings and for drawing control •Used for upload and control of external drawings (collaborations and companies) w/ LHC Stamp, by import
EDMS	•Used to structure the Project in the different folders following the PBS [Configuration] •Used for items •Used for storage, approval, traceability and management of documentation (engineering, manufacturing, installation,..) •Used to access CDD as the drawings are also EDMS documents •Used to access assets linked to an item
MTF/Infor	•Used for assets (equipment or batch) and EDMS documents links •Used for manufacturing data storage •Used for equipment production follow-up and their traceability •Used for storage (KIOSK) •Used for Layout links

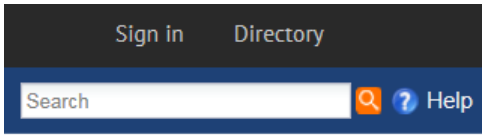
EDMS – Requirements to access

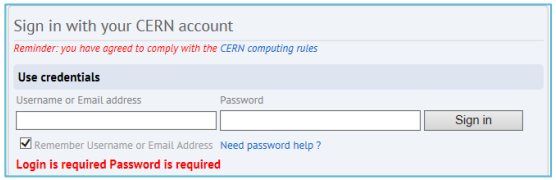
- **CERN Lightweight account** is required (**Link to create one**) to access to **EDMS** (**E**ngineering & **E**quipment **D**ata **M**anagement **S**ervice)

1. Follow the link to register your account



2. Go to EDMS and Log in with this account



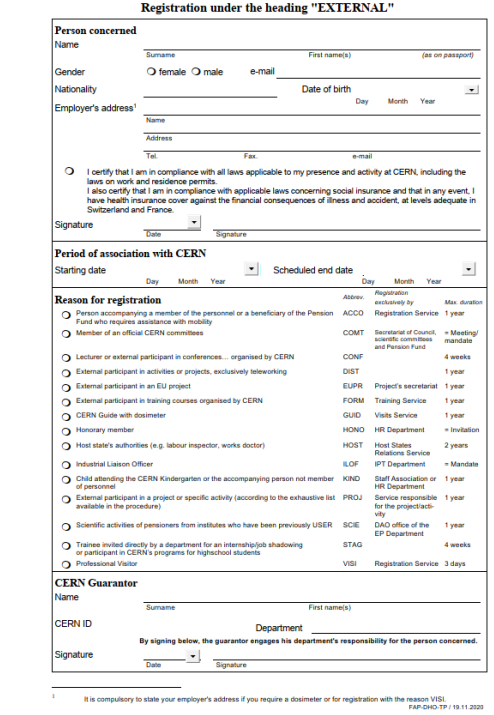


3. You will then have access to the Documentation of the Project

EDMS – Requirements to access

- If you are going to use MTF (Equipment Management Folder), then a CERN Nice Account is required

- Please contact HL-LHC.Secretariat@cern.ch (Michela Lancellotti) in order to proceed
  She will send you the details, the application form to be filled in and the documentation to be provided



Registration under the heading "EXTERNAL"

Person concerned

Name — Surname — First name(s) — (as on passport)

Gender ❍ female ❍ male — e-mail

Nationality — Date of birth — Day Month Year

Employer's address[1]

Name

Address

Tel. — Fax. — e-mail

❍ I certify that I am in compliance with all laws applicable to my presence and activity at CERN, including the laws on work and residence permits.
I also certify that I am in compliance with applicable laws concerning social insurance and that in any event, I have health insurance cover against the financial consequences of illness and accident, at levels adequate in Switzerland and France.

Signature — Date — Signature

Period of association with CERN

Starting date — Day Month Year — Scheduled end date — Day Month Year

Reason for registration	Abbrev.	Registration exclusively by	Max. duration
❍ Person accompanying a member of the personnel or a beneficiary of the Pension Fund who requires assistance with mobility	ACCO	Registration Service	1 year
❍ Member of an official CERN committees	COMT	Secretariat of Council, scientific committees and Pension Fund	= Meeting/ mandate
❍ Lecturer or external participant in conferences... organised by CERN	CONF		4 weeks
❍ External participant in activities or projects, exclusively teleworking	DIST		1 year
❍ External participant in an EU project	EUPR	Project's secretariat	1 year
❍ External participant in training courses organised by CERN	FORM	Training Service	1 year
❍ CERN Guide with dosimeter	GUID	Visits Service	1 year
❍ Honorary member	HONO	HR Department	= Invitation
❍ Host state's authorities (e.g. labour inspector, works doctor)	HOST	Host States Relations Service	2 years
❍ Industrial Liaison Officer	ILOF	IPT Department	= Mandate
❍ Child attending the CERN Kindergarten or the accompanying person not member of personnel	KIND	Staff Association or HR Department	1 year
❍ External participant in a project or specific activity (according to the exhaustive list available in the procedure)	PROJ	Service responsible for the project/activity	1 year
❍ Scientific activities of pensioners from institutes who have been previously USER	SCIE	DAO office of the EP Department	1 year
❍ Trainee invited directly by a department for an internship/job shadowing or participant in CERN's programs for highschool students	STAG		4 weeks
❍ Professional Visitor	VISI	Registration Service	3 days

CERN Guarantor

Name — Surname — First name(s)

