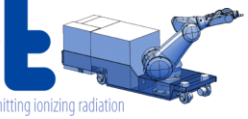
Overview of PUREsafe WP1 openSE at a Glance



Preventing hUman intervention for IncREased SAfety inFrastructures — Emitting ionizing radiation

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Scientist-in-Charge for CERN

CERN | EN ENGINEERING DEPARTMENT

Outline

1. Rationale towards a SE-related WP
2. Status of PUREsafe WP1
3. openSE at a glance

1. Rationale

Rationale

Scientific facility emitting ionizing radiations:

- It shall run and achieve **performance** level
- It shall also achieve **ORAMS** objectives

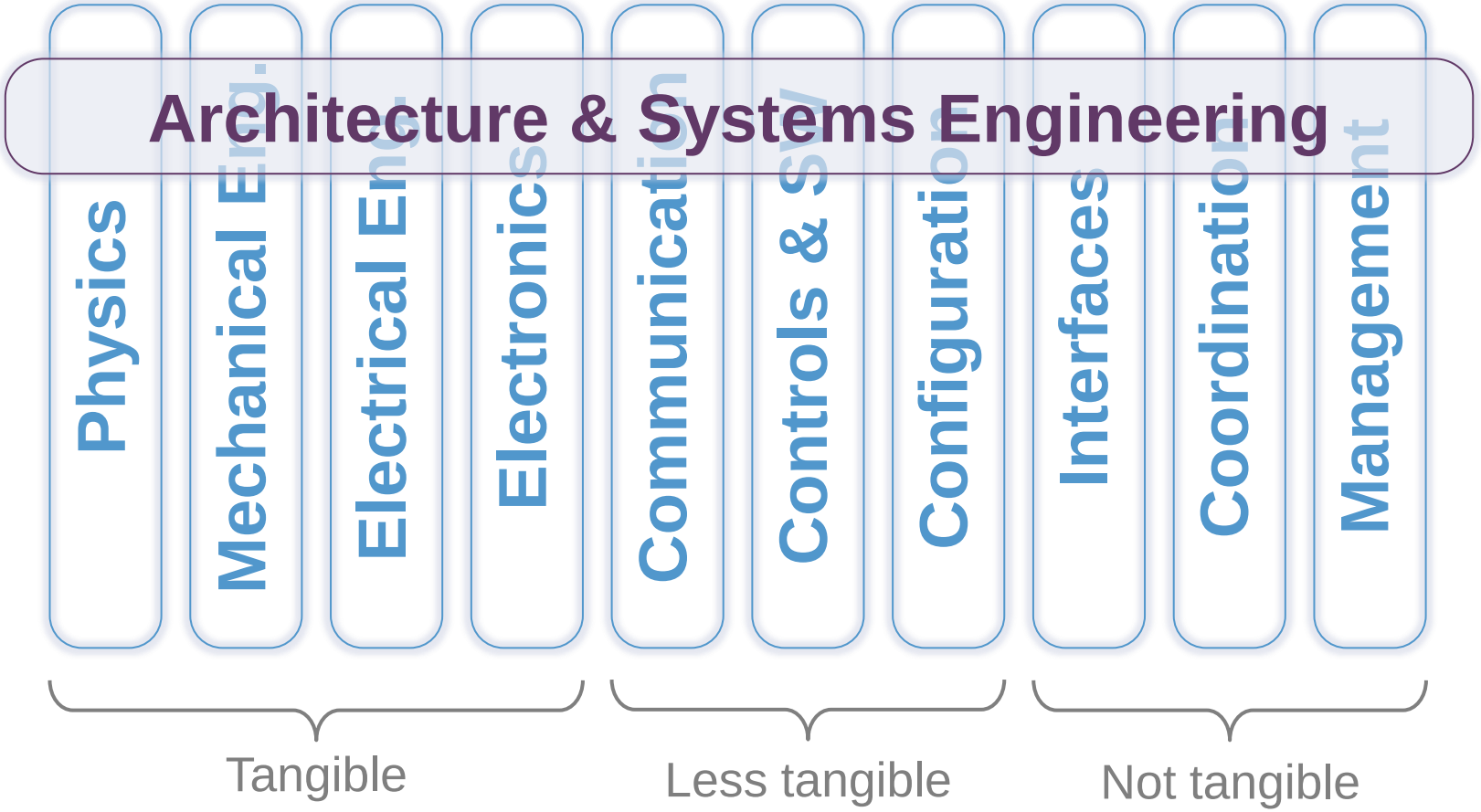
  Operability, Reliability, Availability, Maintainability, Safety

