Design Integration and Configuration Management

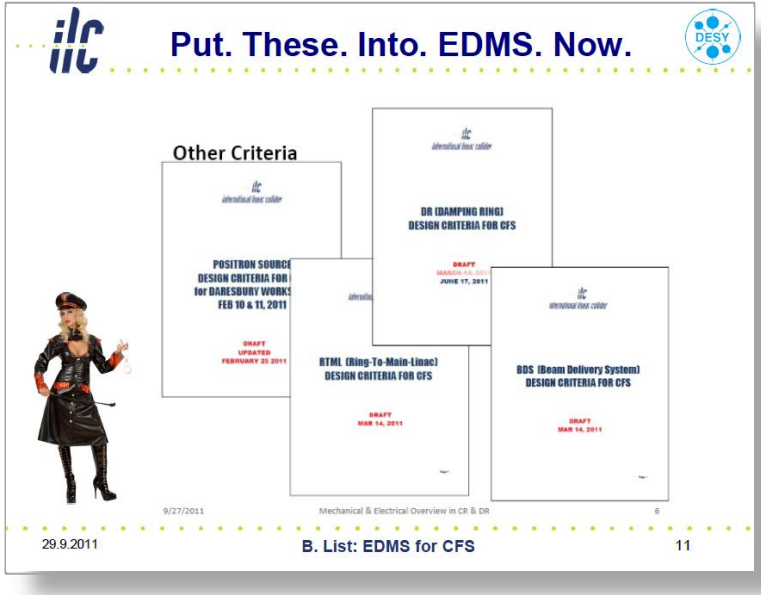
Benno List
DESY

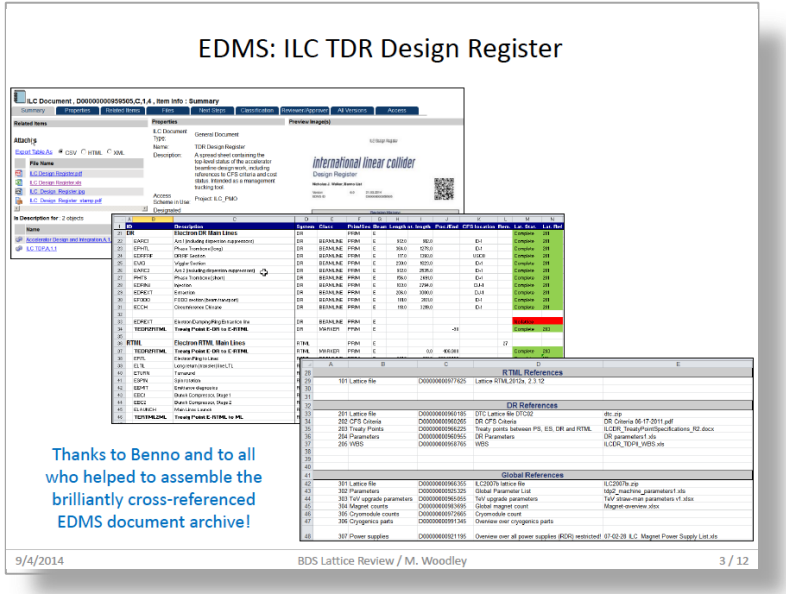
LINEAR COLLIDER COLLABORATION
Designing the world's next great particle accelerator

Technical Design Documentation

- TDD: The complete set of documents, CAD models and drawings that represent the design as described in the TDR
- EDMS is used to store the TDD
- TDD as we have it now was a result and deliverable of the Technical Design Phase II
- The TDD must be maintained and elaborated in the Preconstruction Phase
  -> this needs a systematic approach:
  Configuration Management

Assembling the TDD was a lot of work





2011: Gentle persuasion

2014: Satisfied customers

Power Point is no Documentation

COLUMBIA

ENGINEERING BY VIEWGRAPHS

See Report of Columbia Accident Investigation Board, vol I, p. 191 at http://caib.nasa.gov/news/report/volume1/default.html

> At many points during its investigation, the Board was surprised to receive similar presentation slides from NASA officials in place of technical reports. The Board views the endemic use of PowerPoint briefing slides instead of technical papers as an illustration of the problematic methods of technical communication at NASA.

The New York Times

Magazine

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS | OPINION

PowerPoint Makes You Dumb

By CLIVE THOMPSON
Published: December 14, 2003

In August, the Columbia Accident Investigation Board at NASA released Volume 1 of its report on why the space shuttle crashed. As expected, the ship's foam insulation was the main cause of the disaster. But the board also fingered another unusual culprit: PowerPoint, Microsoft's well-known "slideware" program.

NASA, the board argued, had become too reliant on presenting complex information via PowerPoint, instead of by means of traditional oral and paper technical reports. When NASA engineers assessed possible wing damage during the mission, they presented the findings in a confusing PowerPoint slide -- so crammed with nested bullet points and irregular short forms that it was nearly impossible to untangle. "It is easy to understand how a senior manager might read this PowerPoint slide and not realize that it addresses a life-threatening situation," the board sternly noted.

TDD Status and Examples

- Design Register: Lists status of beamline design and completeness of mandatory documents
- Defines the core of the baseline documentation
- Documents listed here (existing or newly prepared) are subject to Change Control

ID	Description	System	Class	Prim/Sec	Beam	Length	Int. length	z Pos./End	CFS location	Rem.	Lat. Stat.	Lat. Ref	Magnets	Mag. Ref.	PS
TEML2PS	**Treaty Point E-ML to PS**	PS	TREATY	PRIM	E	0.0	0.0	-3251	T-8		Complete	501			
EUPM	PS Undulator Protection and Matching	PS	BEAMLINE	PRIM	E	377.4	377.4	-2874	T-8, UJ-7		Complete	22	Concept	4, 3	
EUND	Undulator Section	PS	BEAMLINE	PRIM	E	359.3	736.7	-2568	UJ-7	10	Complete	22	Engineering	4, 3, 18	
MEUNDEND	Undulator End	PS	MARKER	PRIM	E	0.0	736.7	-2568	UJ-7, T-6		Complete	22	Concept	4, 3	
EDUMPEX	Dump Line Extraction Section	PS	BEAMLINE	PRIM	E	missing	missing	missing	T-6	4	Complete	22	Concept	4, 3	
EDOGL	PS Dogleg	PS	BEAMLINE	PRIM	E	423.6	1160.3	-2111	T-6, UJ-5		Complete	22	Concept	4, 3	
TPS2BDS	**Treaty Point PS to BDS**	PS	TREATY	PRIM	E	0.0	1160.3	-2111	UJ-5		Complete	501			
	Positron Source, Electron Secondary Beamlines	PS													
TEML2PS	Treaty Point ML to PS	PS	TREATY	SE											
EFADL	PS Fast Abort Dump Line	PS	BEAMLINE	SE											
EFAD	PS Fast Abort Dump	PS	DUMP	SE											
MEUNDEND	Undulator End	PS	MARKER	SE											
EPUNDDL	PS Post Undulator Dump Line	PS	BEAMLINE	SE											
DBETUD	BDS Tune-up Dump	BDS	DUMP	SE											
BDS	**Electron BDS Main Lines**	BDS		PR											
TPS2BDS	**Treaty Point PS to BDS**	BDS	TREATY	PR											
EENMEA	Energy Measurement Chicane	BDS	BEAMLINE	PR											
ETUDEX	Marker Tuneup Dump Extraction	BDS	MARKER	PR											
ETUNL	Tuning Line	BDS	BEAMLINE	PR											
EPOL	Polarimeter Chicane	BDS	BEAMLINE	PR											
EBECOLL	Betatron Collimation	BDS	BEAMLINE	PR											
EENCOLL	Energy Collimation	BDS	BEAMLINE	PR											
EFFM	Final Focus Matching Section	BDS	BEAMLINE	PR											
EFFS	FF Energy Spectrometer	BDS	BEAMLINE	PR											
EFFD	Final Focus	BDS	BEAMLINE	PR											
IP	**Treaty Point Interaction Point**	BDS	TREATY	PR											
EMDUMPL	Electron Main Dump Line	BDS	BEAMLINE	PR											
EMDUMP	**Electron Main Dump**	BDS	DUMP	PR											

Overview over Mandatory Documents

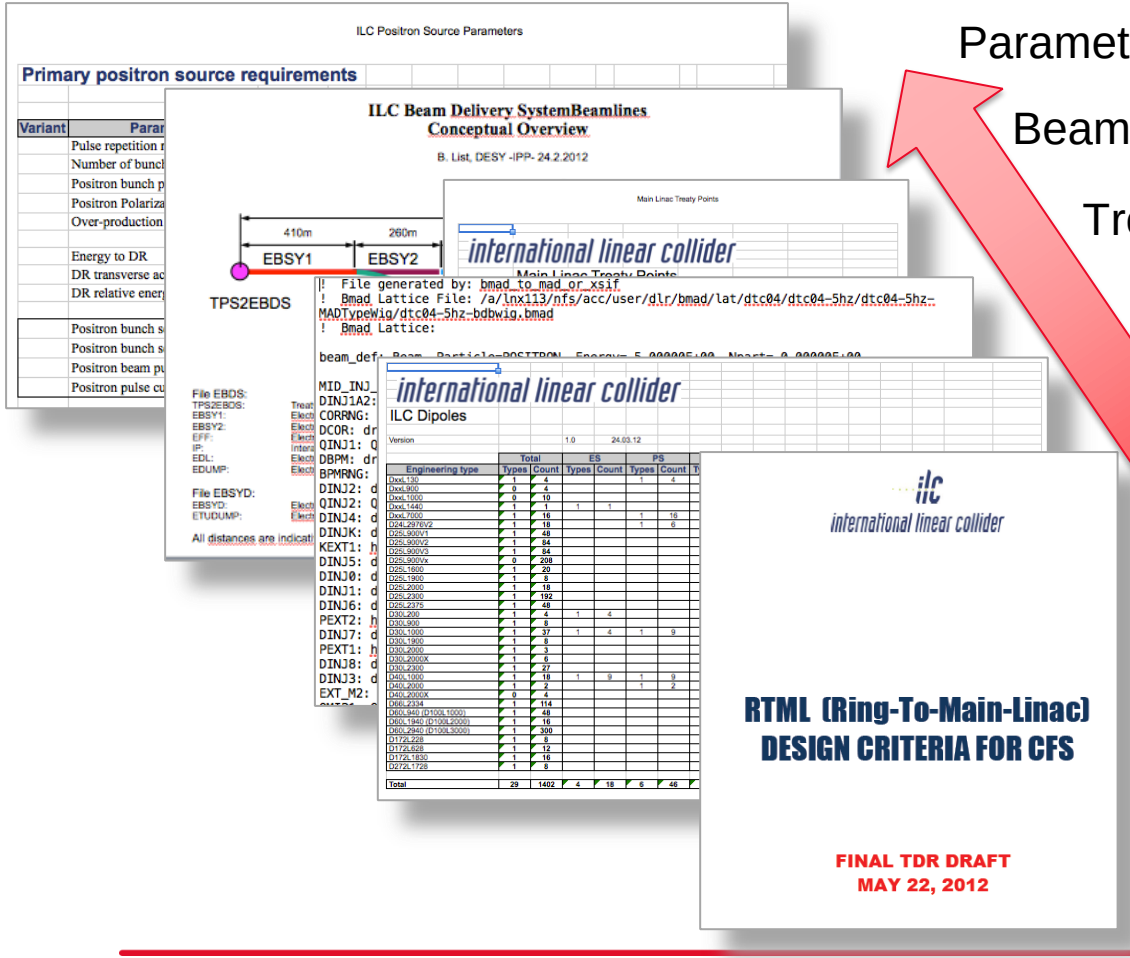
	Global		Electron Source		Positron Source		Damping Ring		RTML		Main Linac			BDS	
WBS	complete				complete		complete	D*0958765							
System Overview	missing		missing		missing		missing		missing			missing		missing	
Parameter List	complete	D*0925325	Draft	D*0973565	complete	D*0943695	complete	D*0960955	Incomplete	D*0967505	Main Linac	Draft	D*0975625	missing	
											Cryogenics, KCS	complete	D*0975575		
											Cryogenics, DKS	complete	D*0991555		
Beamline Description					Incomplete	D*0948135									
Beamline sketch			complete	D*975475	Incomplete	D*0959325			Incomplete	D*0967545				complete	D*0976355
Lattice	KCS		complete	D*0976695	complete	D*0977535	complete	D*0960185	complete	D*0977625	KCS:	complete	D*0977355	Incomplete	D*0972985
	DKS								Incomplete	to be done	DKS	complete	to be done		
Treaty Point Definitions		complete	D*0966225	complete	D*0966225	complete	D*0970685	complete	D*0966225	complete	D*0970685	KCS	complete	D*0970685	complete	D*0970685
									complete	D*0970685	DKS	complete	D*0970685		
Component List	cryomodules	complete	D*0972665												
	magnets	Incomplete	D*0983695												
	cryo parts	Incomplete	D*0991345												
	power suppl	RDR	D*0921195												
Component Specifications	magnets	Incomplete	D*01049445												
	Cryomodule	complete	D*0973345								Cryomodule	complete	D*0973345	Miss	
											Cavity	Draft	D*0973245		
											Modulators	missing			
											Klystrons	missing			
											LPDS	missing			
											HLRF	missing			
Heat Load Calculation					Incomplete	D*0943275									
CFS Criteria			Incomplete	D*0970195	complete	D*0970225	complete	D*0960265	Incomplete	D*0970275	KCS:	Incomplete	D*0970355	Incomplete	D*0970315
											DKS	missing			
Cost Overview	complete	D*0998775	complete	D*0998475	complete	D*0998515	complete	D*0998545	complete	D*0998575		complete	D*0998605	complete	D*0998635

Overall TDD Status

- TDD incomplete in several areas due to lack of personpower during TDP-II
- New ADI team leaders should review baseline documentation available in their area
- Missing and incomplete documents should be provided

- We need a plan how to complete and evolve the design itself and its documentation in the preconstruction phase