CERN ID — Department

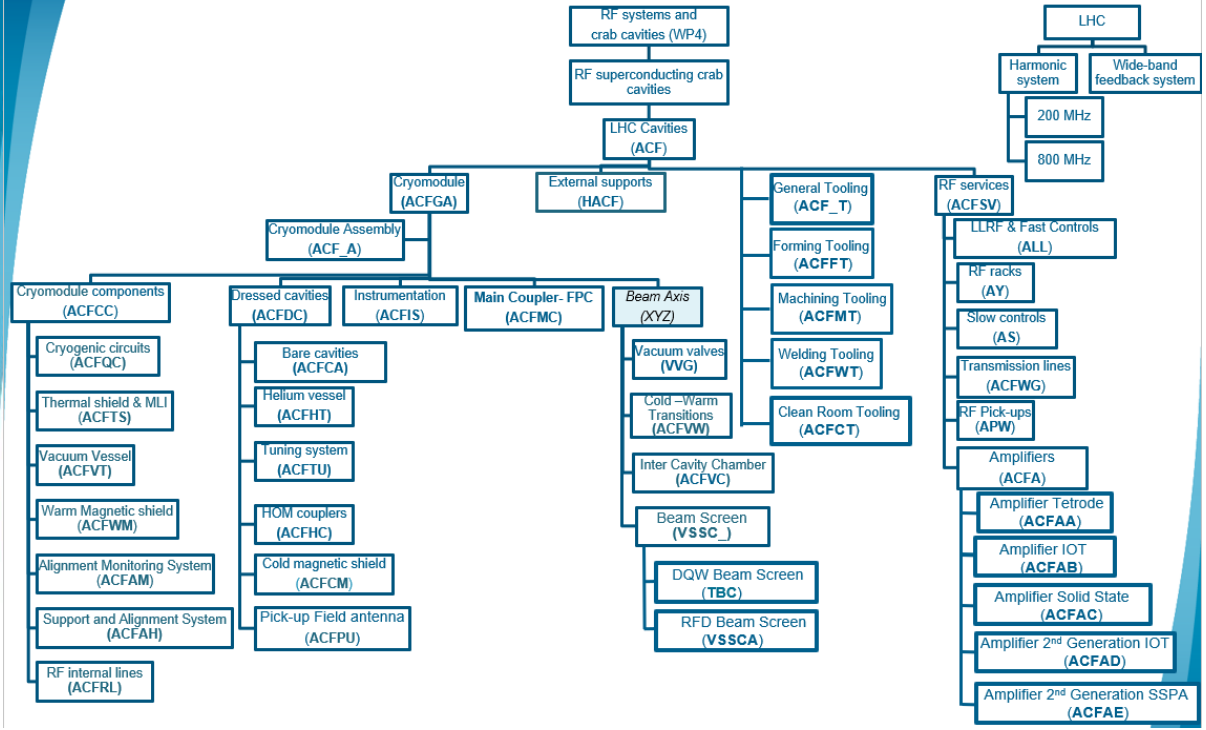
By signing below, the guarantor engages his department's responsibility for the person concerned.

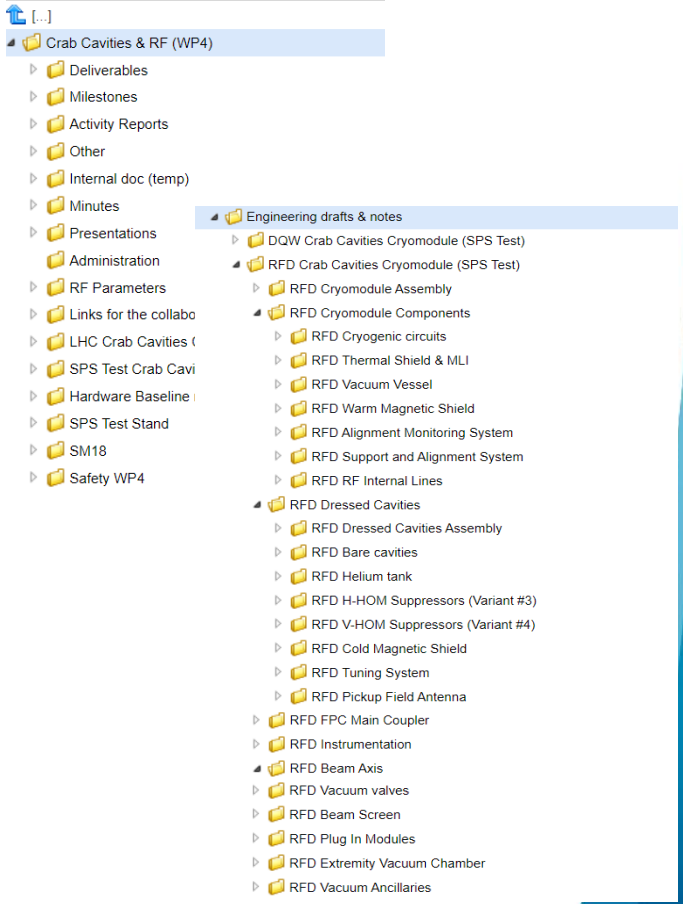
Signature — Date — Signature

[1] It is compulsory to state your employer's address if you require a dosimeter or for registration with the reason VISI.

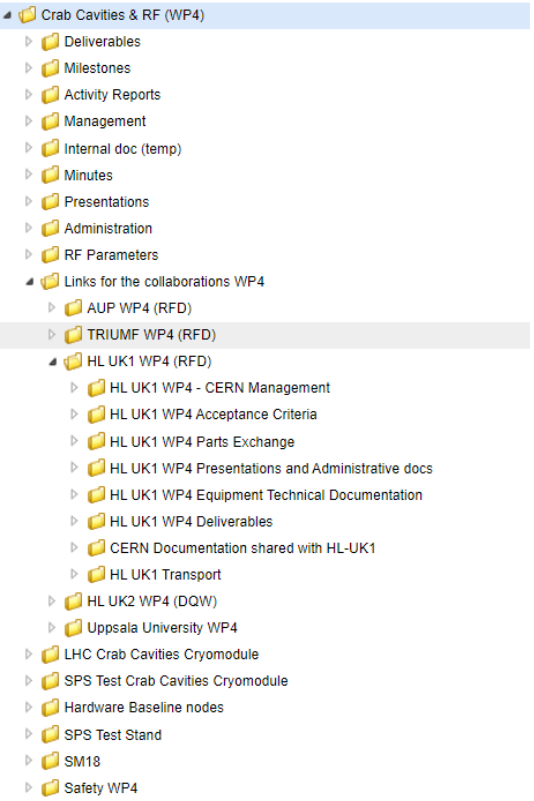
FAP-DHO-TP / 19.11.2020

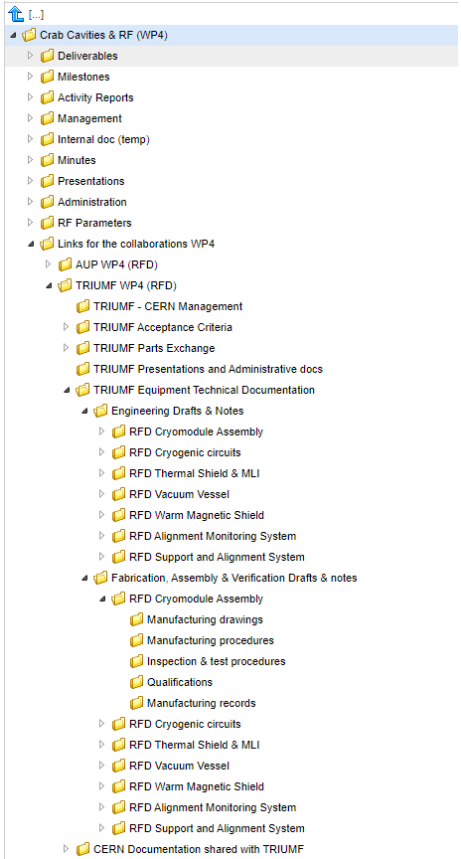
From system architecture to EDMS Structure





