

# 1st Accelerators Technology Sector Workshop

Engineering Design Tools and Processes  
Project Management Methodologies and Tools

Chair: Mike Lamont

Interconnecting knowledge, experience, methods,  
people & data to foster learning & collaboration



ATS  
Accelerators and  
Technology Sector

# Engineering Design Tools and Processes

## ENG2

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Alessandro Bertarelli

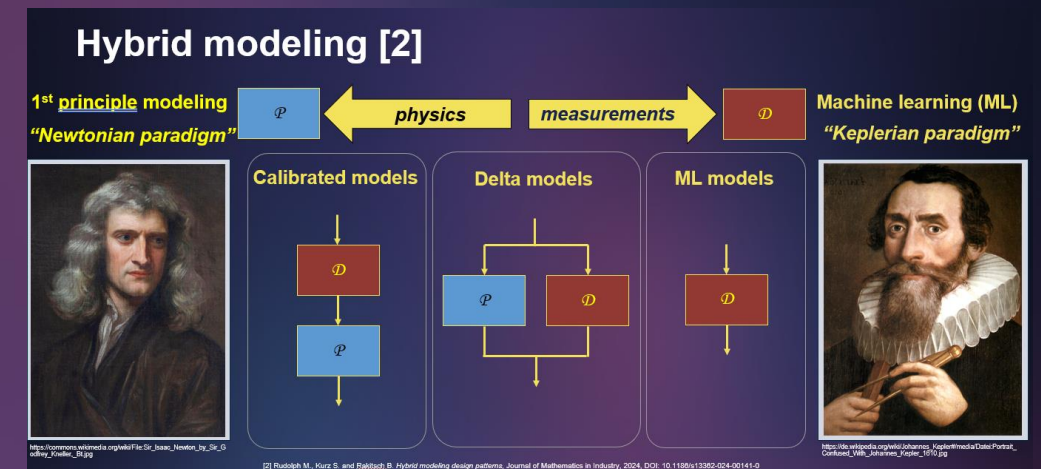
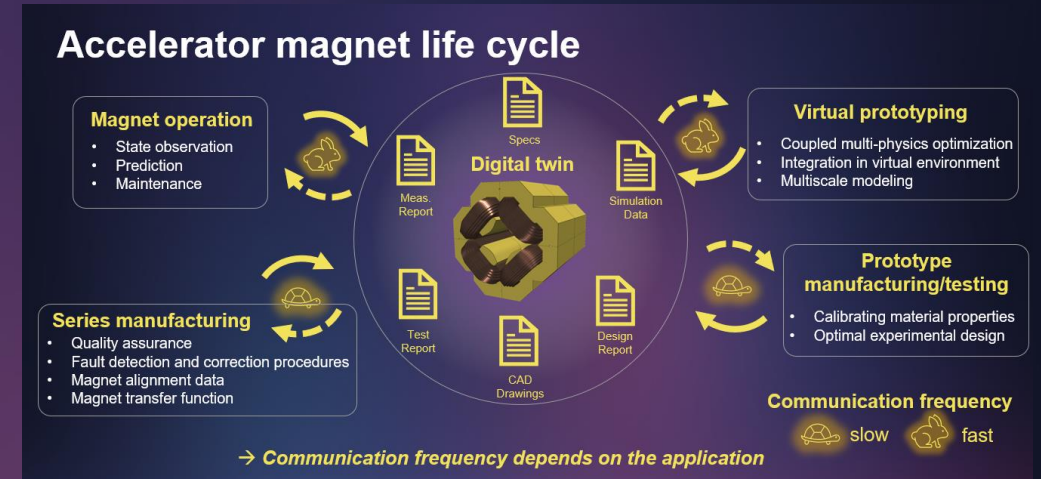
Vanessa Gahier



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# Developing digital twins for accelerator magnets