Mandatory Documents for Accelerator Systems



Parameter List

Beamline Overview

Treaty Point Definition

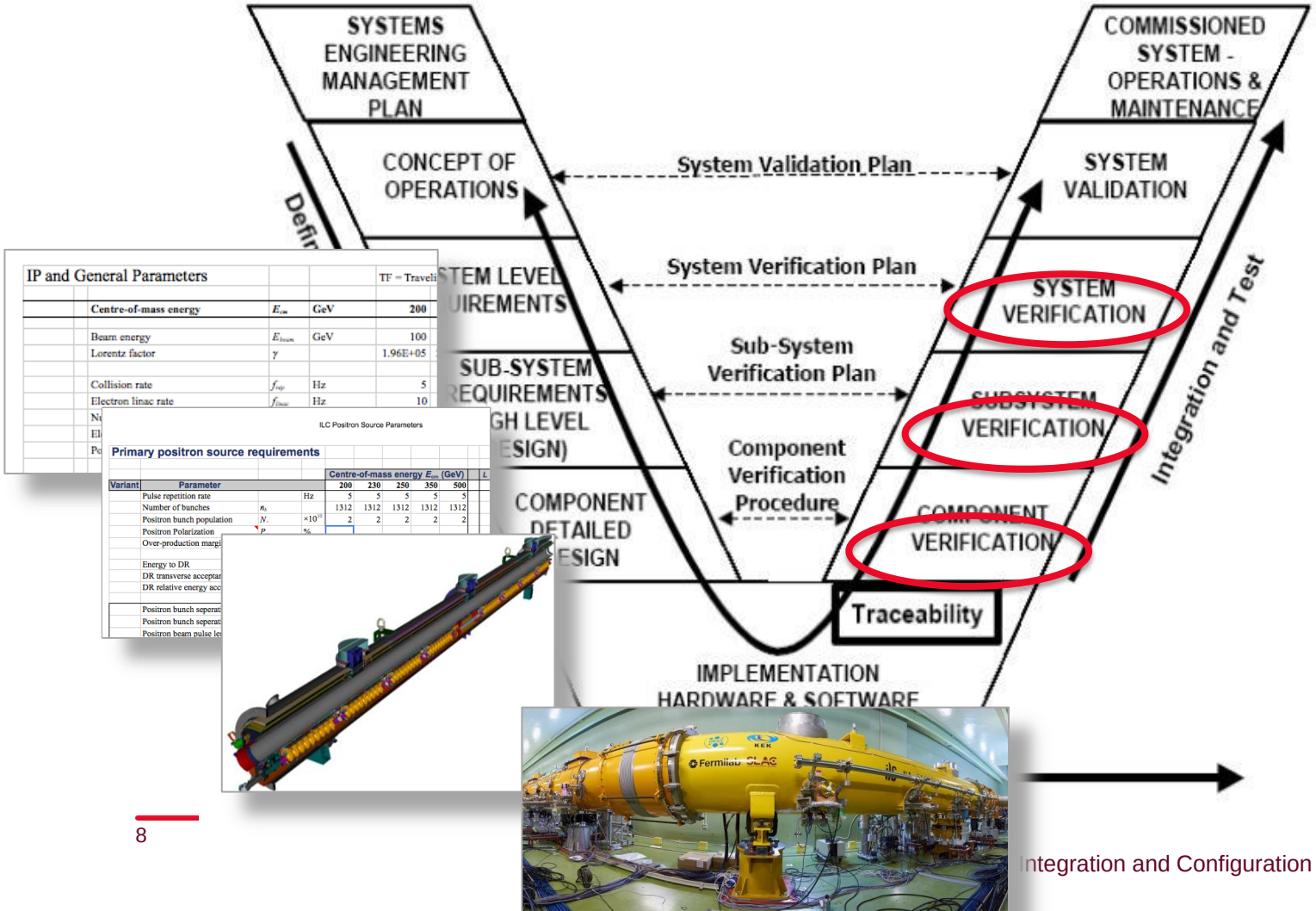
Lattice

Component List

CFS Criteria

Traceability

Documentation in the Design Context



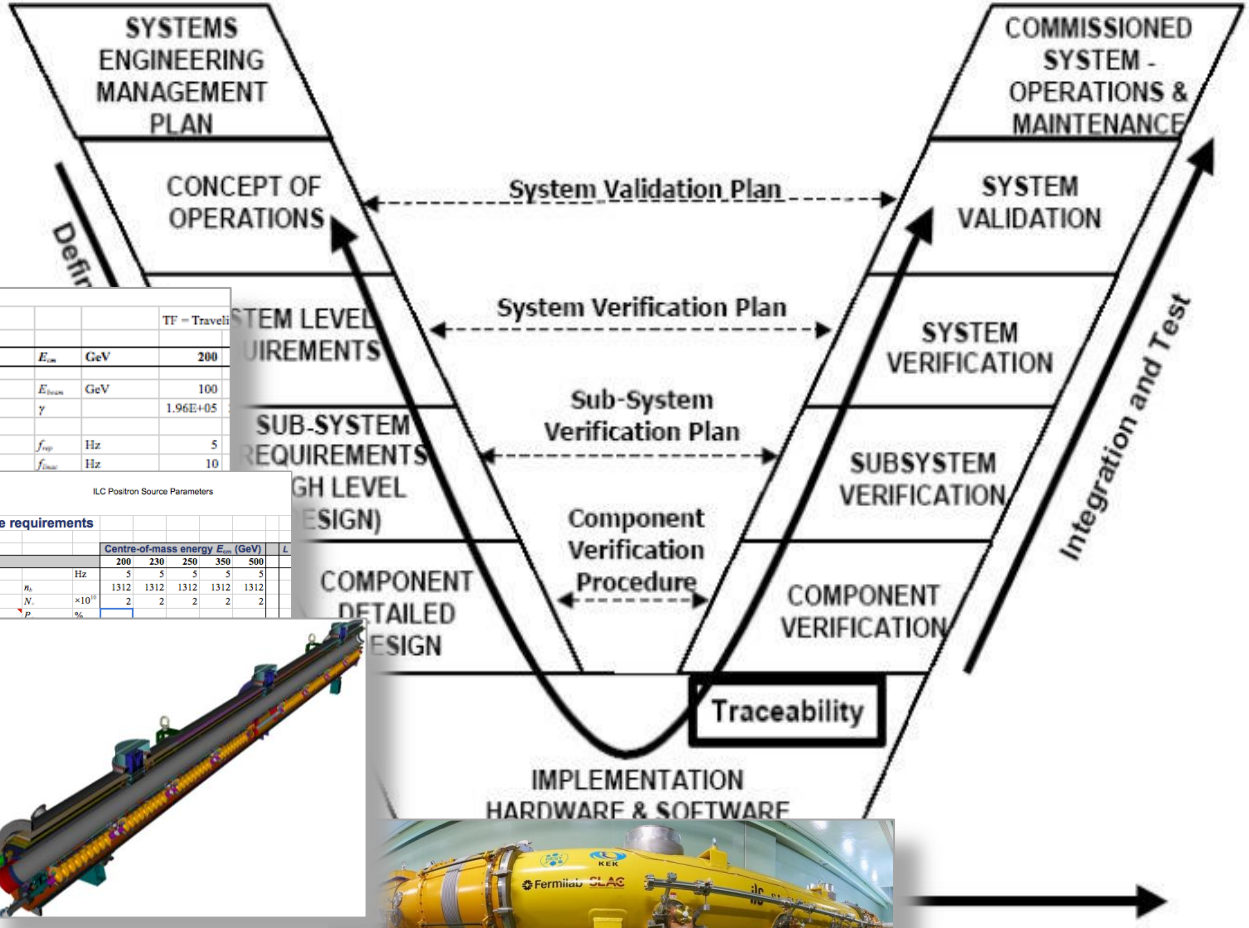
Missing documents

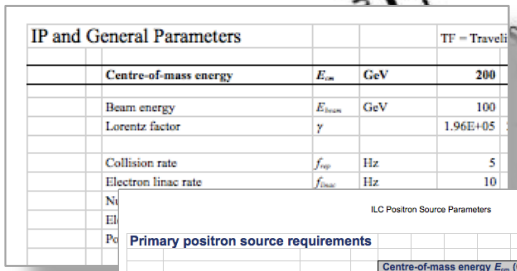
- System overview: what does the system do
- Beam line description: what is the purpose of each beam line section?
- Failure mode analysis: what can go wrong? What happens then? (Diagnosis, collimation, abort, damage to components)
- **Requirements**: what has each beam line to deliver?
- The make a design verifiable, one needs documented requirements.
- We need to ask ourselves: what have we forgotten? How can we be sure we have not forgotten anything (important)?

A form of req's: Extended Parameter Sets

- Current parameter lists focus on typical operation parameters
- Maximum ratings almost nowhere specified
- Cf. any data sheet: operating range - absolute max ratings
- "Risks" are not always "threats", some are opportunities!
- Any "high risk" component has potential to perform better than design - can we make use of that?
- Example: if cavities perform at 35 MeV/m, can the Klystrons power them?
- Distinguish deliberate performance limitations (technological limits, costs) from accidental limits ("nobody told us to plan for that")

From documents to CAD data





IP and General Parameters

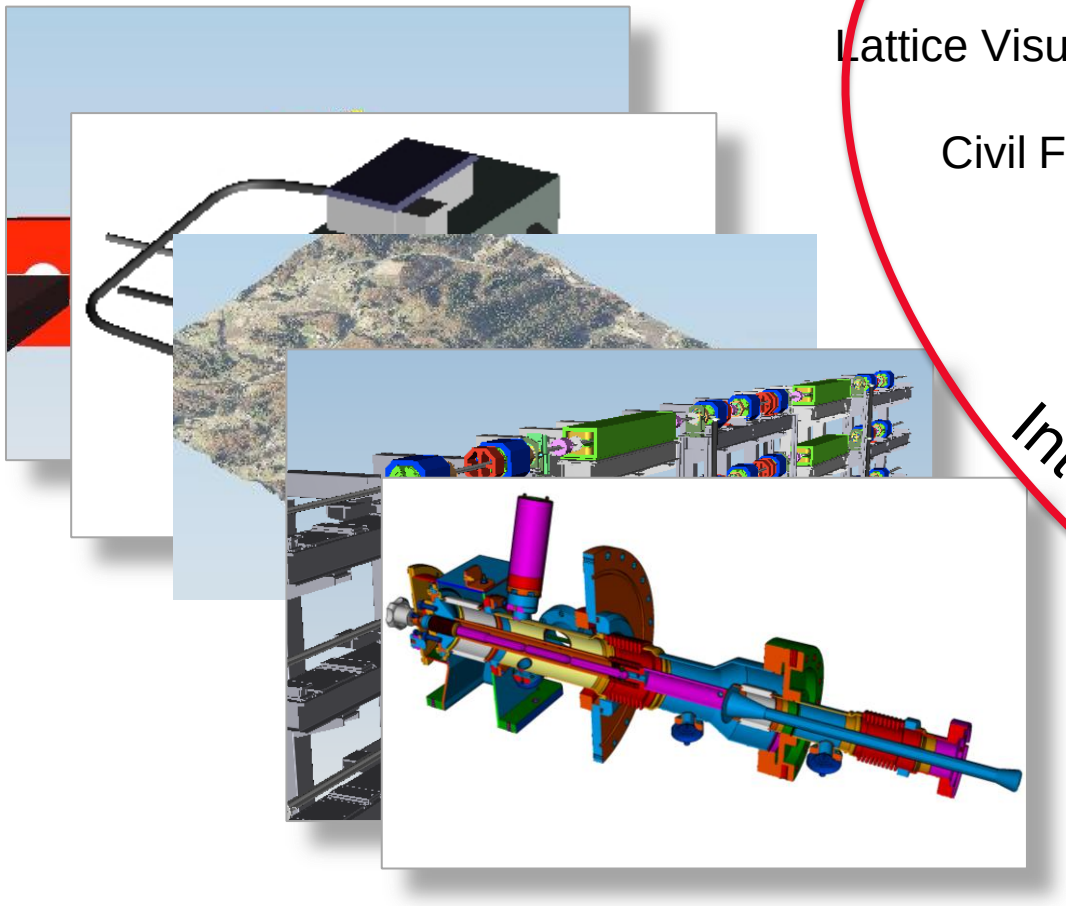
Centre-of-mass energy	E_{cm}	GeV	200
Beam energy	E_{beam}	GeV	100
Lorentz factor	γ		1.96E+05
Collision rate	f_{rep}	Hz	5
Electron linac rate	f_{linac}	Hz	10

ILC Positron Source Parameters

Primary positron source requirements

Variant	Parameter			Centre-of-mass energy E_{cm} (GeV) 200	230	250	350	500
	Pulse repetition rate		Hz	5	5	5	5	5
	Number of bunches	n_b		1312	1312	1312	1312	1312
	Positron bunch population	N_e	$\times 10^{10}$	2	2	2	2	2
	Positron Polarization	P	%					
	Over-production margi							
	Energy to DR							
	DR transverse acceptar							
	DR relative energy acc							
	Positron bunch seperat							
	Positron bunch seperat							
	Positron beam pulse le							

Examples of 3D Models



Lattice Visualization

Civil Facilities

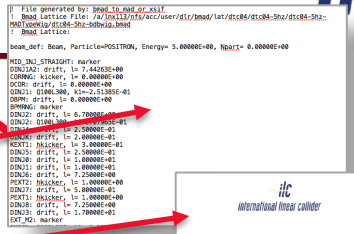
Surface Models

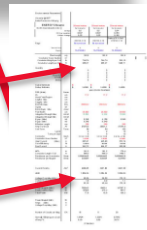
Accelerator Sections

Components

Integrate!

Tie to documents!

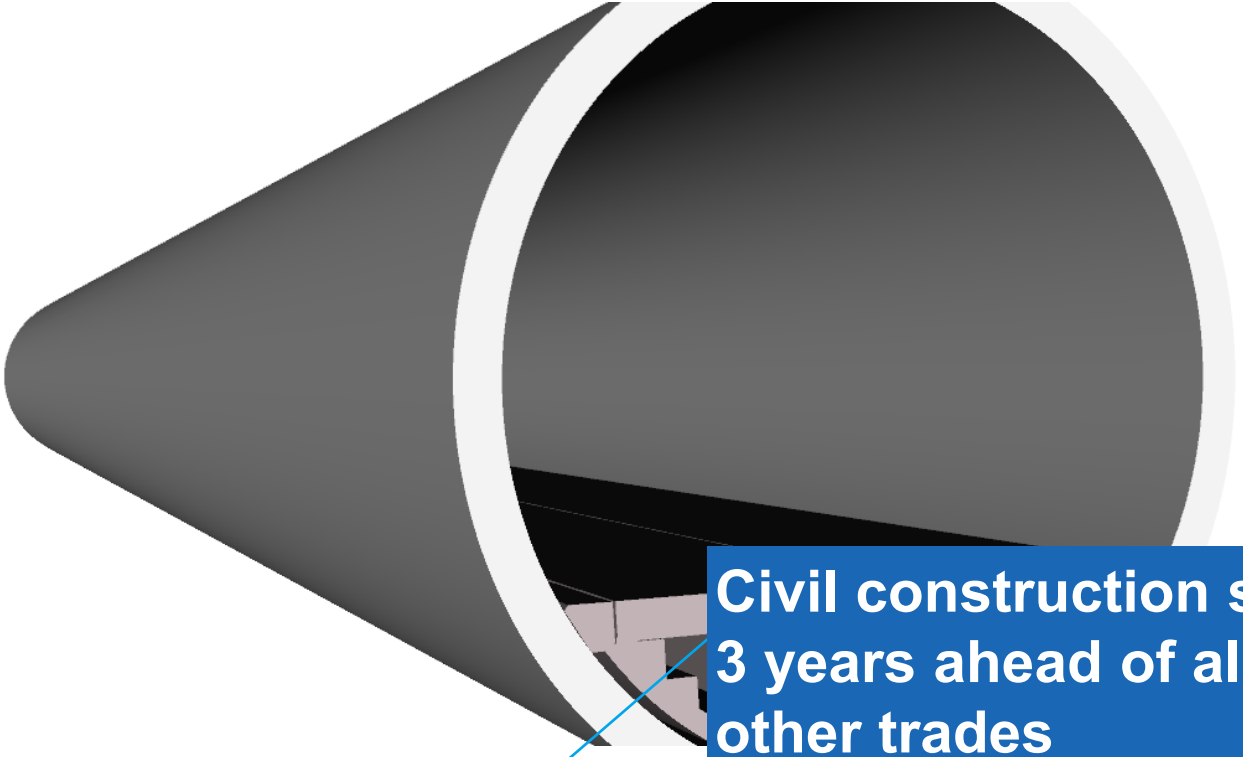




Design Integration

- Design integration is a methodical process in which all design contributions are combined into a complete and consistent design for all stakeholders.
- We have achieved some integration between lattice, tunnels and caverns, and detectors.
- Underground structures are only partially available in 3d for the Japanese site. Complete 3d data would be helpful to review and improve the design.
- We need to make sure that all necessary connections to the surface (access tunnels) are foreseen.

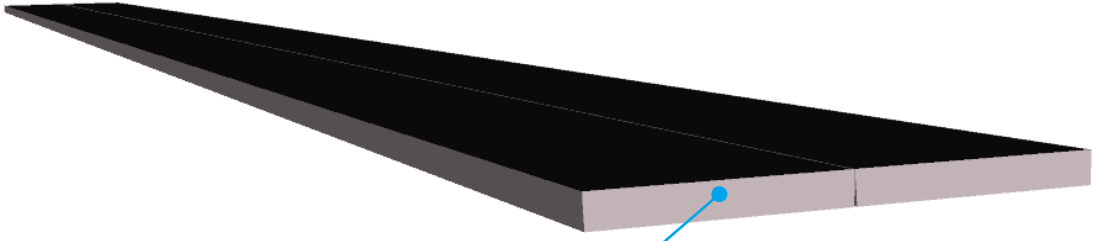
Design Integration at European XFEL



Civil construction starts 3 years ahead of all other trades

Civil Construction (WP31)

Design Integration at European XFEL



Civil Construction (WP31)

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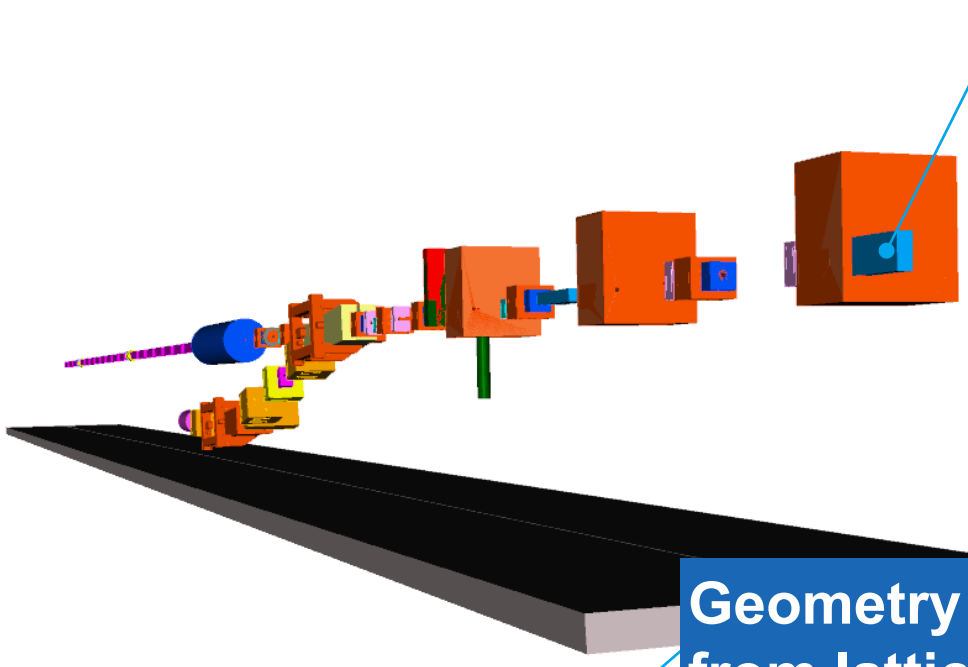
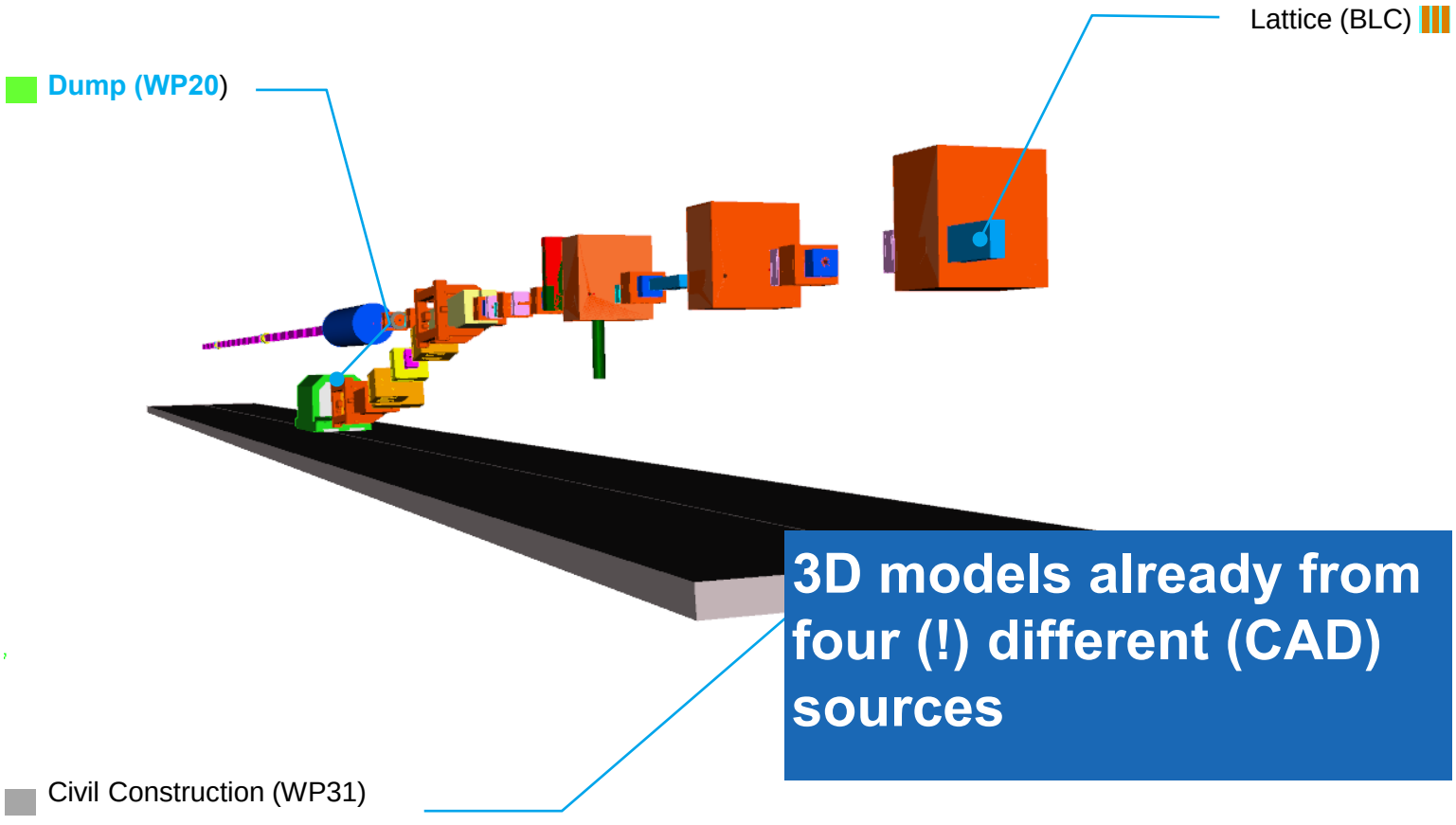