Specific Nodes for Collaborations

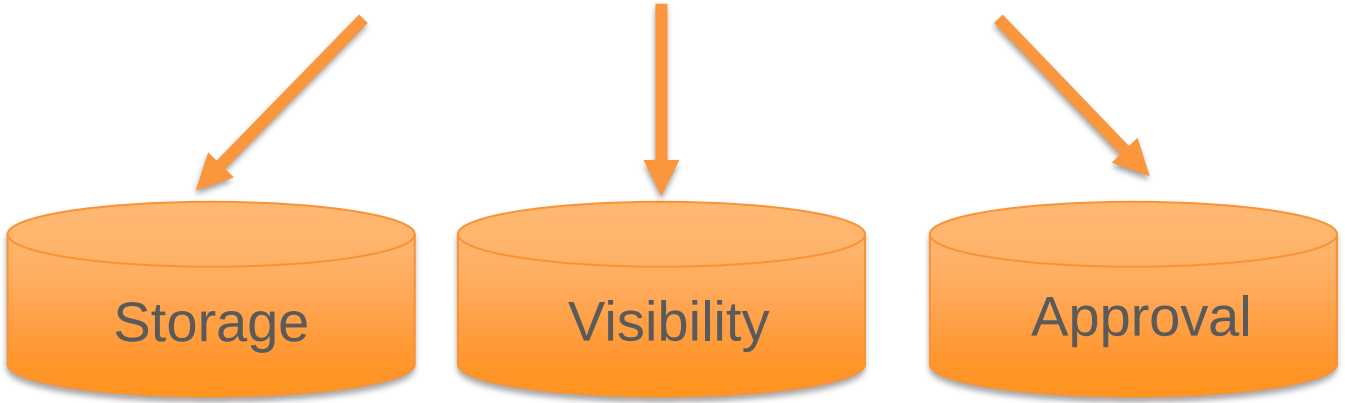




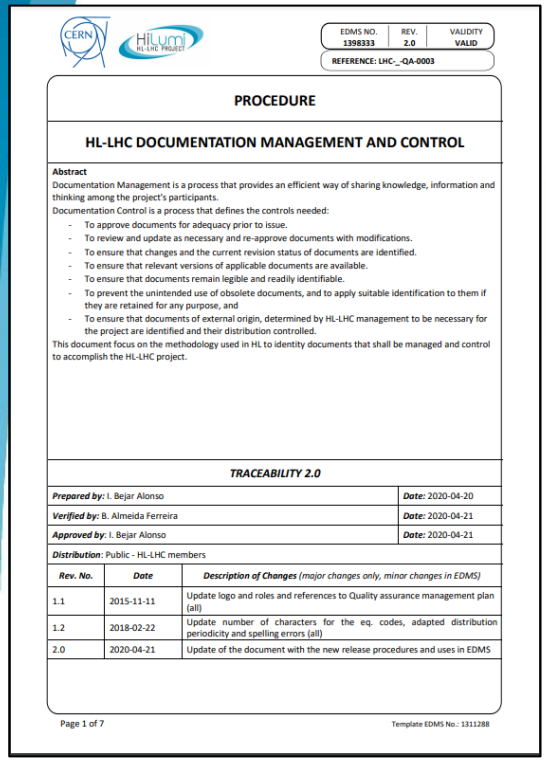
- Dedicated node for each Collaboration within the main WP4 Structure
- To access to CERN tools, colleagues from Collaborations need to set a lightweight account (only for EDMS access) or Nice Account (EDMS and MTF access required)
- All members of HL will have the rights to create/edit documents in EDMS (under the corresponding Context)

Documentation - Key concepts

- Baseline / Non Baseline
- In my Work package / In several Work packages
- Confidential (Cost, Resources, …)



Documentation in one page (EDMS 1398333)



EDMS NO. 1398333 | REV. 2.0 | VALIDITY VALID
REFERENCE: LHC-_-QA-0003

PROCEDURE

HL-LHC DOCUMENTATION MANAGEMENT AND CONTROL

Abstract
Documentation Management is a process that provides an efficient way of sharing knowledge, information and thinking among the project's participants.
Documentation Control is a process that defines the controls needed:
- To approve documents for adequacy prior to issue.
- To review and update as necessary and re-approve documents with modifications.
- To ensure that changes and the current revision status of documents are identified.
- To ensure that relevant versions of applicable documents are available.
- To ensure that documents remain legible and readily identifiable.
- To prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose, and
- To ensure that documents of external origin, determined by HL-LHC management to be necessary for the project are identified and their distribution controlled.

This document focus on the methodology used in HL to identity documents that shall be managed and control to accomplish the HL-LHC project.

TRACEABILITY 2.0

Prepared by: I. Bejar Alonso	***Date:*** 2020-04-20
Verified by: B. Almeida Ferreira	***Date:*** 2020-04-21
Approved by: I. Bejar Alonso	***Date:*** 2020-04-21

Distribution: Public - HL-LHC members

Rev. No.	*Date*	*Description of Changes (major changes only, minor changes in EDMS)*
1.1	2015-11-11	Update logo and roles and references to Quality assurance management plan (all)
1.2	2018-02-22	Update number of characters for the eq. codes, adapted distribution periodicity and spelling errors (all)
2.0	2020-04-21	Update of the document with the new release procedures and uses in EDMS

Page 1 of 7 — Template EDMS No.: 1311288

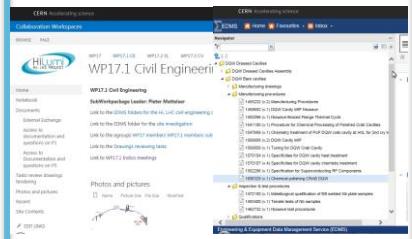
Non Baseline

Documents required for the well functioning of the project but which storage will not be critical after commissioning

Peer review process is generally managed by the author

Do not require special labelling

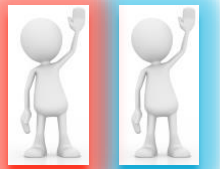
Stored in SharePoint or EDMS requiring approval process



Baseline

Documents that will have to be stored and updated until the dismantling of the LHC

Concerning one Workpackage



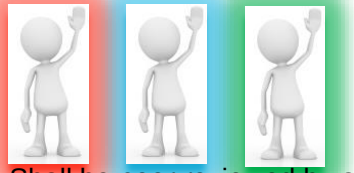
Shall be peer reviewed by a group of people knowledgeable on the subject and those interfacing with the system /process described in the document.