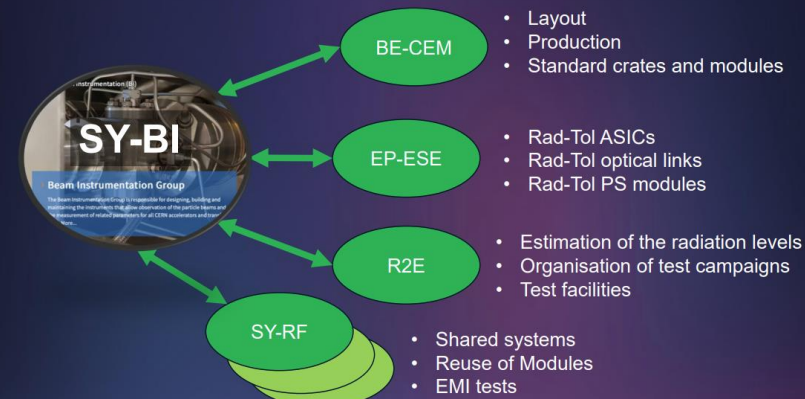
- ❖ Towards problem solving and reverse engineering tasks along the magnet life cycle.
- ❖ Based on hybrid modelling.
- ❖ Require integration of data in the development and product lifecycle management and collaborative effort within ATS sector.



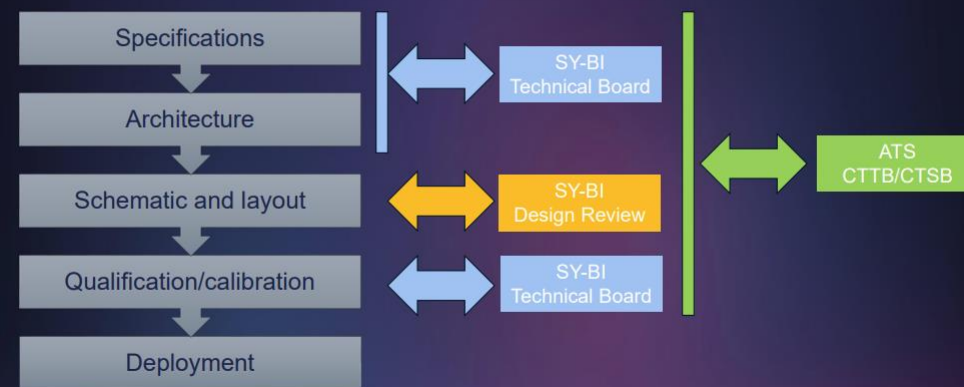
# Developing electronics boards through standardisation, specialised tools and collaboration

- ❖ Several examples of collaboration of SY-BI dealing with many interfaces.
- ❖ Electronics boards life cycle from specification to deployment / maintenance.
- ❖ Requirement for standardization.

## CERN services and collaborations



## From specifications to deployment



# Improving future designs by learning from radioactive waste-management experiences

❖ **Lifecycle / ALARA** to be considered in the design of radioactive system from the beginning.

❖ Taking into consideration :

- ❖ Waste packaging for final disposal
- ❖ Methodology for handling radioactive objects
- ❖ Documentation to be kept

❖ **Continuous improvement** by implementing **Return of Experience** in new designs.

## Beam Intercepting Devices Lifecycle

Different stakeholders across the lifecycle:

- Design offices
- Workshops
- Control teams
- Installation teams
- Radiation protection
- Transport and Handling
- Operation



Stakeholders brings along the lifecycle:

- Expertise
- Integrate their standard subsystems
- Integrate their return of experience

## Implementation of the Return of Experience in new designs

How are we going to implement this for future facilities?