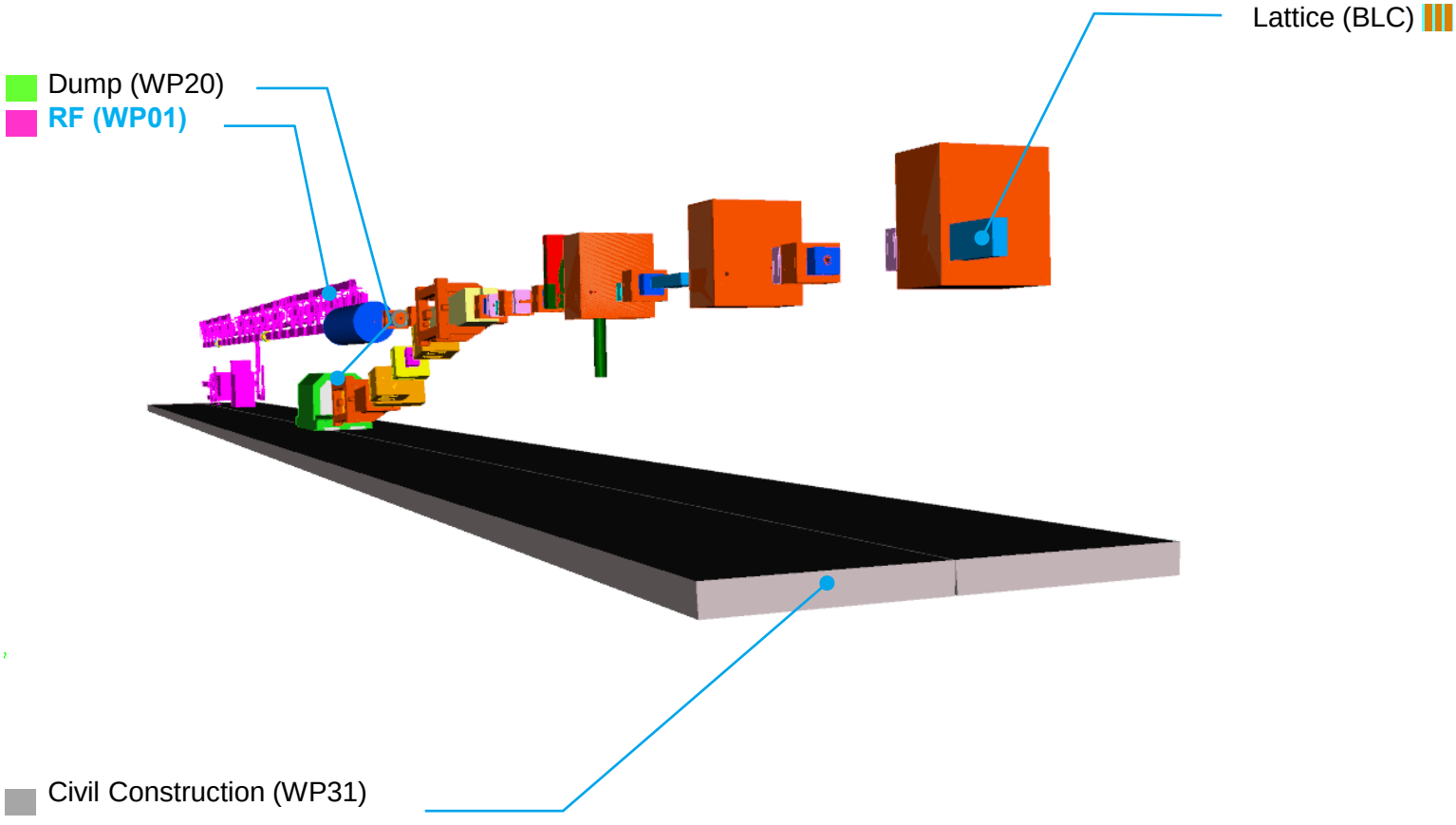
Geometry generated from lattice simulation files

Design Integration at European XFEL



3D models already from four (!) different (CAD) sources

Design Integration at European XFEL



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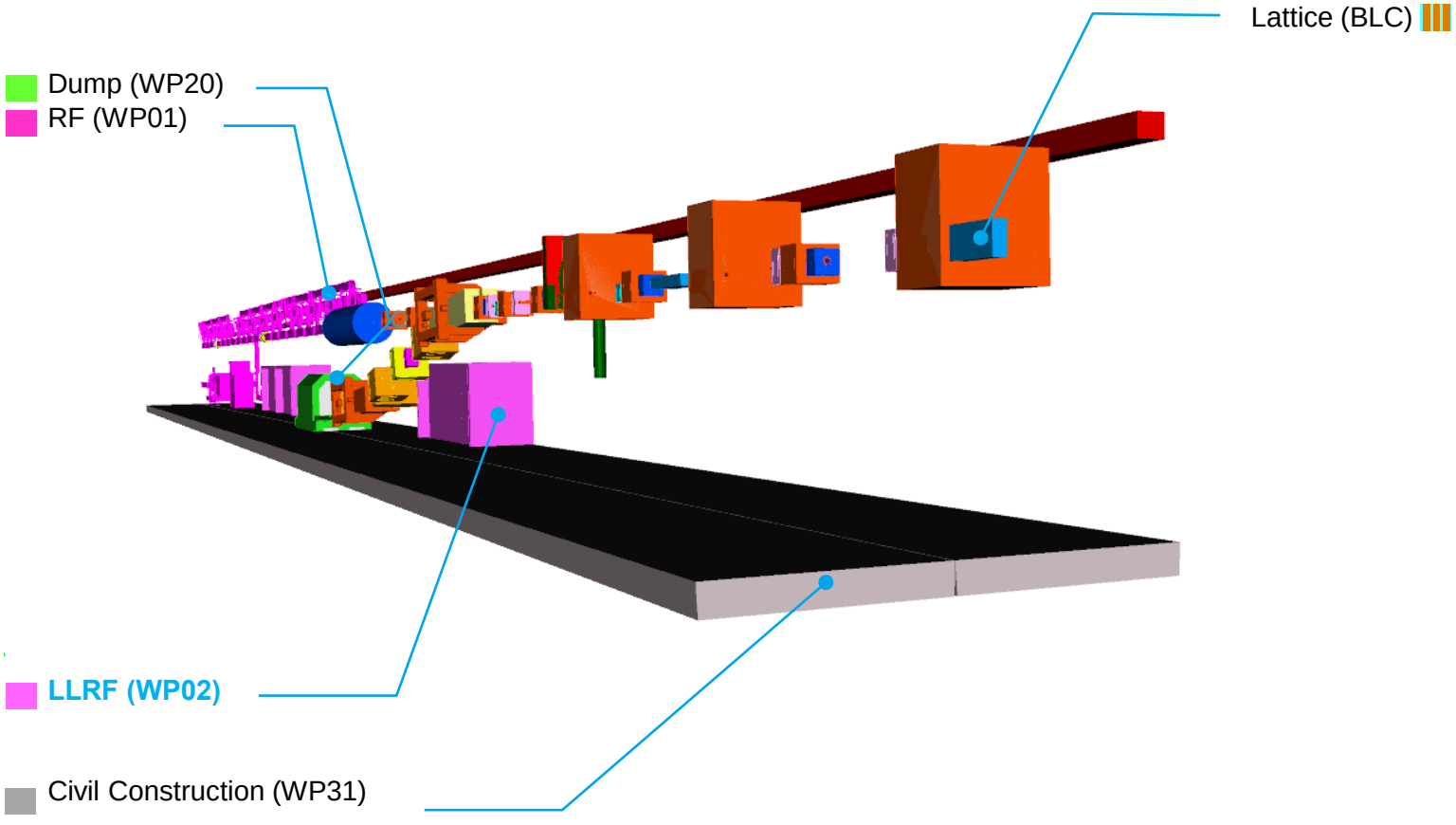

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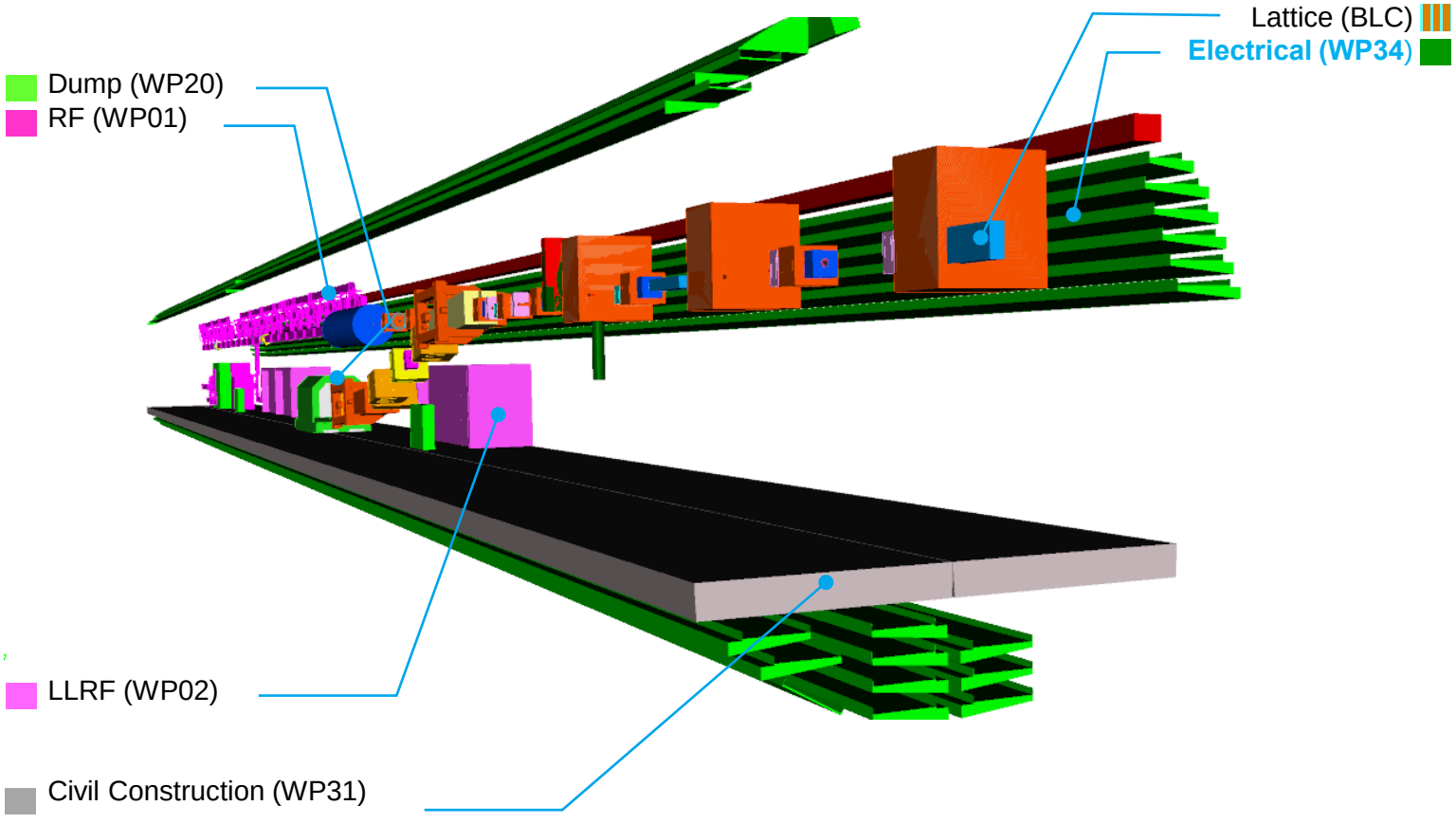

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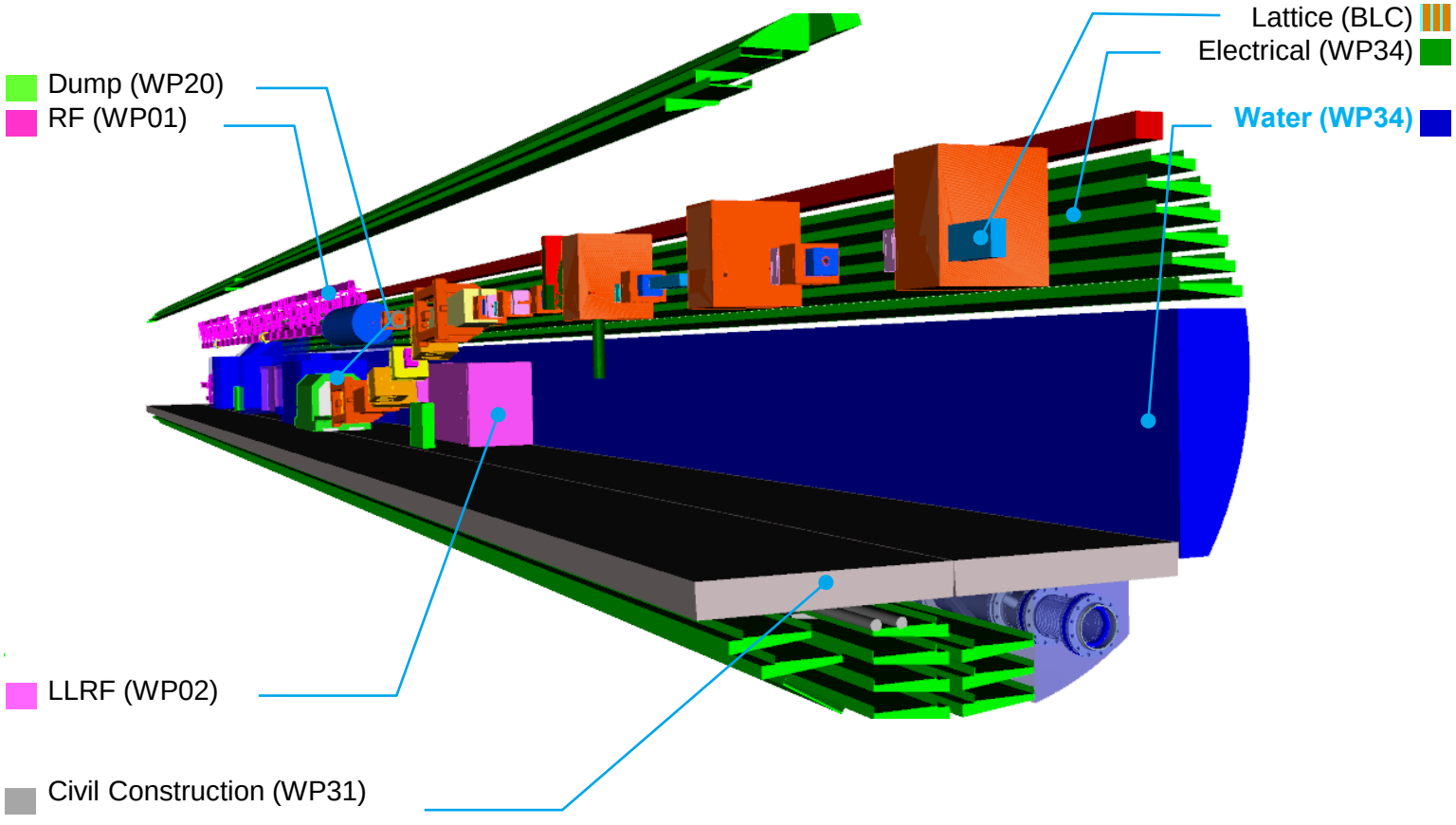