Approved by the WPL

Requires labelling

Can be prepared using the SharePoint but is stored in EDMS

Concerning more than one Workpackage or the project



Shall be peer reviewed by a group of people knowledgeable on the subject and those interfacing with the system /process described in the document.

Approved by the Project Office or by the Project Leader

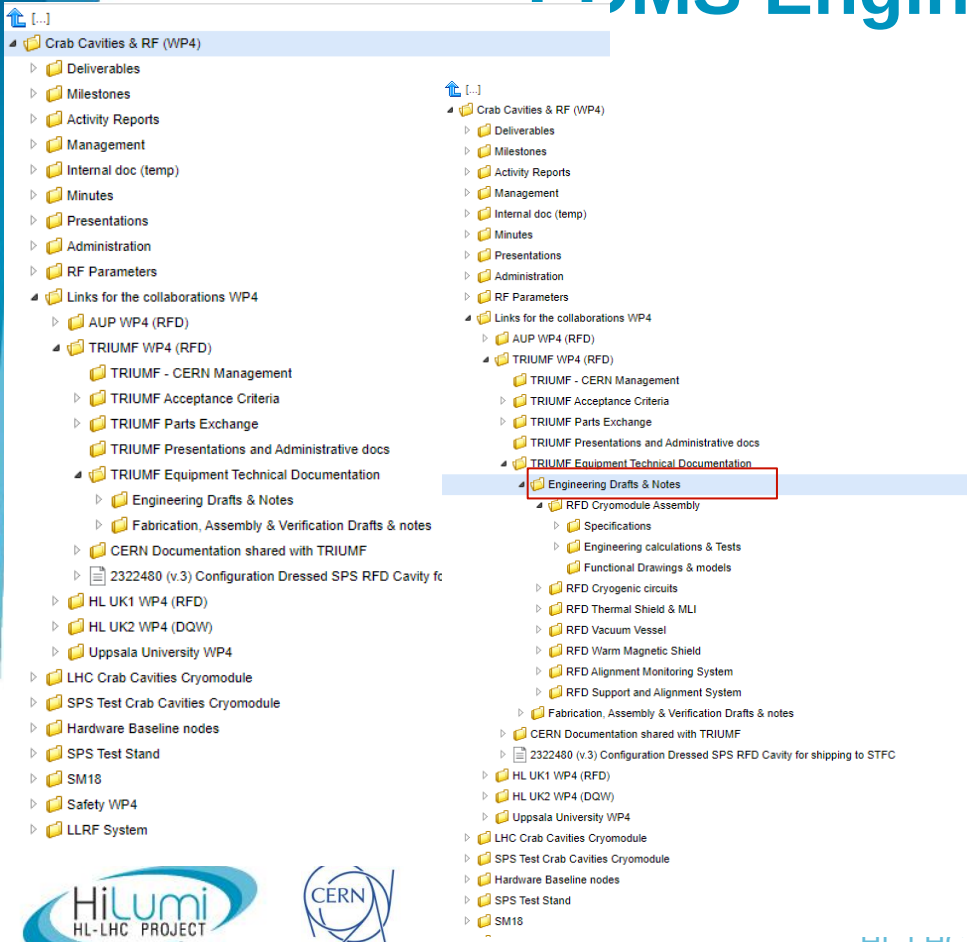
Requires labelling

Can be prepared using the SharePoint but is stored in EDMS

Commercial documents are always baseline

While technical documents are all open to all the members of the project, Commercial, financial and HR documents are limited to the WPLs, DWPLs and PO

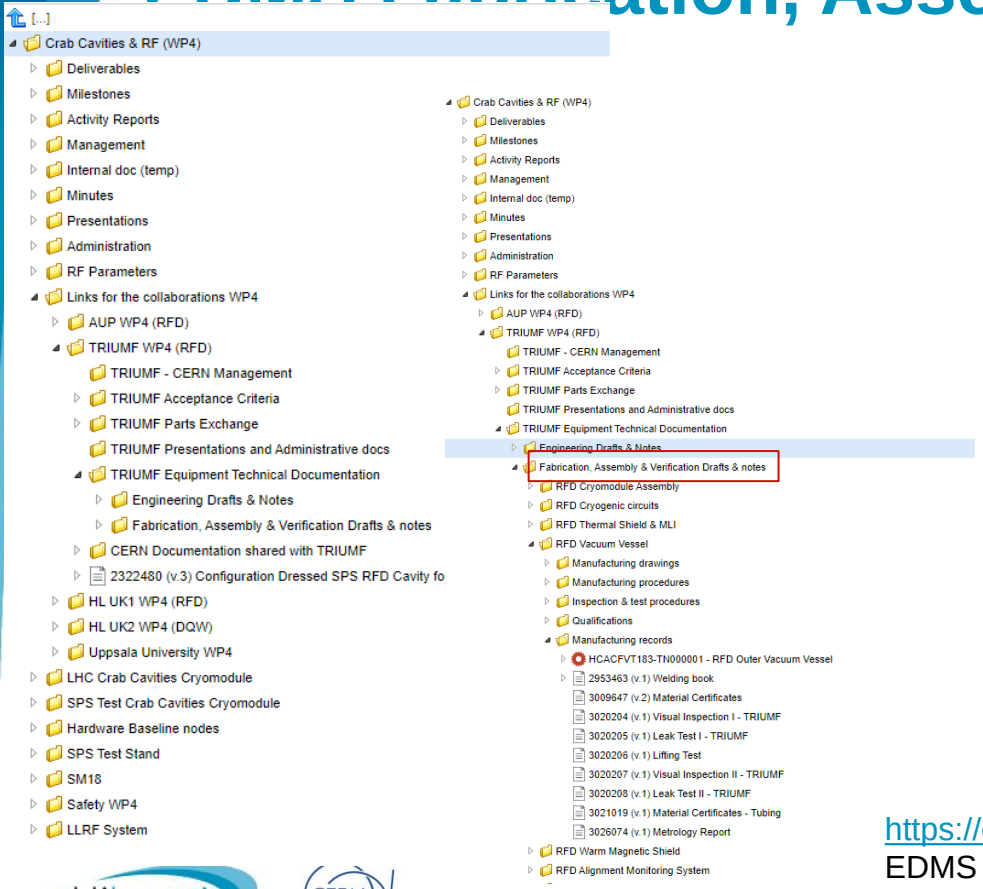
EDMS Engineering node



Documentation during this phase

- Specifications
- Drawings
- Calculations
- Simulations
- Engineering notes
- Bill of Materials, List of Materials