The case of [HI-ECN3 Beam Dump Facility Project](#)

- Design jointly merging functional requirements with requirements of the Host States authorities for final disposal
- Design ready for material separation & waste packaging
- Infrastructure for waste packaging foreseen as part of target complex
- Remote handling largely implemented as per dose rates increases



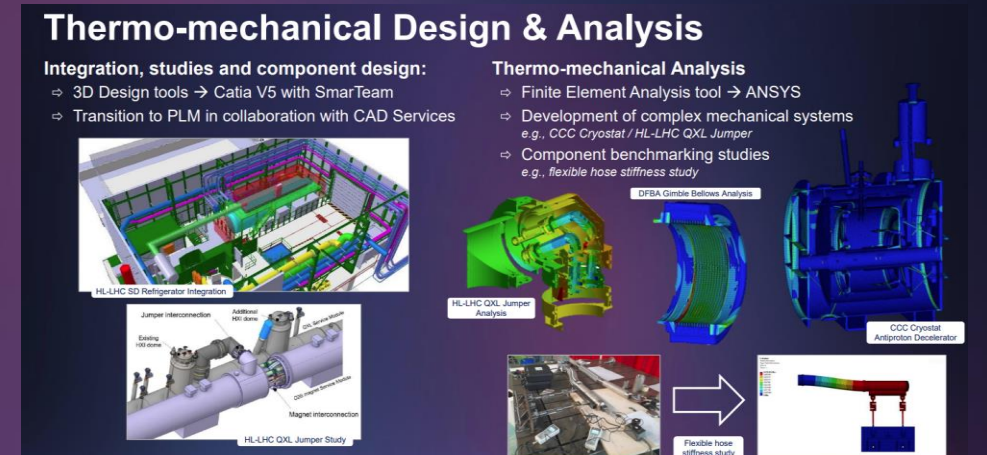
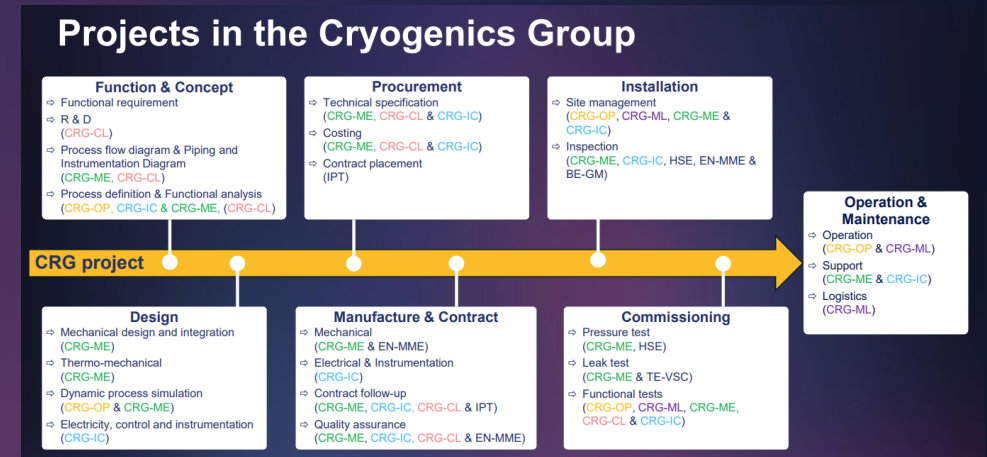
BDF target handling in case of replacement



BDF target complex building with service cell

# Engineering design tools and processes for cryogenics

- ❖ Overview of CERN cryogenics and CRG project integrated road map.
- ❖ Overview of the **tools and methods** used to meet the challenges posed by the **complexity and variety** of cryogenics at CERN.
- ❖ Introduction to cryogenic engineering toolkits aiming to **Standardised methods** and streamline engineering approach.



# Summary of Engineering Design Tools and Processes, part 2

- ❖ **PLM, Digital Twins, Design Cycles and Procedures, Industrial Standards are gaining growing interest and widespread use across the Sector**
- ❖ **Collaboration is key to implement such tools in a harmonized, consistent and balanced way**
- ❖ **Very good feedback on existing ATS bodies as Common Technologies Technical and Steering Boards**
- ❖ **Interest in having ATS-wide platforms to share Best Practices and optimize Tools?**