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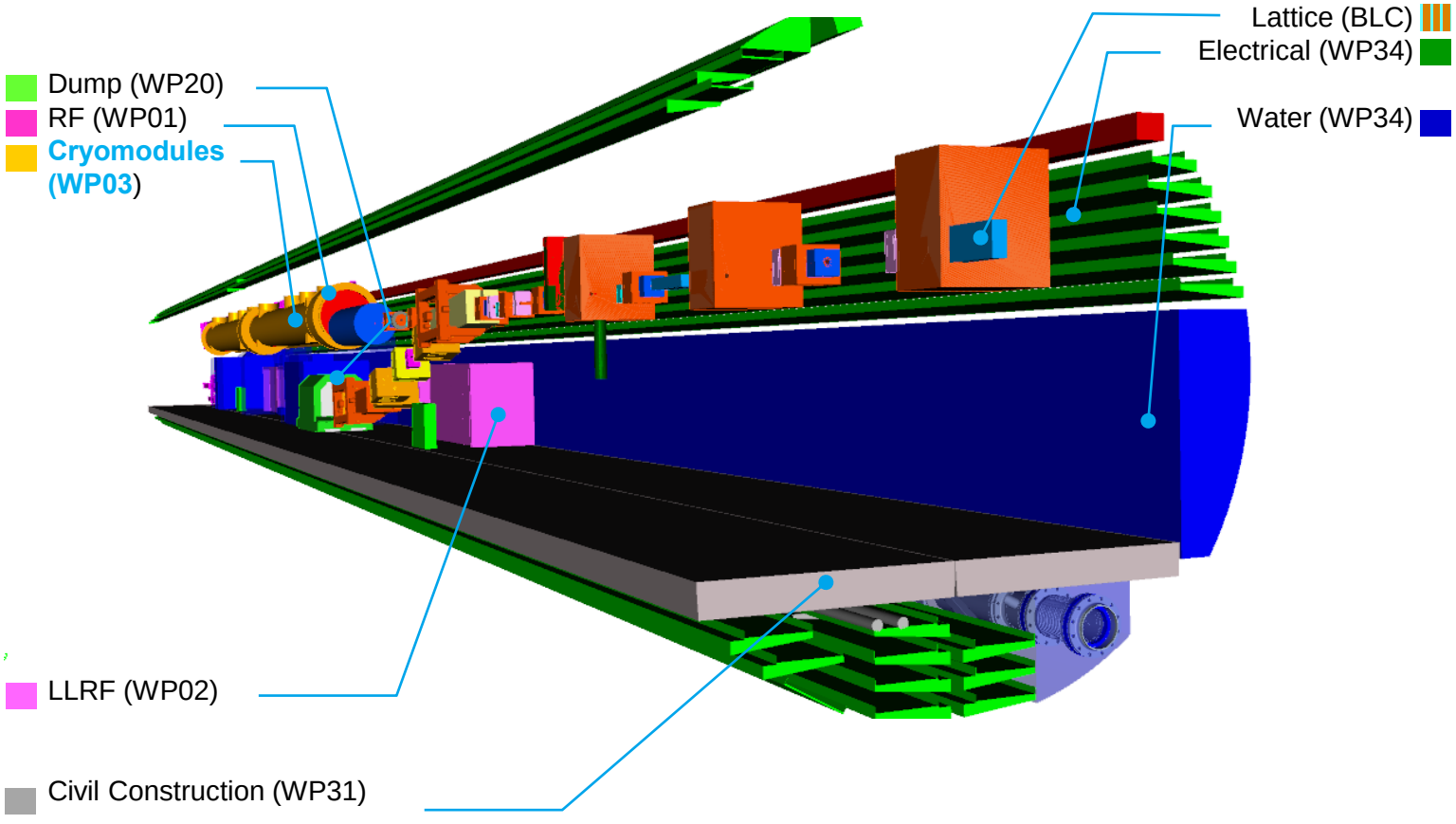

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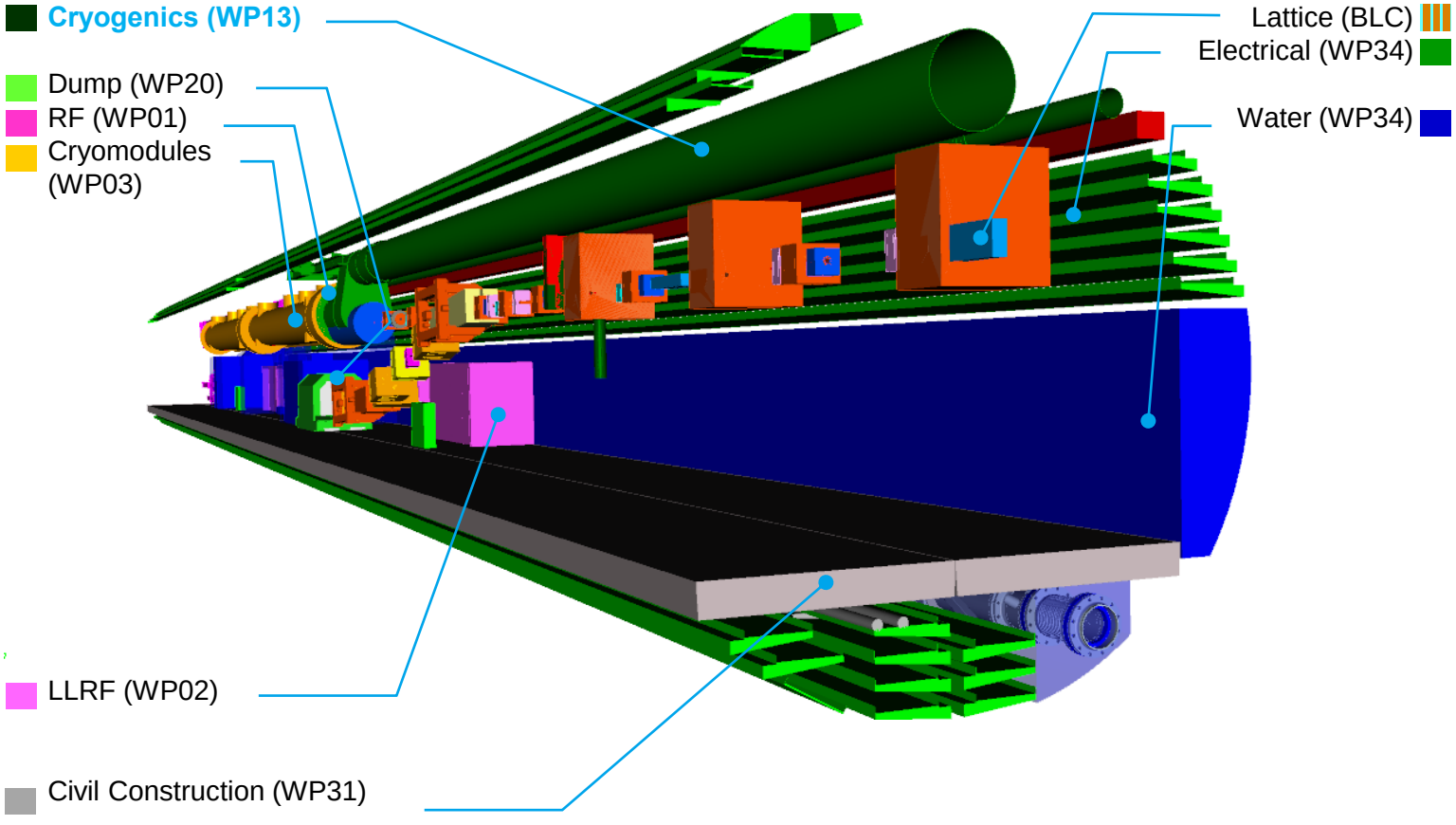

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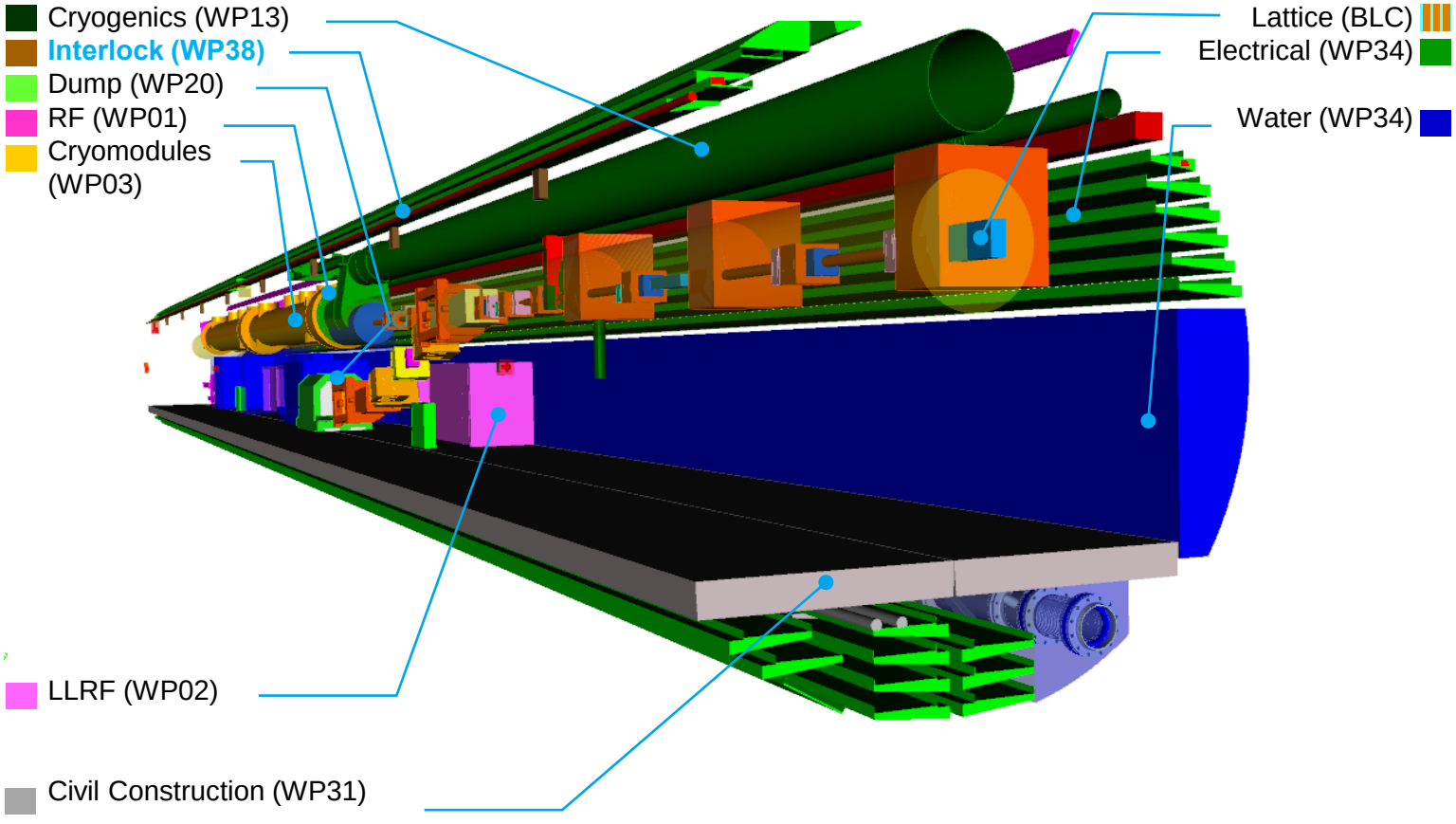

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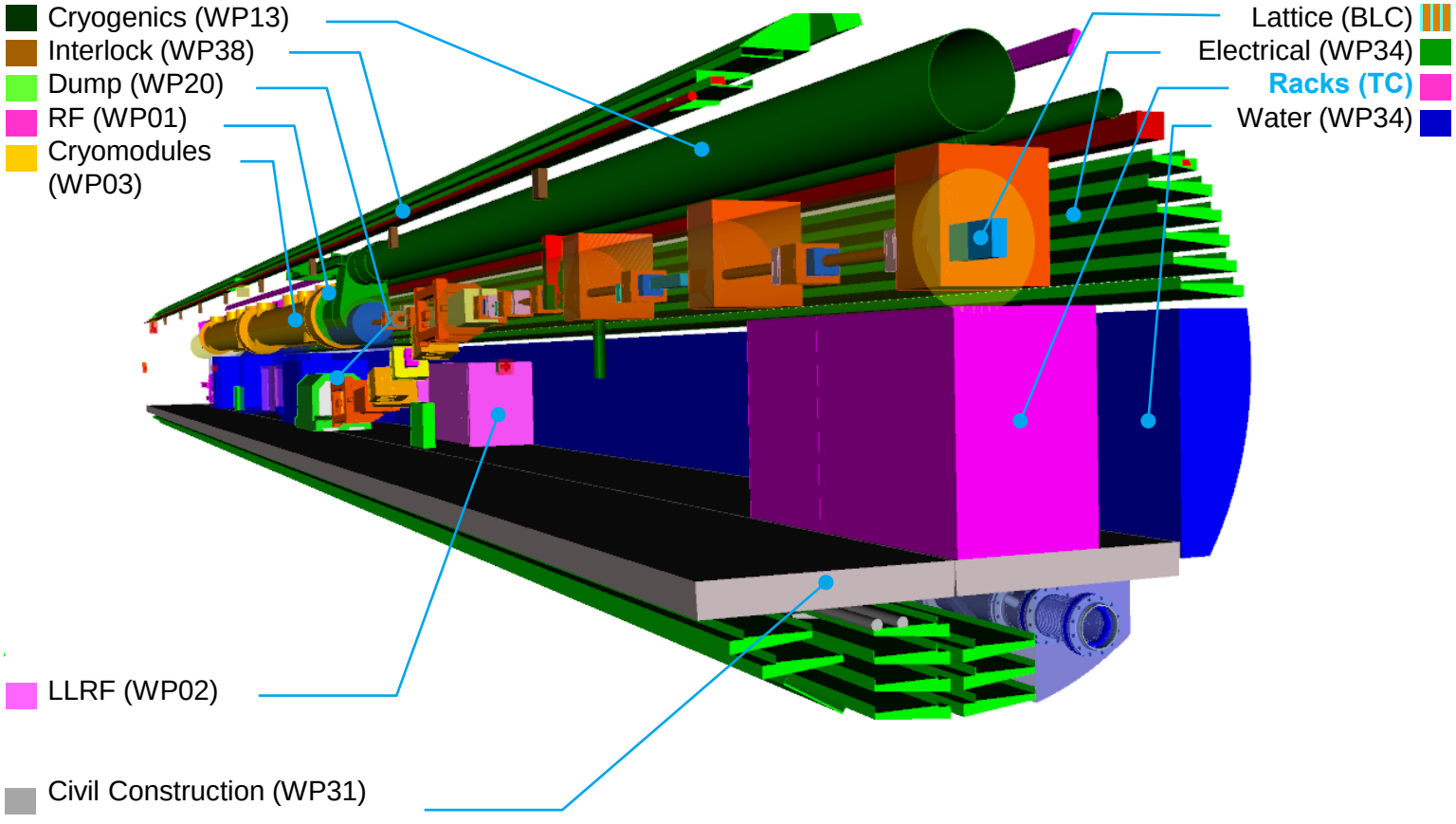

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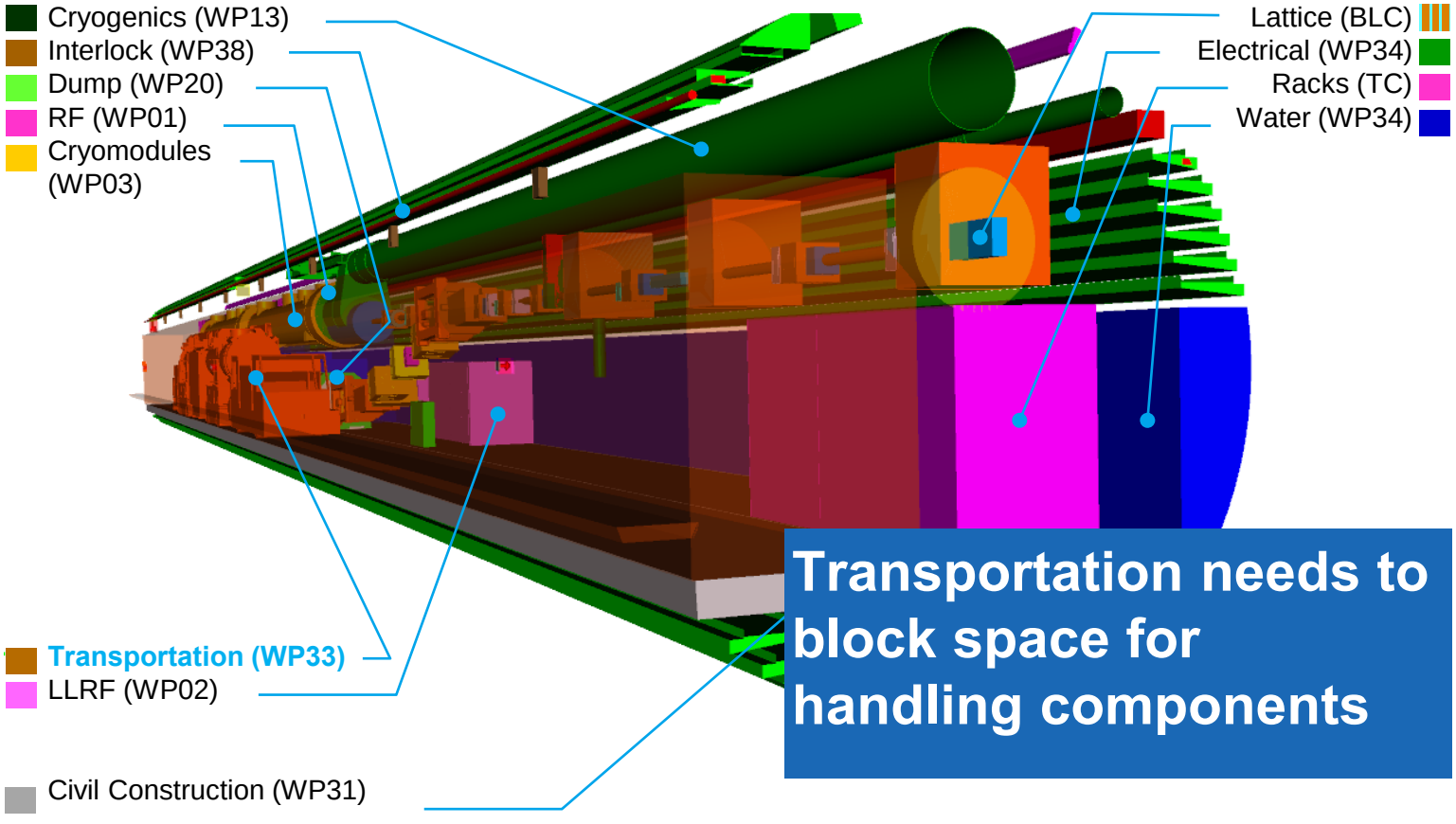
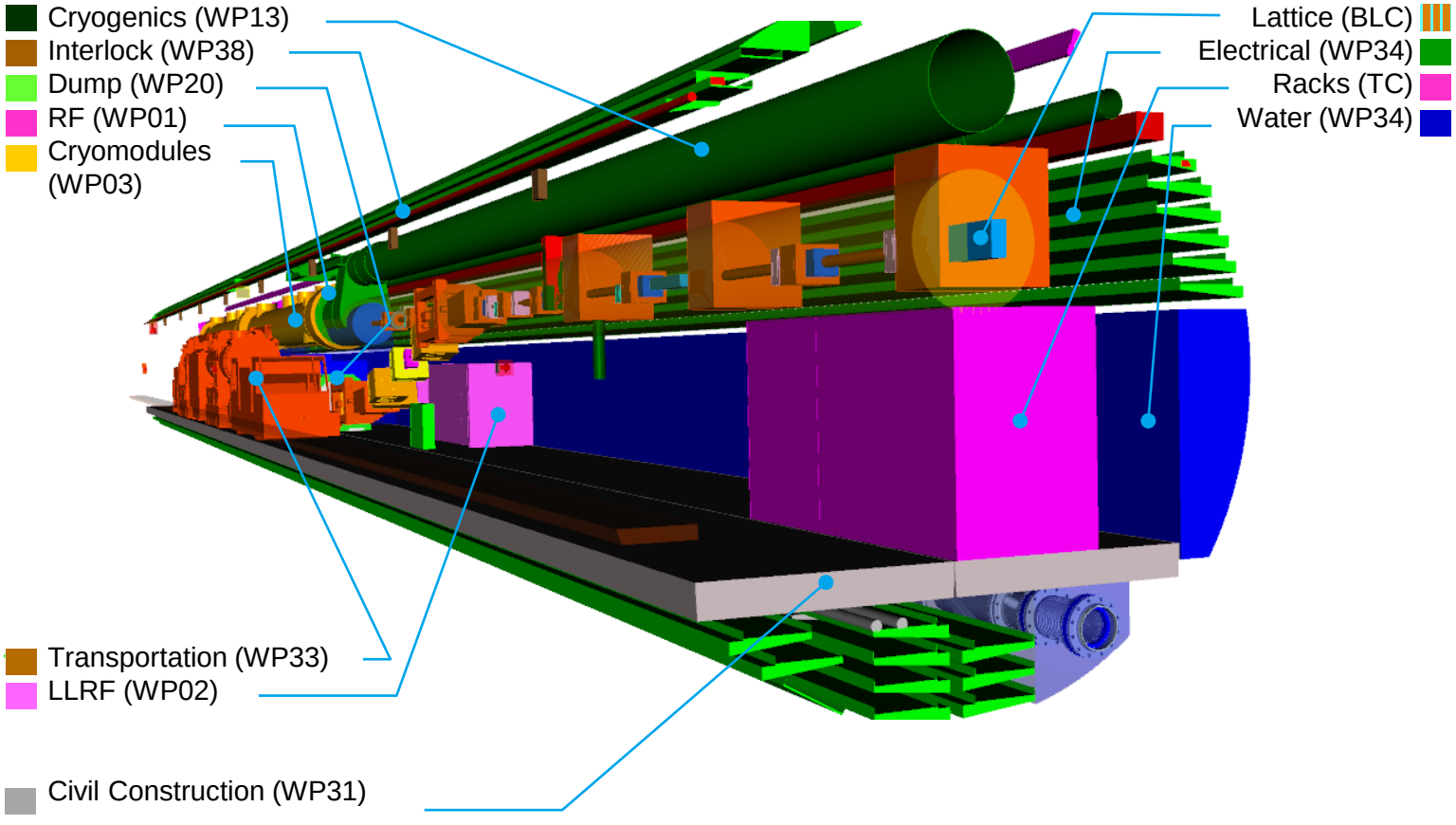