EDMS Fabrication, Assembly, Verification node

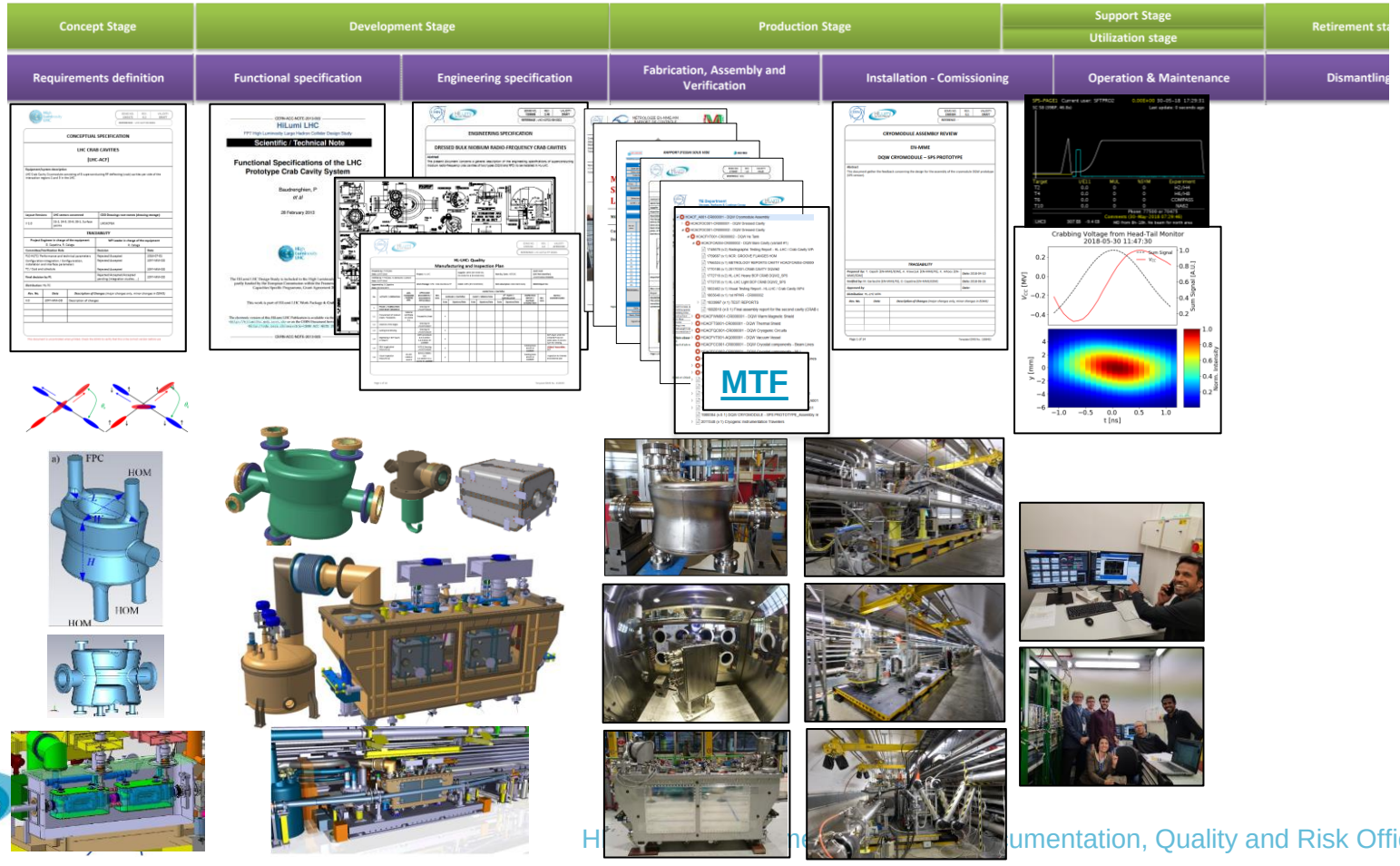


Documentation during this phase

- Manufacturing Procedures
- Test Procedures
- Assembly Procedures
- Manufacturing and Inspection Plans
- Qualifications
- Manufacturing Records – **MTF**

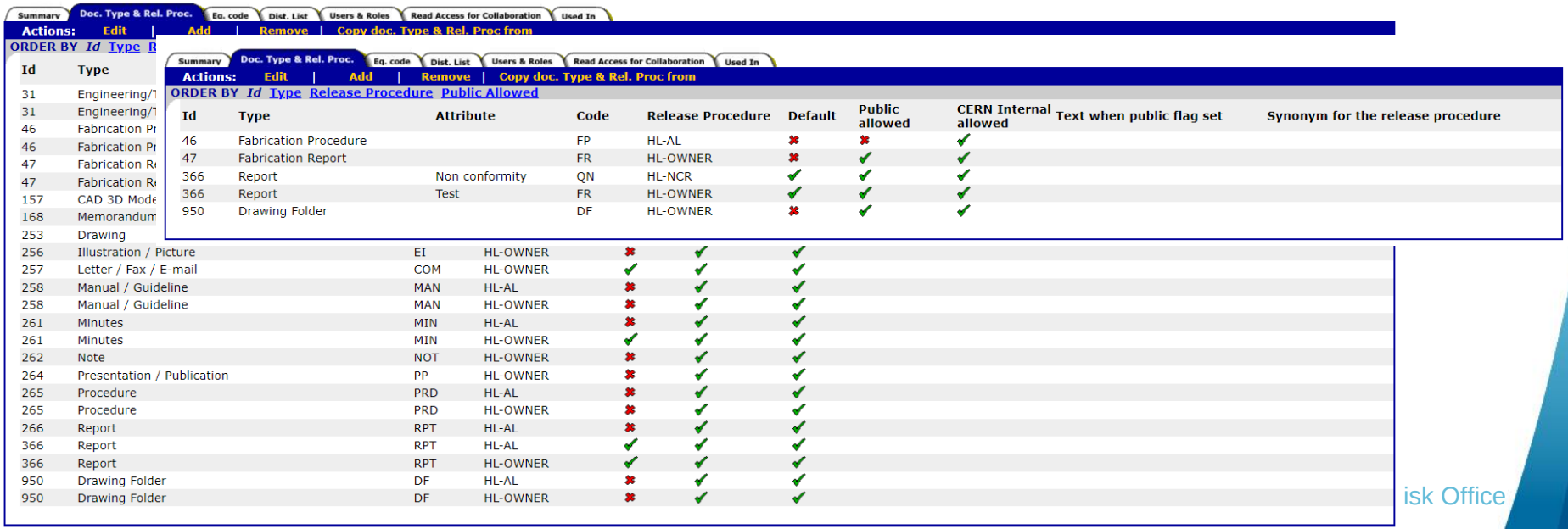
https://edms-service.web.cern.ch/faq/EDMS/pages/tutorials.html
EDMS Tutorials