Transportation needs to block space for handling components

Design Integration at European XFEL



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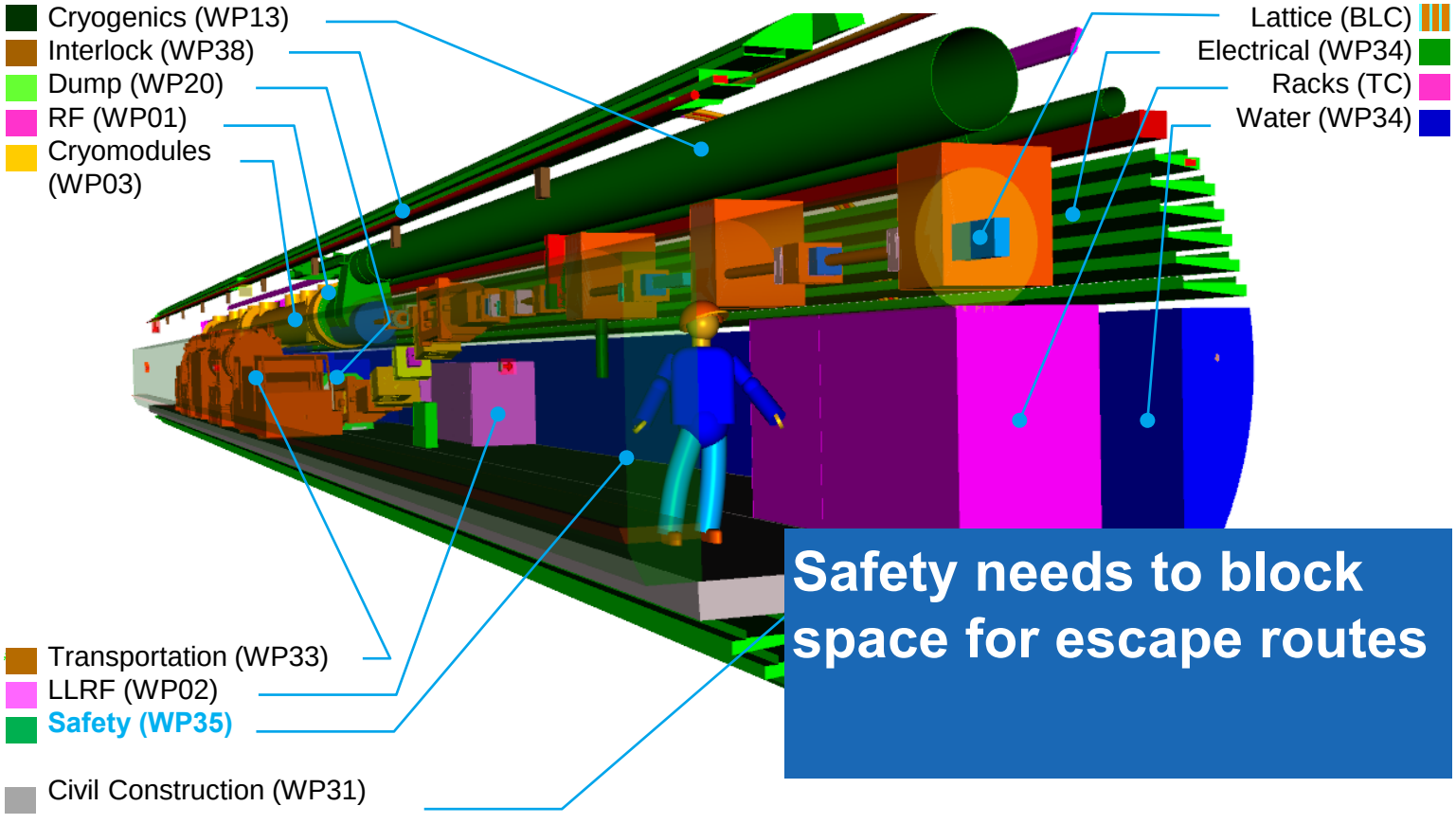

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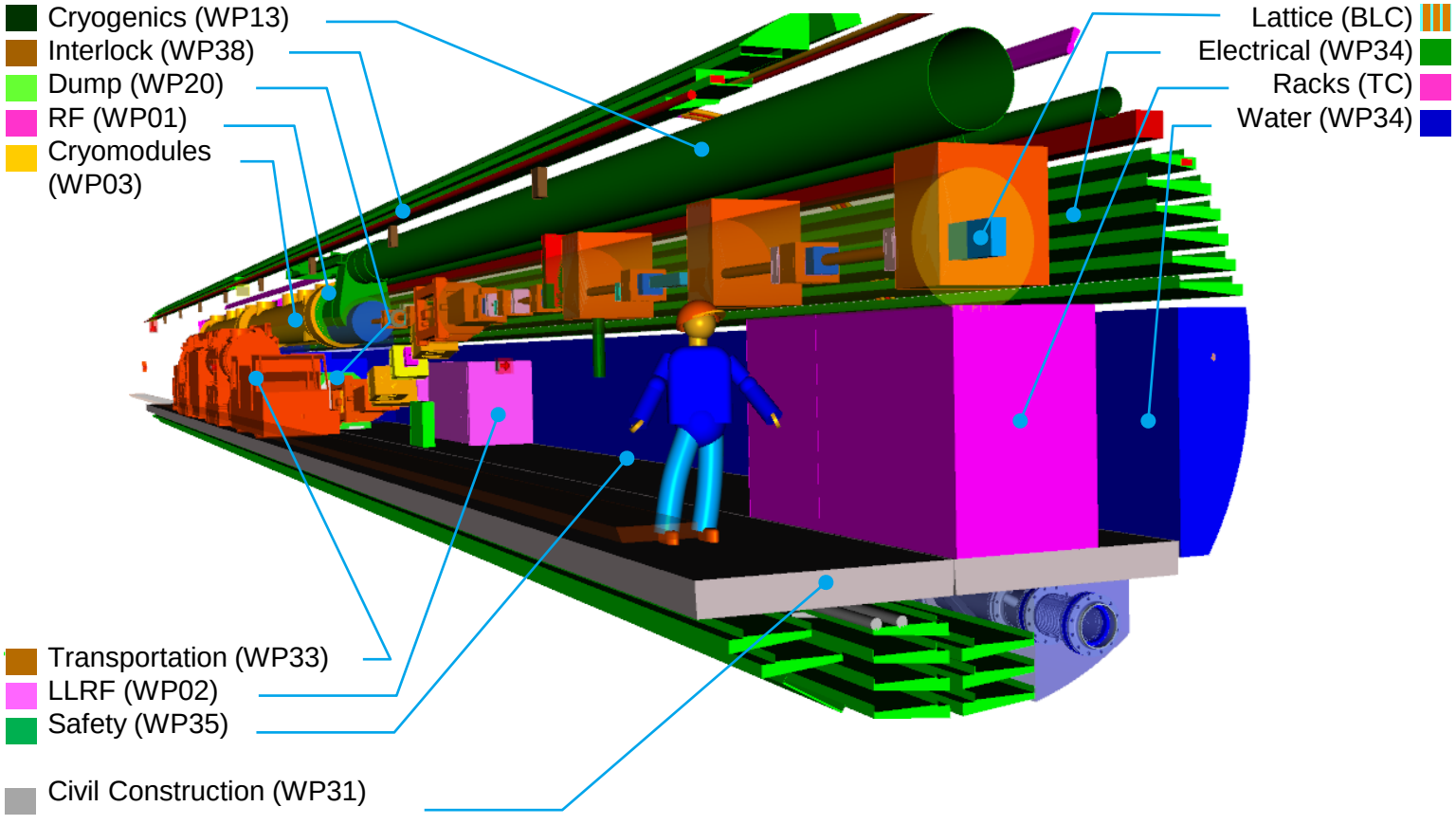

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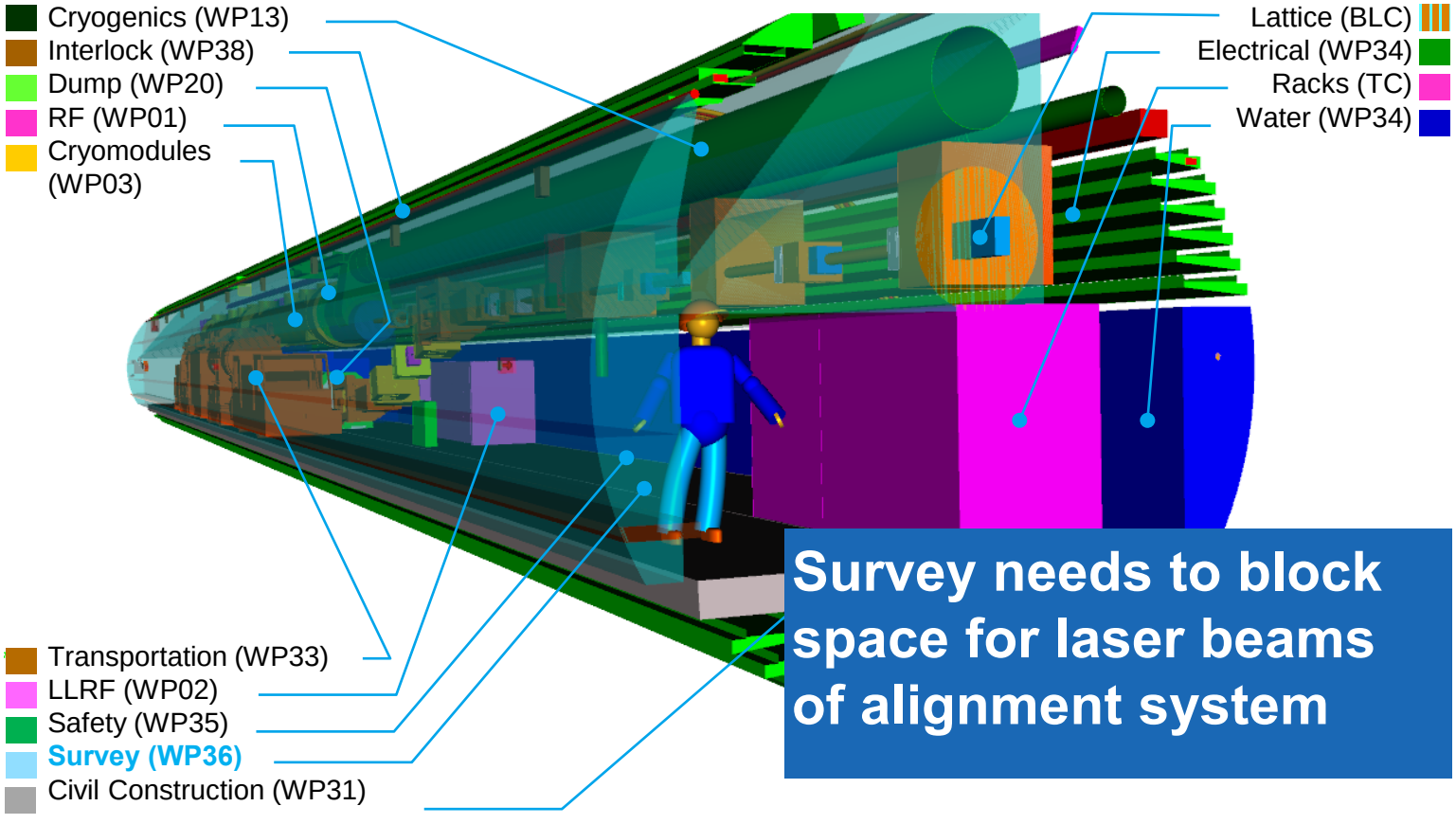
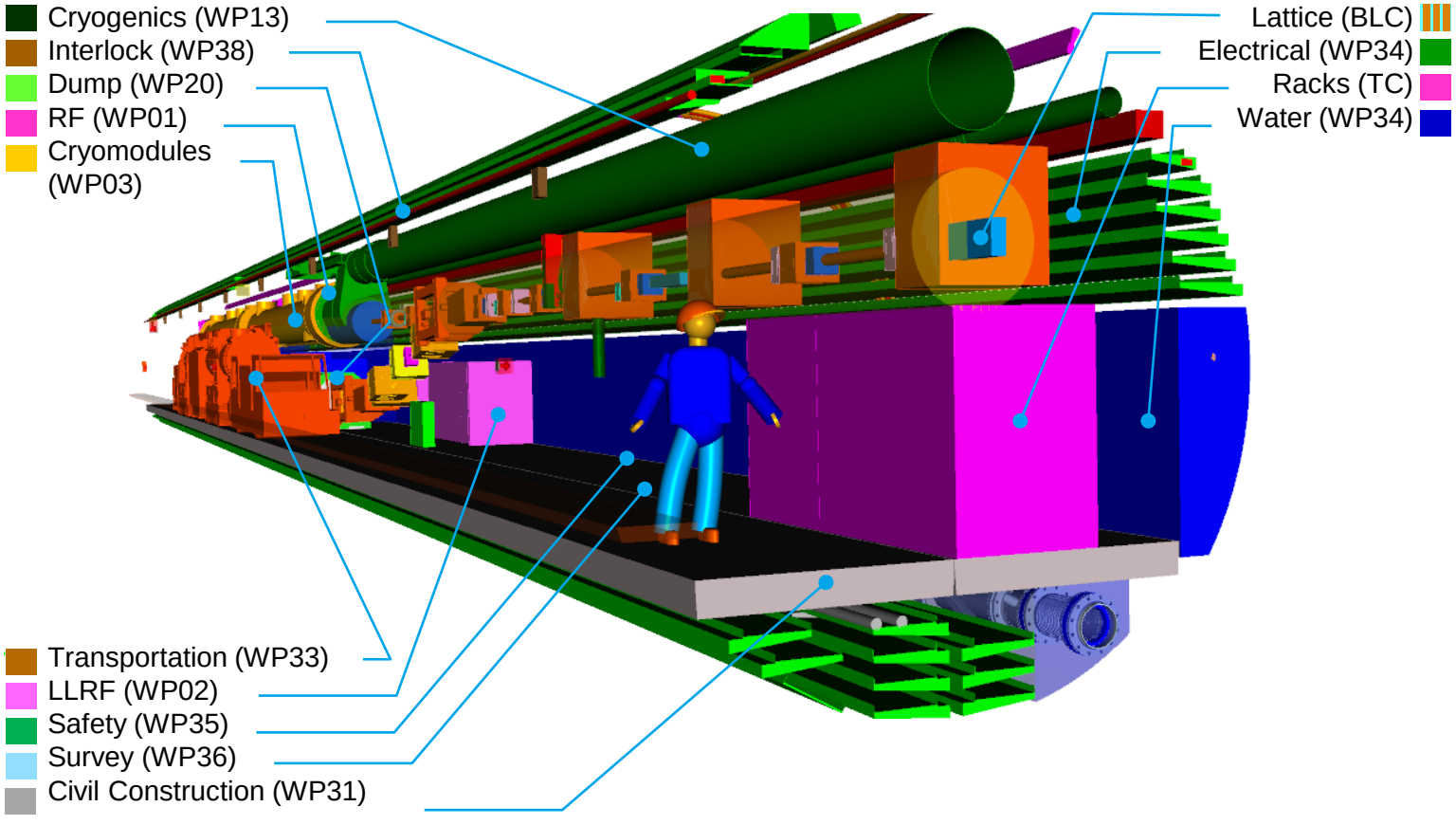


Survey needs to block space for laser beams of alignment system

Design Integration at European XFEL



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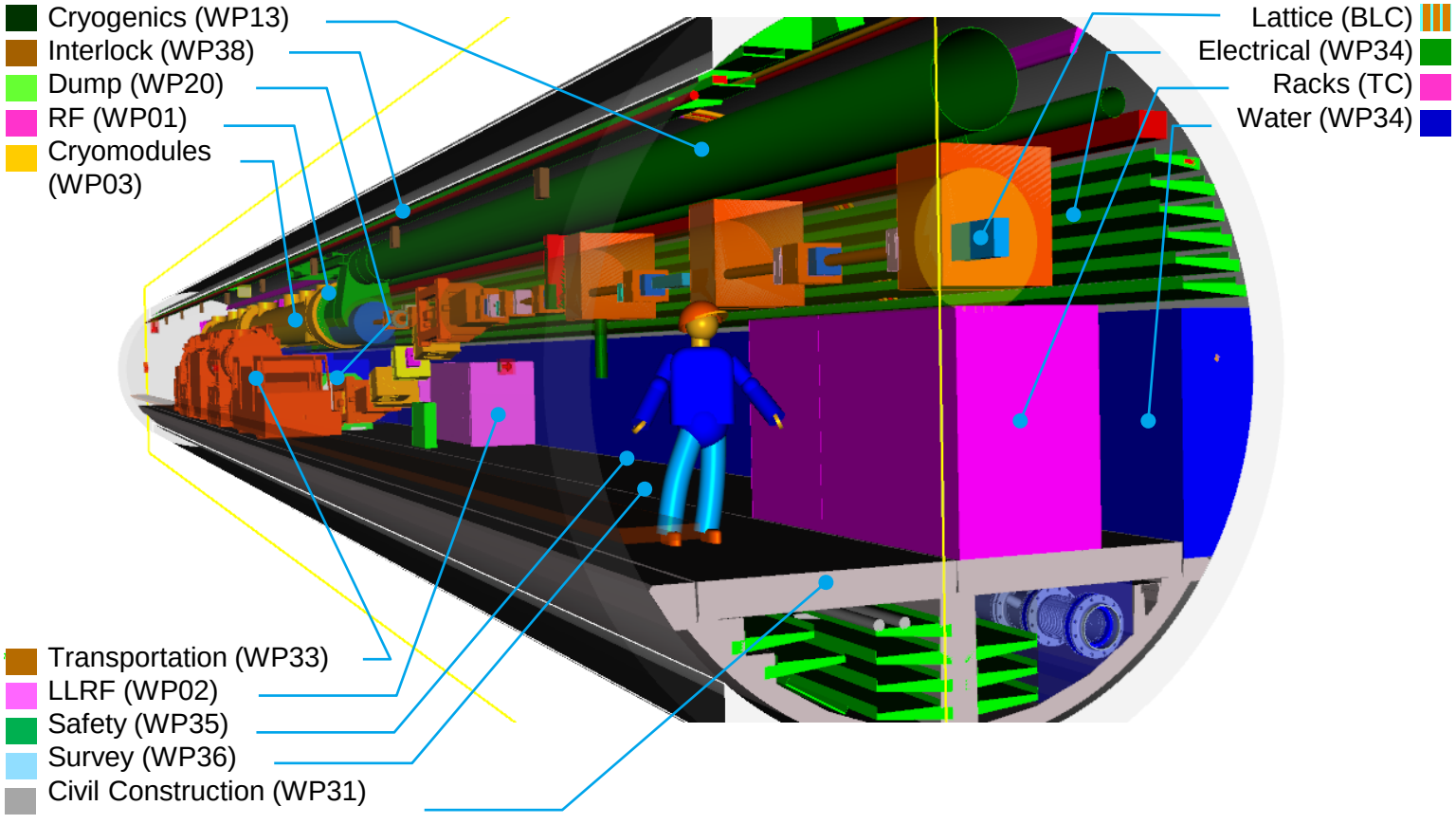

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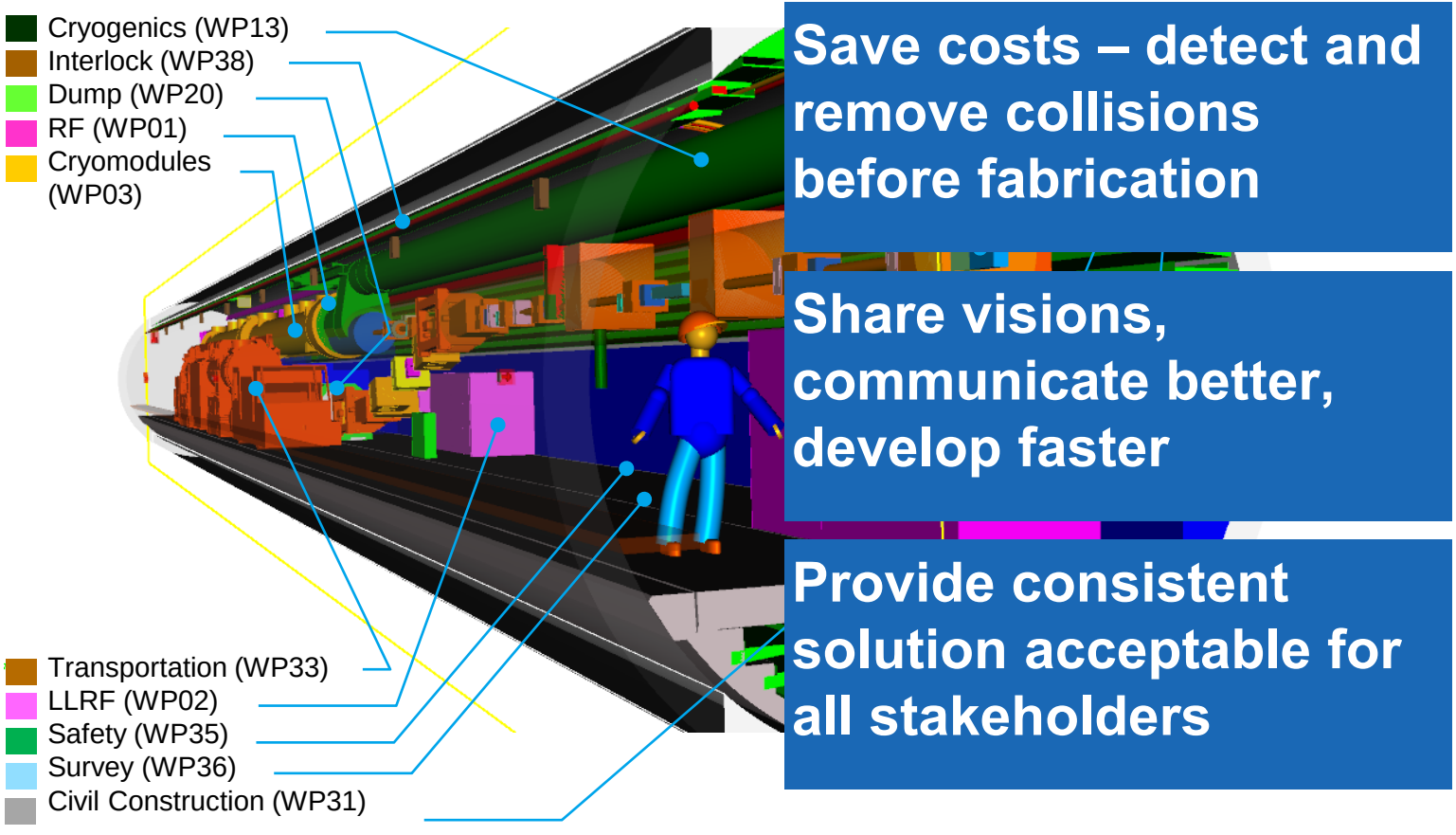
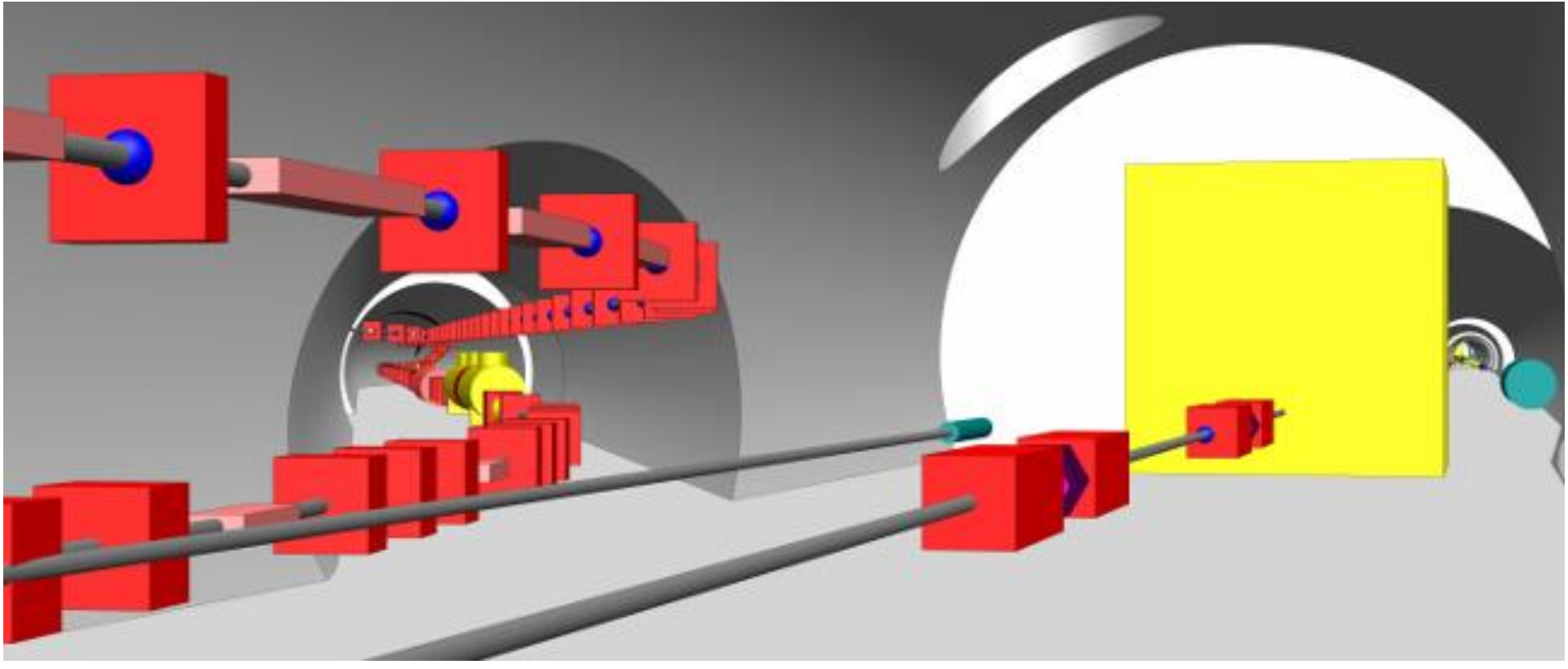


Save costs – detect and remove collisions before fabrication

Share visions, communicate better, develop faster

Provide consistent solution acceptable for all stakeholders

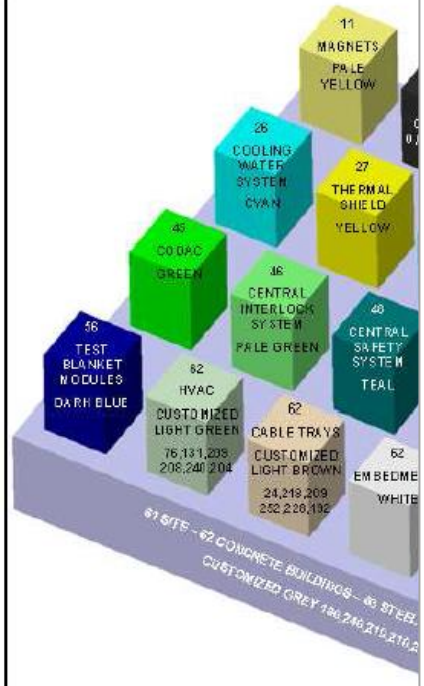
Central Region Integration



Central Region Design Integration

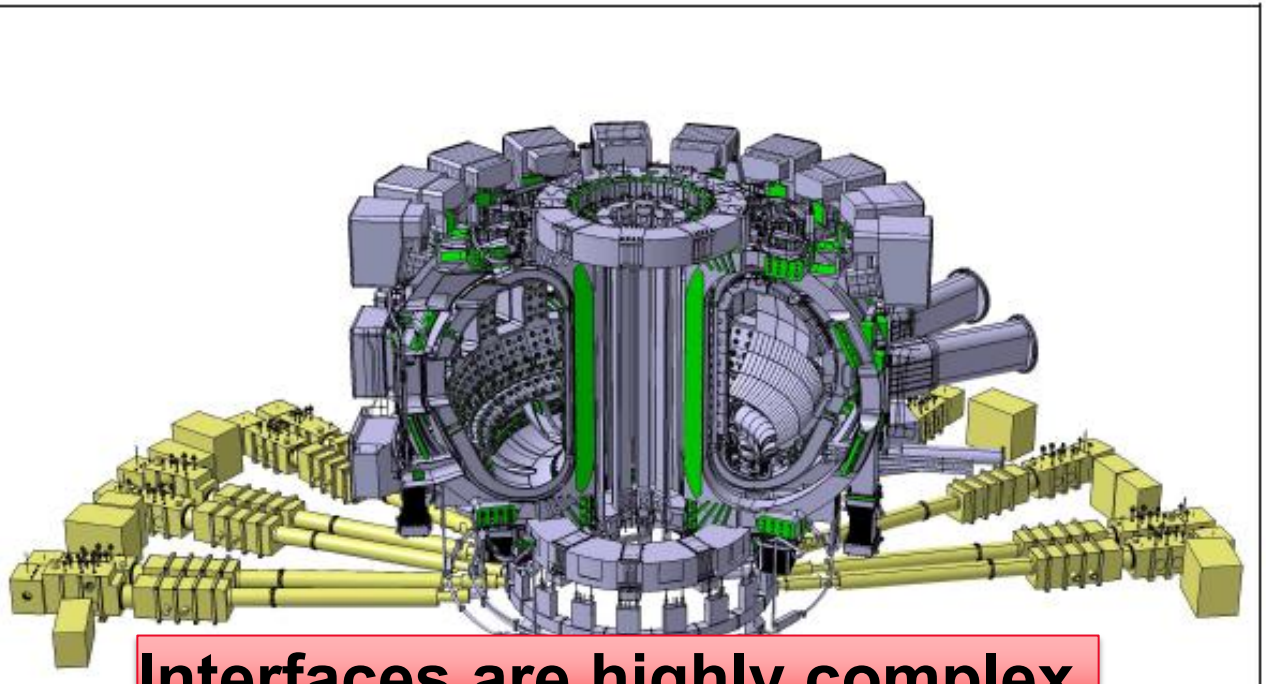
- Central region is highly complex
- Was partially optimized during BTR in oct. 2011 at DESY. Several issues were found. Focus was flat terrain layout. Needs repetition for mountainous site!
- Necessary input: list of equipment with special requirements from each system: sources, RTML, BDS (cryogenics, laser systems, dumps, radiation protection in hot regions...)
- **D**efinition of baseline ambiguous. Tunnel configuration (Kamaboko or twin tunnels) different between drawings and some 3d models - consolidate in context of ILC-CR-0003