CC for SPS – The full HL-LHC life-cycle



EDMS Release Procedures

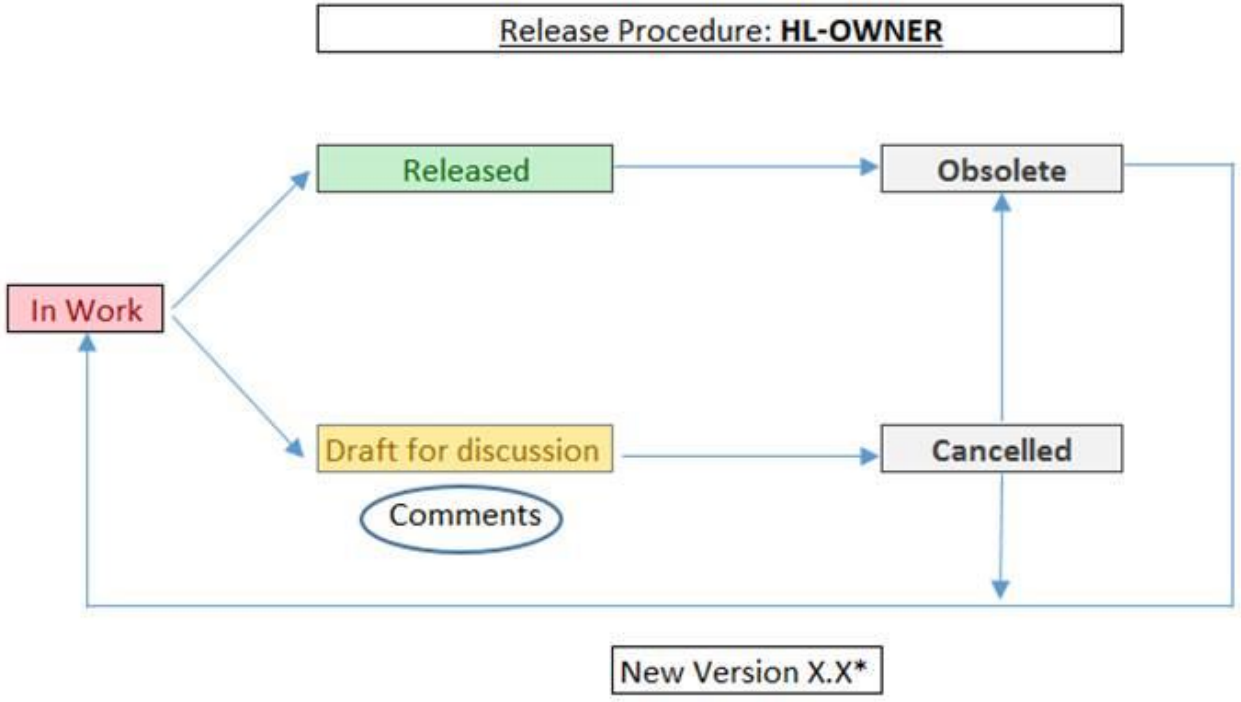
- **EDMS Documents (specifications, MIPs, procedures)** issued by the Collaboration will be issued under the Context: **HL-LHC-WP4-CANADA** or **HL-LHC-WP4-CANADA-MTF HL-LHC-WP4-UK-MTF**
- **MTF Documents (production reports/certificates/nonconformities)** issued by the Collaboration will be issued under the Context: **HL-LHC-WP4-CANADA-MTF or HL-LHC-WP4-UK-MTF (For our cryomodule or equipment HL-LHC-WP4-MTF)**



Id	Type	Attribute	Code	Release Procedure	Default	Public allowed	CERN Internal allowed	Text when public flag set	Synonym for the release procedure
46	Fabrication Procedure		FP	HL-AL	✖	✖	✔		
47	Fabrication Report		FR	HL-OWNER	✖	✔	✔		
366	Report	Non conformity	QN	HL-NCR	✔	✔	✔		
366	Report	Test	FR	HL-OWNER	✔	✔	✔		
950	Drawing Folder		DF	HL-OWNER	✖	✔	✔		