Design Integration at ITER



I. Kühn, SOFE (2009) 5226

Figure 1. C

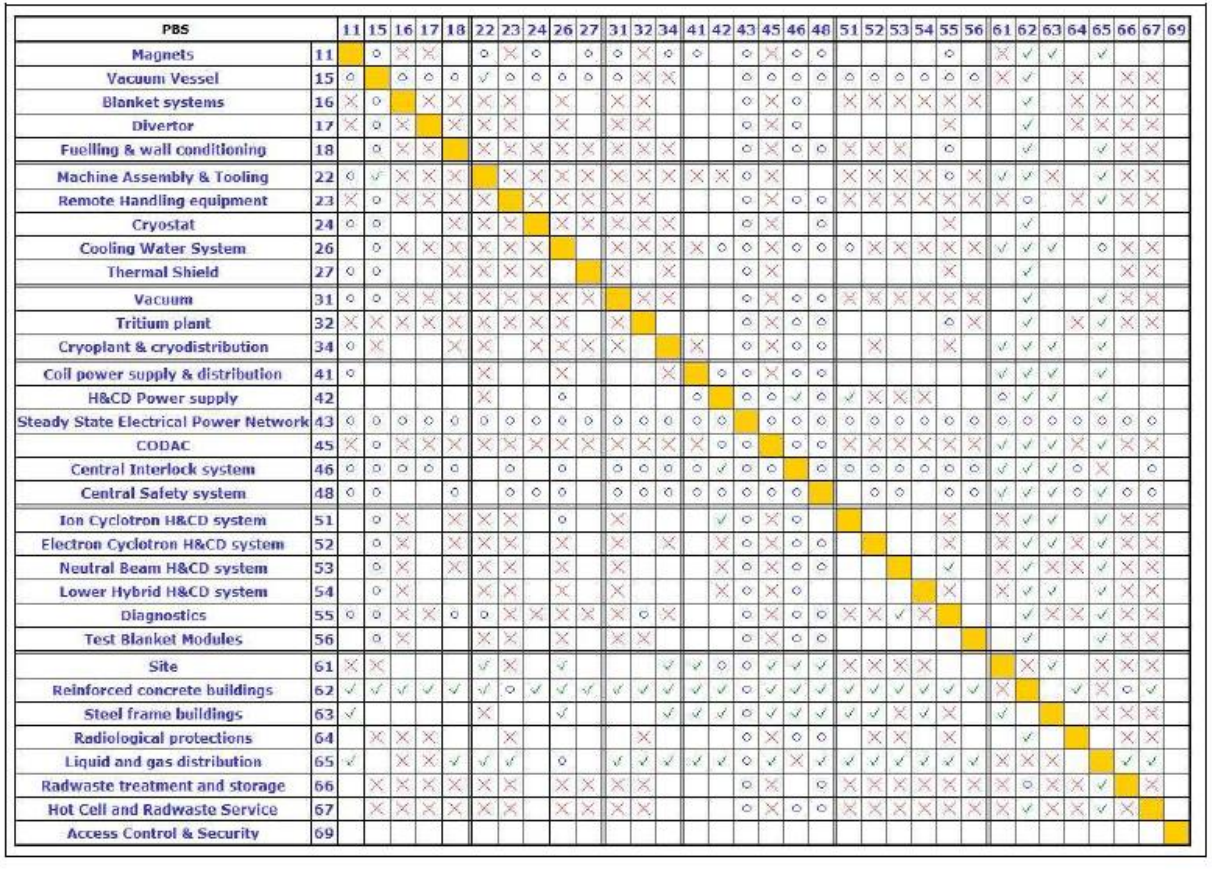


Interfaces are highly complex

I. Kühn, SOFE (2009) 5226475.

Figure 2. CMM of the magnet system and Vacuum Vessel

ITER Interface Control Documents



PBS		11	15	16	17	18	22	23	24	26	27	31	32	34	41	42	43	45	46	48	51	52	53	54	55	56	61	62	63	64	65	66	67	69
Magnets	11		○	×	×		○	×	○		○	○	×	○	○		○	×	○	○					○		×	✓	✓		✓			
Vacuum Vessel	15	○		○	○	○	✓	○	○	○	○	○	×	×			○	○	○	○	○	○	○	○	○	○	×	✓		×		×	×	
Blanket systems	16	×	○		×	×	×	×		×		×	×				○	×	○		×	×	×	×	×	×		✓		×	×	×	×	
Divertor	17	×	○	×		×	×	×		×		×	×				○	×	○						×			✓		×	×	×	×	
Fuelling & wall conditioning	18		○	×	×		×	×	×	×	×	×	×	×			○	×	○	○	×	×	×		○			✓			✓	×	×	
Machine Assembly & Tooling	22	○	✓	×	×	×		×	×	×	×	×	×	×	×	×	○	×			×	×	×	×	○	×	✓	✓	×		✓	×	×	
Remote Handling equipment	23	×	○	×	×	×	×		×	×	×	×	×				○	×	○	○	×	×	×	×	×	×	×	○		×	✓	×	×	
Cryostat	24	○	○			×	×	×		×	×	×	×	×			○	×		○					×			✓						
Cooling Water System	26		○	×	×	×	×	×	×			×	×	×	×	○	○	×	○	○	○	×	×	×	×	×	✓	✓	✓		○	×	×	
Thermal Shield	27	○	○			×	×	×	×			×		×			○	×							×			✓				×	×	
Vacuum	31	○	○	×	×	×	×	×	×	×	×		×	×			○	×	○	○	×	×	×	×	×	×		✓		✓	×	×	
Tritium plant	32	×	×	×	×	×	×	×	×	×		×					○	×	○	○					○	×		✓		×	✓	×	×	
Cryoplant & cryodistribution	34	○	×			×	×		×	×	×	×			×		○	×	○	○		×			×		✓	✓	✓		✓			
Coil power supply & distribution	41	○					×			×				×		○	○	×	○	○							✓	✓	✓		✓			
H&CD Power supply	42						×			○					○		○	○	✓	○	✓	×	×	×			○	✓	✓		✓			
Steady State Electrical Power Network	43	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
CODAC	45	×	○	×	×	×	×	×	×	×	×	×	×	×	×	○	○		○	○	×	×	×	×	×	×	✓	✓	✓	×	✓	×	×	
Central Interlock system	46	○	○	○	○	○		○		○		○	○	○	○	✓	○	○		○	○	○	○	○	○	○	✓	✓	✓	○	×		○	
Central Safety system	48	○	○			○		○	○	○		○	○	○	○	○	○	○	○			○	○		○	○	✓	✓	✓	○	✓	○	○	
Ion Cyclotron H&CD system	51		○	×		×	×	×		○		×				✓	○	×	○						×		×	✓	✓		✓	×	×	
Electron Cyclotron H&CD system	52		○	×		×	×	×		×		×		×		×	○	×	○	○					×		×	✓	✓	×	✓	×	×	
Neutral Beam H&CD system	53		○	×		×	×	×		×		×				×	○	×	○	○					✓		×	✓	×	×	✓	×	×	
Lower Hybrid H&CD system	54		○	×			×	×		×		×				×	○	×	○						×		×	✓	✓		✓	×	×	
Diagnostics	55	○	○	×	×	○	○	×	×	×	×	×	○	×			○	×	○	○	×	×	✓	×				✓	×	×	✓	×	×	
Test Blanket Modules	56		○	×			×	×		×		×	×				○	×	○	○								✓			✓	×	×	
Site	61	×	×				✓	×		✓				✓	✓	○	○	✓	✓	✓	×	×	×	×				×	✓		×	×	×	
Reinforced concrete buildings	62	✓	✓	✓	✓	✓	✓	○	✓	✓	✓	✓	✓	✓	✓	✓	○	✓	✓	✓	✓	✓	✓	✓	✓	✓	×			✓	×	○	✓	
Steel frame buildings	63	✓					×			✓				✓	✓	✓	○	✓	✓	✓	✓	✓	×	✓	×		✓				×	×	×	
Radiological protections	64		×	×	×			×					×				○	×	○	○		×	×		×			✓				×	×	
Liquid and gas distribution	65	✓		×	×	✓	✓	✓		○		✓	✓	✓	✓	✓	○	✓	×	✓	✓	✓	✓	✓	✓	✓	×	×				✓	✓	
Radwaste treatment and storage	66		×	×	×	×	×	×		×	×	×	×				○	×		○	×	×	×	×	×	×	×	○	×	×	✓		×	
Hot Cell and Radwaste Service	67		×	×	×	×	×	×		×	×	×	×				○	×	○	○	×	×	×	×	×	×	×	✓	×	×	✓	×		
Access Control & Security	69																																	

I. Kühn, SOFE (2009) 5226475.

Figure 4. Interface matrix for management of the Interface Control Documents at PBS level 1

From Treaty Points to Interface Requirement Documents

- Treaty Points define only beamline Center geometry and Twiss functions
- Phase space (emittance, envelope), intensities, tolerances not specified
- Need performance guarantee (system a shall provide no more than xx intensity outside aperture yy)
- Specs turn into requirements for systems
- Input for failure mode analysis
- Needed for collimation, instrumentation, machine protection, dump system
- Needed for radiation protection analysis

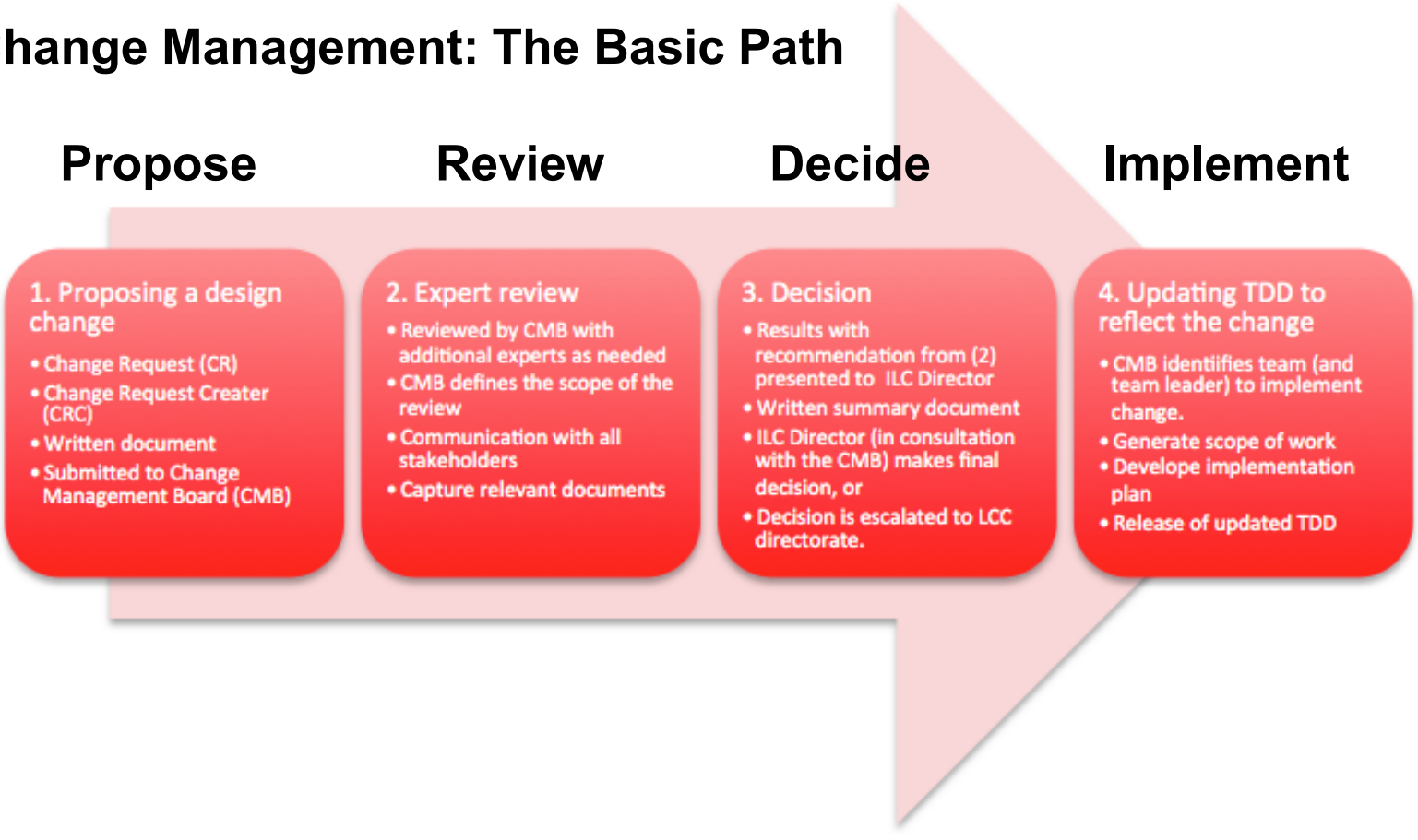
Example: positron source to damping ring

- DR parameters define accepted phase space an assumed intensity
- No definition of max. Intensity (what happens if PS delivers bunches with 3e10 intensity?) or max intensity outside DR acceptance
- What are requirements for collimation, Diagnostics, beam abort, tuneability (intensity!!) of positron source?
- Cannot verify that DR and PS designs are compatible
- Cannot check whether PS needs additional collimation section, or fast (how fast?) beam abort

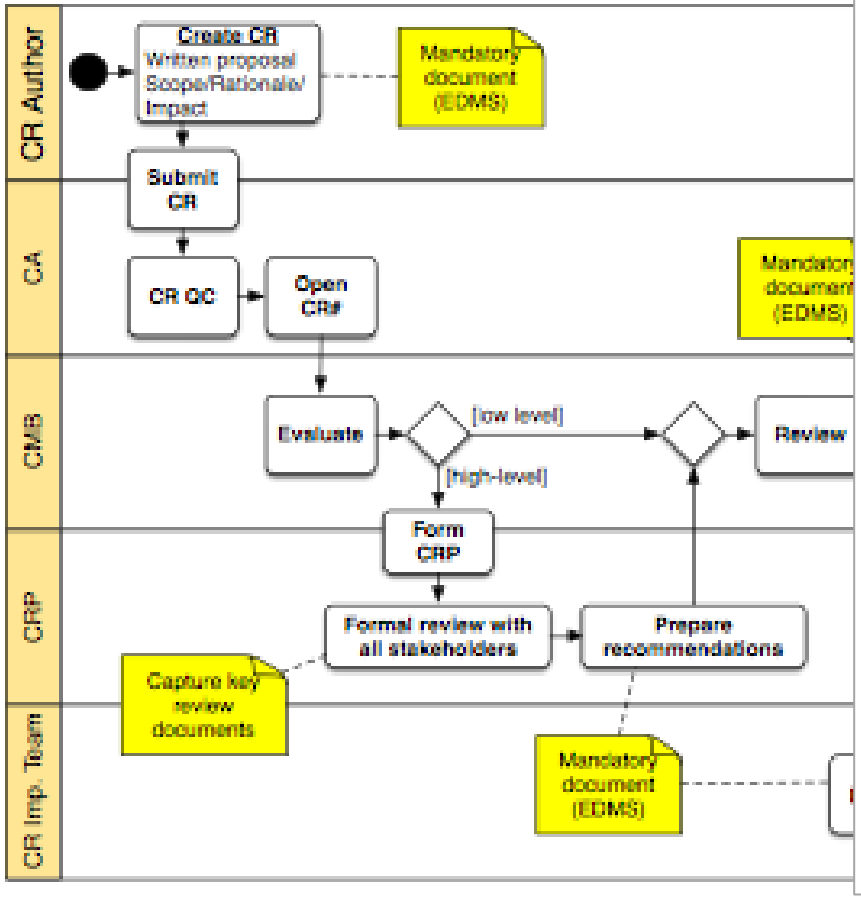
Maintaining the Design Integrity

- The key:
  Do changes to the design baseline in a controlled fashion
- Keep all stakeholders **informed** and **involved**
- Applies equally to alterations of existing designs, and elaboration, i.e., new designs
- The goal is not more bureaucracy, it is transparency
- We are still (too) few people, but scattered around the world
- We cannot afford to waste manpower due to missing information, duplication of work, or incompatible designs

Change Management: The Basic Path



Change Request Lifecycle



Change Management for the ILC

Release Version 1
23.01.2014

Prepared by: B. List, M. Harrison, N. Walker

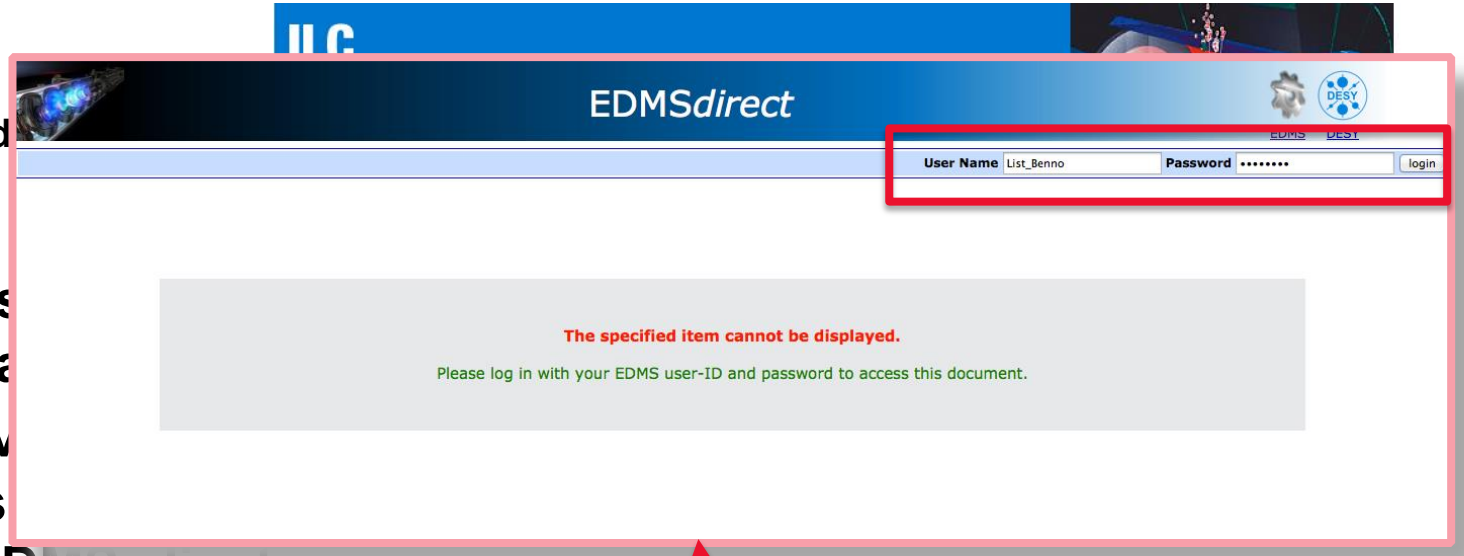
EDMS: D*1057375

Table of Contents

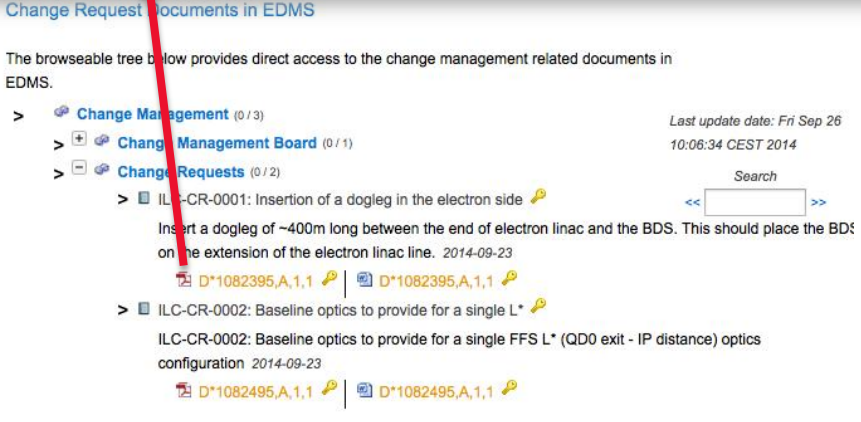
Introduction

The Technical Design Phase II of the GDE has produced an integrated, consistent and complete design of the ILC in its 500 GeV baseline configuration. This design is described in the Technical Design Report (TDR), which is a summary of the detailed body of specifications, calculations, drawings and CAD models that form the Technical Design Documentation (TDD) stored in ILC-EDMS. The level of maturity of the TDD varies considerably, ranging from very detailed and engineering-ready drawings for the cryomodule and its sub-assemblies, to relatively conceptual (non-engineering) design schematics, in particular for the accelerator layouts and associated CFS. Irrespective of the level of detail, it is inevitable that these design elements will evolve as R&D progresses and as we move towards a site-specific design. Furthermore, not only do we expect change in the existing parameters, specifications and drawings, but we also expect that the level of detail of those design elements which remain essentially unaltered to increase. Dealing with these changes in a consistent and efficient manner requires some form of Change Management, especially with a globally distributed design team.