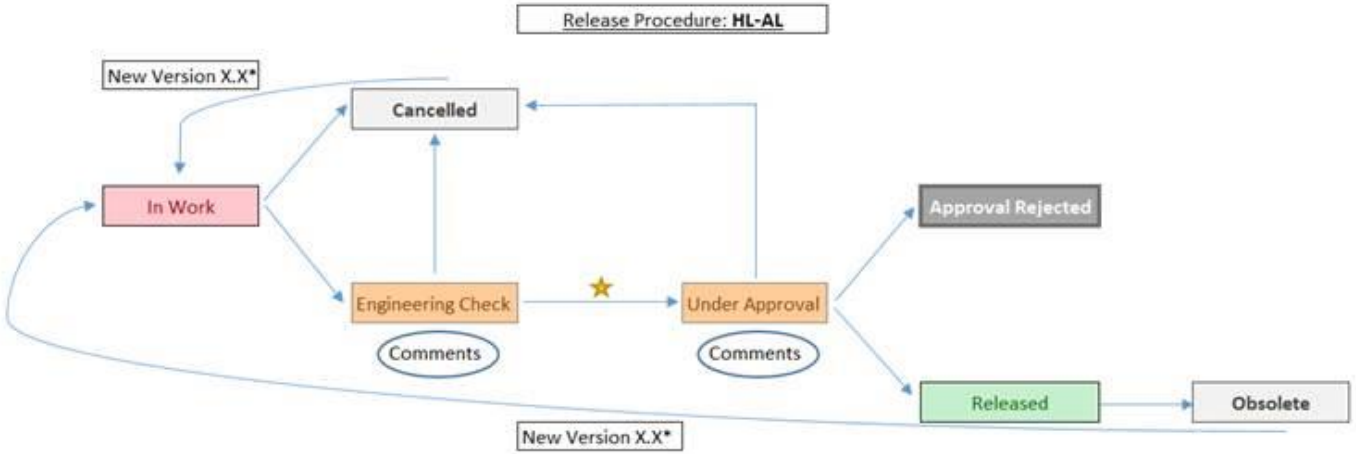
Id	Type						
31	Engineering/T						
31	Engineering/T						
46	Fabrication Pr						
46	Fabrication Pr						
47	Fabrication Re						
47	Fabrication Re						
157	CAD 3D Mode						
168	Memorandum						
253	Drawing						
256	Illustration / Picture	EI	HL-OWNER	✖	✔	✔	
257	Letter / Fax / E-mail	COM	HL-OWNER	✔	✔	✔	
258	Manual / Guideline	MAN	HL-AL	✖	✔	✔	
258	Manual / Guideline	MAN	HL-OWNER	✖	✔	✔	
261	Minutes	MIN	HL-AL	✖	✔	✔	
261	Minutes	MIN	HL-OWNER	✔	✔	✔	
262	Note	NOT	HL-OWNER	✖	✔	✔	
264	Presentation / Publication	PP	HL-OWNER	✖	✔	✔	
265	Procedure	PRD	HL-AL	✖	✔	✔	
265	Procedure	PRD	HL-OWNER	✖	✔	✔	
266	Report	RPT	HL-AL	✖	✔	✔	
366	Report	RPT	HL-AL	✔	✔	✔	
366	Report	RPT	HL-OWNER	✔	✔	✔	
950	Drawing Folder	DF	HL-AL	✖	✔	✔	
950	Drawing Folder	DF	HL-OWNER	✖	✔	✔	

EDMS Release Procedures

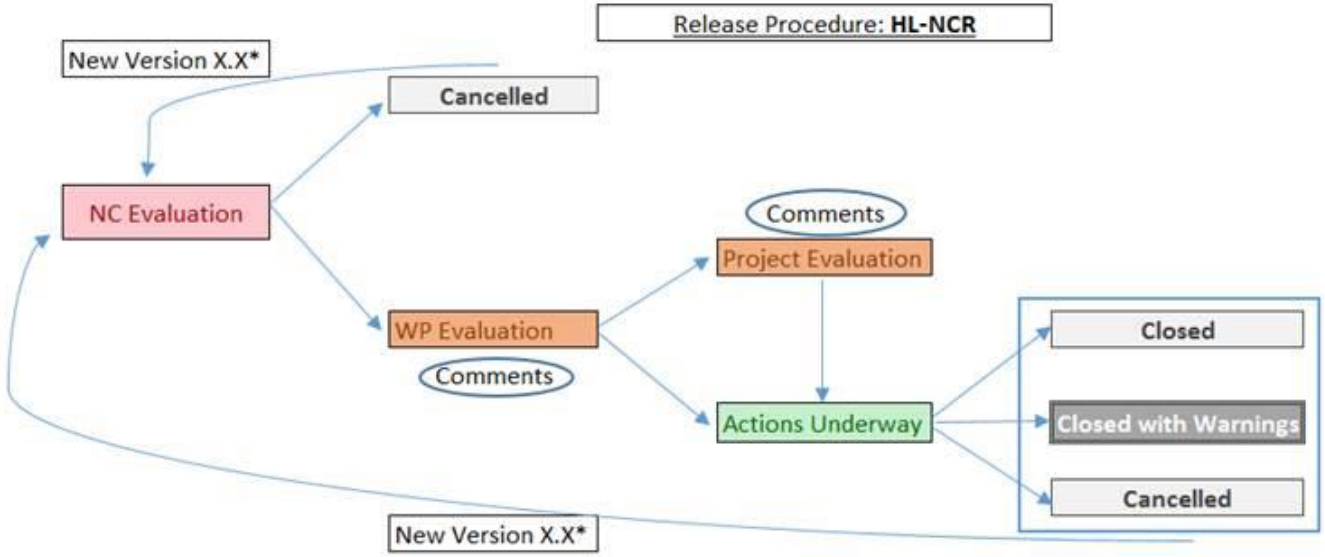


*Create a new version everytime you have a new file to be uploaded

EDMS Release Procedures



EDMS Release Procedures



*Create a new version when you have a new file to be uploaded.

Documentation

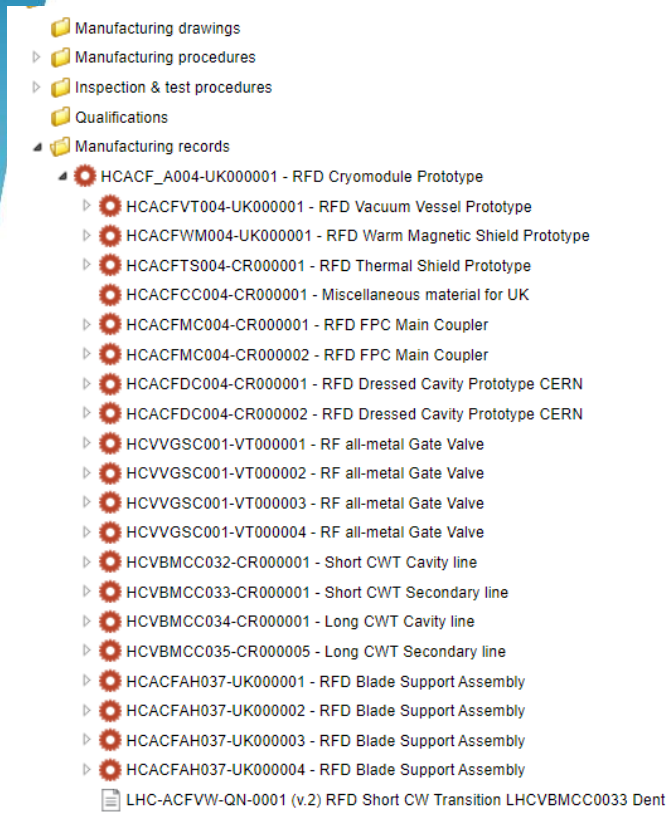
Type of Document	Examples	Context to be used	Release Procedure
Procedures	Assembly Procedures, MIPs	**HL-LHC-WP4-CANADA (CAN)** **HL-LHC-WP4-UK (UK)** **HL-BASELINE (CERN)**	**HL-AL**
Procurement Specifications	Specifications used for the procurement of cryomodule components	**HL-LHC-WP4-CANADA (CAN)** **HL-LHC-WP4-UK (UK)** **HL-BASELINE (CERN)**	**HL-OWNER**
Calculations		**HL-LHC-WP4-CANADA** **HL-LHC-WP4-UK**	**HL-OWNER**
Manufacturing Records	Material certificates, dimensional reports, leak check reports, NDTs reports, etc.	**HL-LHC-WP4-CANADA-MTF (CAN)** **HL-LHC-WP4-UK-MTF (UK)** **HL-LHC-WP4-MTF (CERN)**	**HL-OWNER**
Nonconformities	NCRs arisen during production	**HL-LHC-WP4-CANADA-MTF (CAN)** **HL-LHC-WP4-UK-MTF (UK)** **HL-LHC-WP4-MTF (CERN)**	**HL-NCR**

If Deviation Requests need to be issued, then contact WP4 (Marco) and HLPO (PDQR Office). We will take care of the formal approval (HL-BASELINE with HL-AL release procedure)

HL-LHC Quality Plan – Traceability of Changes

Document	Purpose	Reference	EDMS Docs
Engineering Change Request	Modification of the current Project Baseline: • There is a modification on the scope defined in the technical baseline (TDR) • There is a need of extra funds to pay for an object that was in the baseline and can not be funded by internal reorganization of the budget for the same equipment (Budget ECR) If the modification affects the present **LHC** machine an **ECR** is submitted using the normal **LHC ECR circuit**	**TDR** – Scope Baseline **PBS** – Project Breakdown Structure **MTP** – Cost Baseline	**Process** 2429904 **Template** **HL-LHC ECRs** 1508429 **LHC ECRs** Link
Schedule Change Request	Trace and record relevant variances in the Master Schedule wrt. the one endorsed and approved in the last Cost & Schedule Review (CSR). For deliverables related to LHC installation or IT String installation: - If the shift is > 2 months (LHC installation) : An SCR shall be issued. - If the shift is > 1 months (IT String): An SCR shall be issued.	**MS** – Master Schedule	**Process** 2735444 **Template** 2725175
Decision Management Reports	Trace managerial decisions without modifying the Project Baseline. • Formalize a technical decision between several options or sharing of managerial decisions • Internal re-scheduling w/o affecting the baseline • Revaluation of the cost		**Template** 1501719
Deviation Requests	Request to do something different from an established requirement for a limited number of components, for a brief period, or for a specific use	**Engineering Specifications** **Design/Manufacturing files** **Technical Specifications**	**Process** 1506723 **Template** 1506726
Safety Request	In case the **deviation** concerns exclusively a safety requirement. If so, it is not necessary to create a deviation request on the top of the Safety request.	**Safety Requirements** **Technical Specifications** **Engineering Specifications**	**Template** 1770077
Nonconformity	Non fulfilment of an established requirement (they are more production oriented)	**Engineering Specifications** **Design/Manufacturing files** **Technical Specifications**	**Process** 1499015 **Template** 1501109

Manufacturing Records in MTF



- MTF is an integral part of EDMS.
- This tool is used to store the manufacturing data during production and grant traceability (what goes where)
- Workflow (more or less complex) shall be integrated following the Manufacturing & Inspection Plan (MIP)
- Manufacturing reports shall be provided to CERN along the production (including Nonconformities)

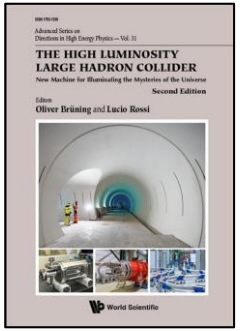
For reference – MTF Training given in June 2020 to the UK Colleagues: https://edms.cern.ch/document/2385803/1.0

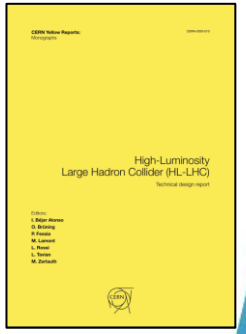
(Some) Conclusions

- Everybody should feel responsible for Quality and not just the people that are more devoted to this activity
- Documentation is a key part of any project
  - It provides provision of objective evidence;
  - It proves the conformity of the requirements established by a customer;
  - It enables repeatability and traceability of the work done
- HL-LHC is an upgrade of an existing machine (LHC). Existing rules are to be followed Pragmatic Approach with our Collaborations
- HL-LHC tried to implement an industrial approach within the boundary conditions of the Research centers: Traceability, documentation, control of changes etc. are ‘a must’ for any project at large scale
- Important to keep traceability (what goes where) along the full life-cycle
- The correct use of EDMS/MTF is of paramount importance in order to store, handle and retrieve information in later stages
- Standardization for all the CERN members and Collaborations
- Continuous improvement as a quality principle and support from PDQR Office

Some useful Links

- EDMS for HL-LHC : https://edms.cern.ch/project/CERN-0000096404
- Sharepoint (Intranet) : https://cern.sharepoint.com/sites/HL-LHC
- Indico : https://indico.cern.ch/category/3063/
- HL-LHC Website: https://hilumilhc.web.cern.ch
- Industry Website : https://project-hl-lhc-industry.web.cern.ch
- Link to Technical Design Report (TDR v1.0 published in 2020): https://e-publishing.cern.ch/index.php/CYRM/issue/view/127
- HL-LHC Quality Plan – EDMS Link
- HL-LHC in CDS : Link
- HL-LHC Documentary (Video): Link
- Hilumi Book 2nd edition: Link





What use to happen at the end of the projects

Thank you for your attention
Link to EDMS

Why the office was created

- **SUPPO**st papers
- **OPTIM**entrate on the
- **HARM**es workin**N** groups
- **RULES**lete