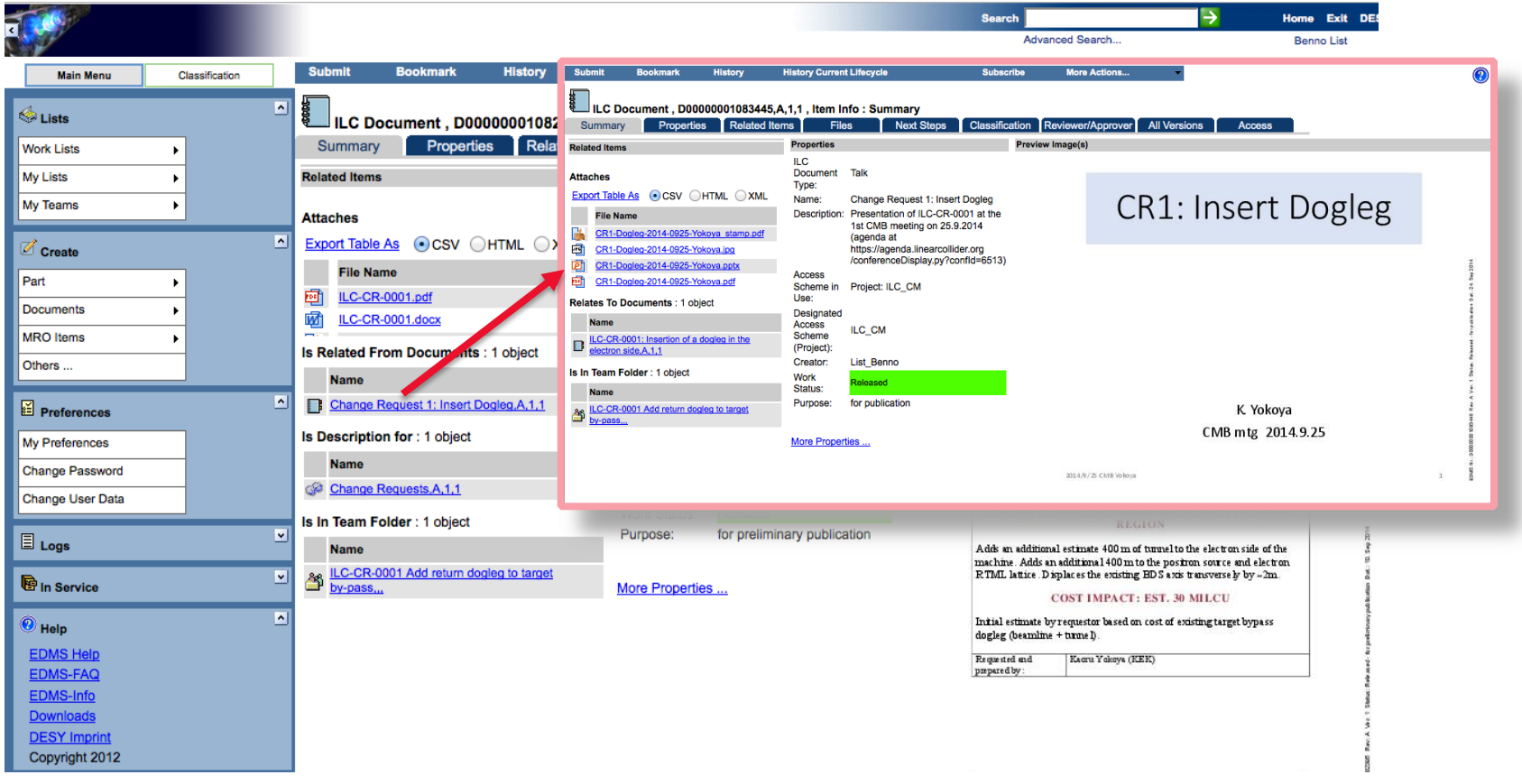
Website: ilc.desy.d



- **Lists in pa**
- **Prov files to EDMS client**
- **Get your password (and account) from ipp-support@desy.de**



EDMS Web Client



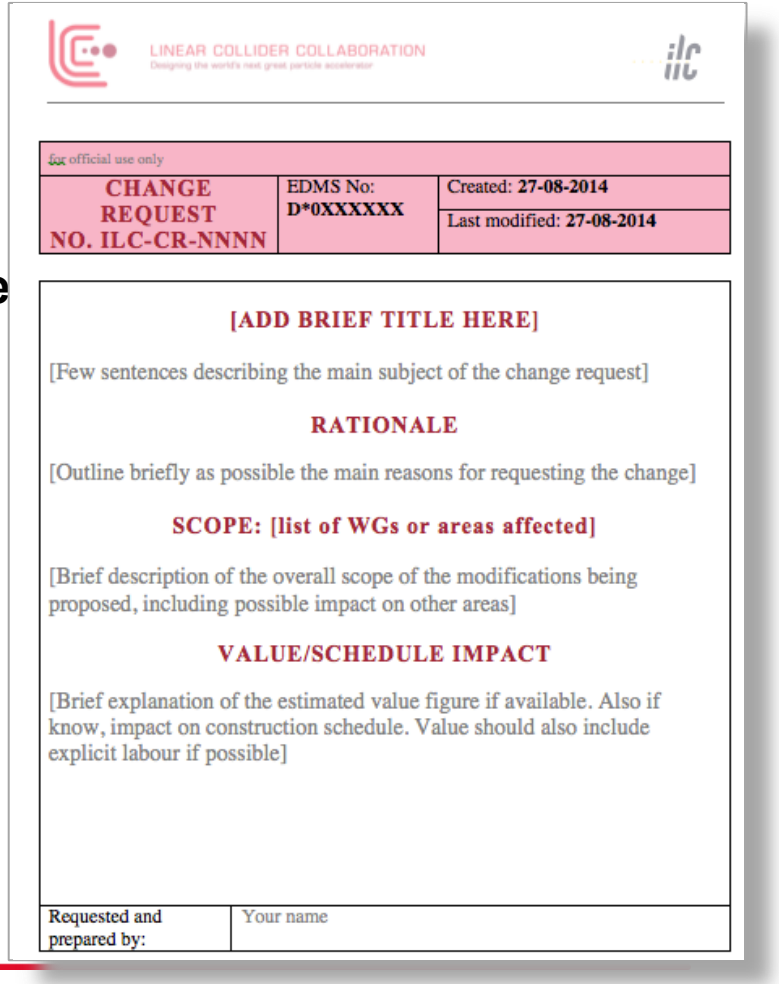
Change Request Register (EDMS: D*1056505)

- **Will be central point of information**
- **Lists also (possibly) upcoming CRs**
- **Will be updated after each CMB Meeting and when new CRs arrive**

No.	Creation Date	Last Modifie	Creator	Primary WG	Title	Description	State	Owner	Impact	Document	Next deadlin	Remark
			M. Harrison	ML	Adopt DKS as HLRF Scheme	The DKS (Distributed Klystron System) HLRF distribution scheme shall be the sole baseline design; KCS will not be persued further.	In preperation	Change Requestor	Administrative			
			N. Walker	RTML / ML	Move Bunch Compressor to Main Linac	The Bunch Compressor formally becomes a part of the Main Linac instead of the RTML.	In preperation	Change Requestor	Administrative			
ILC-CR-0002	02.09.14	09.09.14	G. White	BDS / MDI	Adopt equal L* for both detectors	Find solution for single L* value for BDS and both detectors.	CMB Review	Change Management Board	High	D*1082495	09.10.14	Next CMB meeting in Belgrade
			K. Buesser	MDI / CFS	Adopt 18m shaft solution for detector hall	Consolidated solution for IR hall / layout which supports surface construction of the detectors.	In preperation	Change Requestor	High			
			N. Walker	ADI	Update top-level parameters	Correct errors in reported luminosity for 500 GeV baseline and 1 TeV (b) parameters.	In preperation	Change Requestor	Administrative			Is this really a CR? Also questionable if this is really just administrative.
ILC-CR-0001	01.09.14	01.09.14	K. Yokoya	PS / BDS / RTML	Add return dogleg to target by-pass	Add additional lattice to bring BDS beamline on axis with main linac, to accommodate future >1 TeV beam energies.	CMB Review	Change Management Board	High	D*1082395	09.10.14	Next CMB meeting in Belgrade
			H. Hayano	SRF	Adopt Saclay-like tuner as baseline	Adopt LCLS-2 tuner and associated helium tank and flange solution.	Under consideration		Low			
			H. Hayano	SRF	Magnetic shield inside helium tank	Place magnetic shielding inside helium tank to simplify string / cryomodule assembly.	Under consideration		Low			
			E. Paterson	PS	Add timing adjustment chicance system	Implement a timing adjustment chicane in the positron injection system to allow for fine path-length adjusment.	Under consideration		Medium			Part of global-timing task force review
			N. Walker	BDS / MDI	Alternative FF scheme removing strong sextupoles from FD	Consider alternative FF schemes which would remove the strong sextupole magnets from the FD.	Under consideration		High			
			B. Parker	BDS / MDI / CFS	Reduce IR crossing angle	Develop hilghly-compact SC FD to allow for smaller crossing angle.	Under consideration		High			

CR Preparation

- **Please download and fill out template (D*1082175) if you prepare a CR**
- **Complete and send to BL by email**
- **CRs can be submitted by:**
  - TB members
  - WG coordinators
  - Phys&Det Representatives



LINEAR COLLIDER COLLABORATION

for official use only

CHANGE REQUEST NO. ILC-CR-NNNN	EDMS No: D*0XXXXXX	Created: 27-08-2014
		Last modified: 27-08-2014

[ADD BRIEF TITLE HERE]

[Few sentences describing the main subject of the change request]

RATIONALE

[Outline briefly as possible the main reasons for requesting the change]

SCOPE: [list of WGs or areas affected]

[Brief description of the overall scope of the modifications being proposed, including possible impact on other areas]

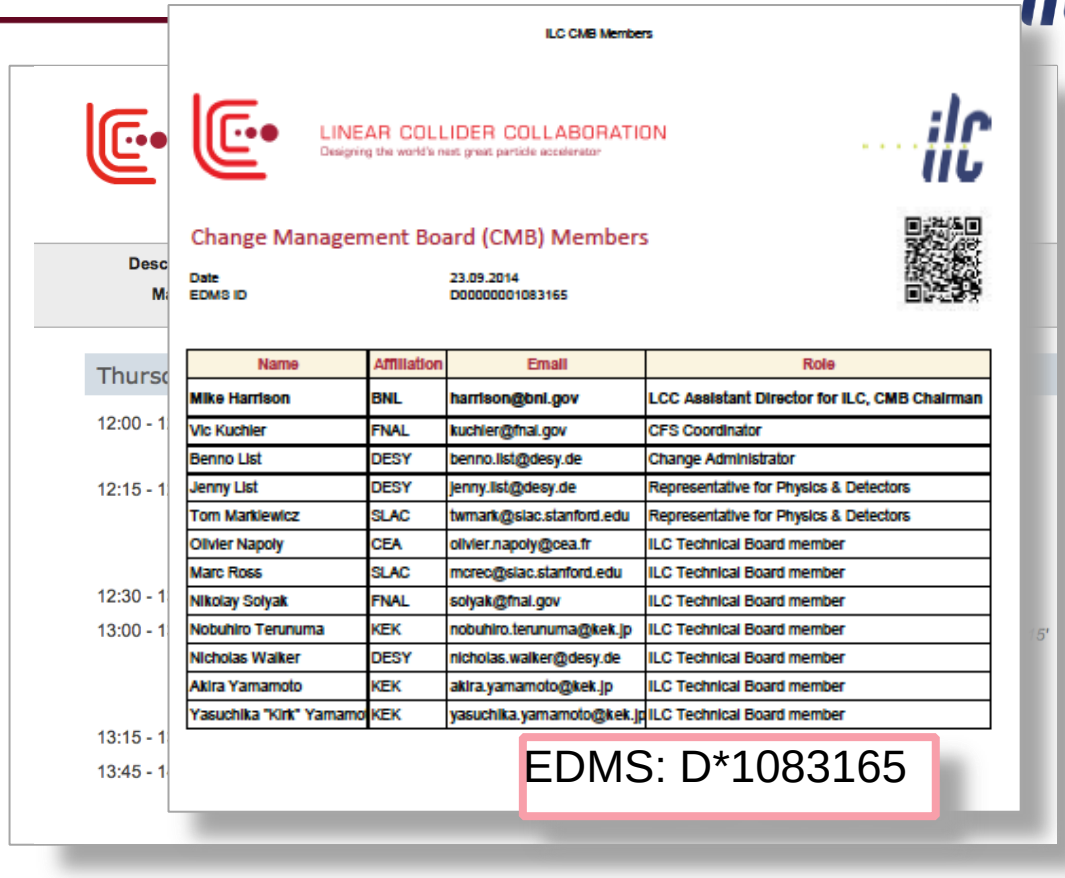
VALUE/SCHEDULE IMPACT

[Brief explanation of the estimated value figure if available. Also if know, impact on construction schedule. Value should also include explicit labour if possible]

Requested and prepared by:	Your name

Change Management Board Meetings

- Agenda is open
- Participation limited to CMB members
- Minutes will be available
- CMB can review and decide on CRs
- CMB can also ask for more info or delegate to a Change Review Panel
- CMB members are TB members + CFS expert (Vic Kuchler) + 2 detector experts (J. List, T. Markiewicz) and Change Administrator (BL)



ILC CMB Members

LINEAR COLLIDER COLLABORATION
Designing the world's next great particle accelerator

Change Management Board (CMB) Members

Date 23.09.2014
EDMS ID D00000001083165

Name	Affiliation	Email	Role
Mike Harrison	BNL	harrison@bnl.gov	LCC Assistant Director for ILC, CMB Chairman
Vic Kuchler	FNAL	kuchler@fnal.gov	CFS Coordinator
Benno List	DESY	benno.list@desy.de	Change Administrator
Jenny List	DESY	jenny.list@desy.de	Representative for Physics & Detectors
Tom Markiewicz	SLAC	twmark@slac.stanford.edu	Representative for Physics & Detectors
Olivier Napoly	CEA	olivier.napoly@cea.fr	ILC Technical Board member
Marc Ross	SLAC	mcreo@slac.stanford.edu	ILC Technical Board member
Nikolay Solyak	FNAL	solyak@fnal.gov	ILC Technical Board member
Nobuhiro Terunuma	KEK	nobuhiro.terunuma@kek.jp	ILC Technical Board member
Nicholas Walker	DESY	nicholas.walker@desy.de	ILC Technical Board member
Akira Yamamoto	KEK	akira.yamamoto@kek.jp	ILC Technical Board member
Yasuchika "Kirk" Yamamo	KEK	yasuchika.yamamoto@kek.jp	ILC Technical Board member

EDMS: D*1083165

http://agenda.linearcollider.org/conferenceDisplay.py?confId=6513

Summary for Change Management

- ILC Baseline Configuration is under Change Control
- CRs can be submitted by TB members and WG coord's
- CRs will be processed by Change Management Board

- Change Control Process is open, your input about current change requests is welcome and needed
- Keep yourself informed about CRs at http://ilc.desy.de/cm

Summary and Conclusions

- The Technical Design Documentation in EDMS is the basis for the Accelerator Design and Integration activities
- ADI is design and engineering of a complex system: Systems Engineering
- Apply Systems Engineering methods where appropriate
- Design Integration will continue, with focus on CFS in Japan
- Configuration Control / Change Management is active to preserve integrity of the design
- Focus of CM is to be efficient:
  least possible amount of paper pushing, but sufficient documentation

Additional Material

Roles and Responsibilities

Formal CM title	LCC implementation	Responsibilities
CR Author	*Limited to ILCTB members, WG coordinators, other approved individuals (e.g. physics and detector reps.)*	*Preparation of clear and unambiguous Change Request document. Point of contact for questions arising during review process.*
Change Administrator (CA)	*B. List (DESY, ILC-EDMS)*	*Supports and facilitates all phases of a CR. Primary recipient of a newly created CR. Provide EDMS support for CR process. Maintains Change Request Register. Monitors progress during Implementation Phase. General documentation control. Reports to the CMB.*
Configuration Management Board (CMB)	*ILC Technical Board (ILCTB), P&D representatives (2), CFS representative (1), CA (1)*	*Primary management body for change management. The Chair provides final formal decision after consultation with the board. Convenes a Charge Review Panel (and a chair) when needed (at the boards discretion). Provides clearly document assessments and decisions on all CRs.*
Change Review Panel (CRP)	*Ad hoc review team, formed by CMB when needed. Specific to each CR identified as requiring higher-level review. Membership, chair and charge at the discretion of the CMB, but generally representative of stakeholders and domain experts.*	*Review in a timely fashion (defined by ILCTB) the change request, as specified in the charge provided by the CMB. Provide a written consensus report on its findings and recommendations, to be submitted to the CMB.*
Change Request Implementation Team (CRIT)	*Identified team (and team leader) who will implement the changes to the design documentation. ILC-EDMS support provided by the CA.*	*Prepare (with the help of the CA) a plan for implementing all necessary modifications to the technical design documentation, including milestones. Implement the plan.*

CRR Status Flags

	Status	Meaning
Informal pre-CR	Under consideration	Place-holder / capture for upcoming ideas being discussed by ad hoc groups.
	In preparation	In transition to a formal CR (i.e. CR document being prepared for submission)
Formal CR	Submitted	CA has formally received mandatory CR document and assigned a number.
	CMB Review	Formally being discussed by CMB
	Deferred to Review Panel	CRP formed by CMB and charged to review CR.
	Accepted / Deferred	Accepted but implementation deferred until a more convenient time.
	Accepted / Implementing	Accepted and change is to be immediately implemented.
	Rejected	Assumed closed.
	Completed	If accepted, change has been fully implemented.

Systems Engineering V-Diagram