To enhance these objectives:

- **Telerobotics** solutions may be required
- **Virtual reality** solutions also

Rationale

Development of **telerobotics** also involves:



Adapted from Krob 2014

Rationale

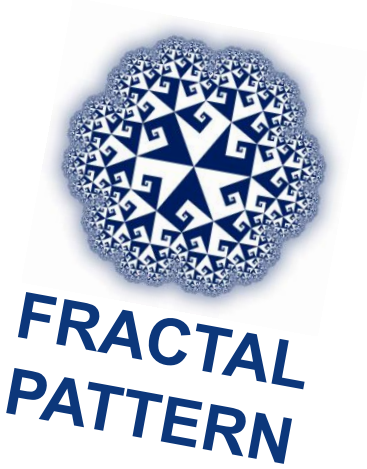
- Multi-dimensional complex *product* (**scientific facility**)

made of

- Multi-dimensional complex products (**equipment and systems**)

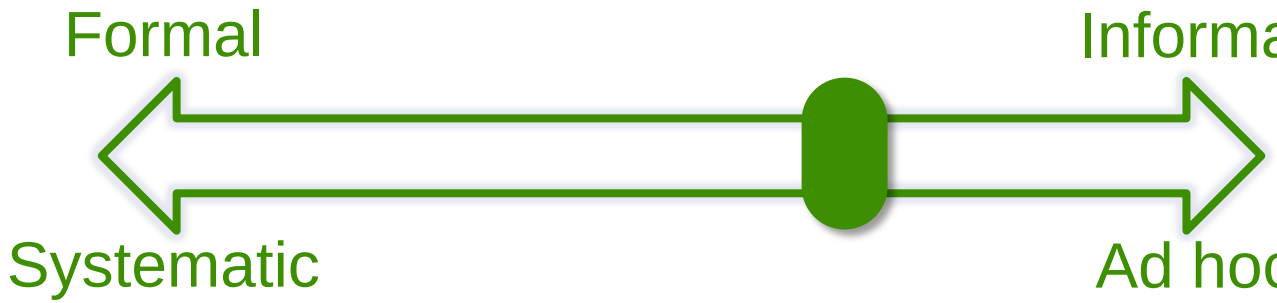
contributing to

- the **performance**
  e.g. RF cavities, magnets, collimators, etc.
- The **ORAMS** objectives
  e.g. telerobotic means, virtual reality devices



Rationale → **Requirement no. 1**

Considering **Systems Engineering**
for enhancing the development and operation of scientific facilities is required



Rationale (continued)

Which systems engineering approach?

Rationale

- Software / IT
- Organisational
- Training / HR
- Construction (CE)
- **PROJECTS**
- Industrial Plants
- Events
- Complex Systems
- New Services
- New Products

Rationale

Software / IT

Construction (CE)

Industrial Plants

Complex Systems

New Products

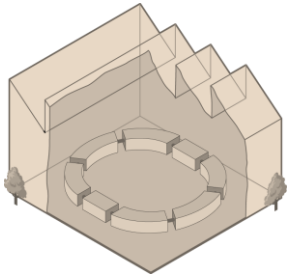
PROJECTS

Organisational

Training / HR

Events

New Services



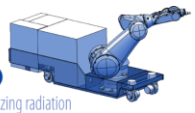
Common PM + SE backbone

Rationale → **Requirement no. 2**

Considering a **PM + SE** approach that:

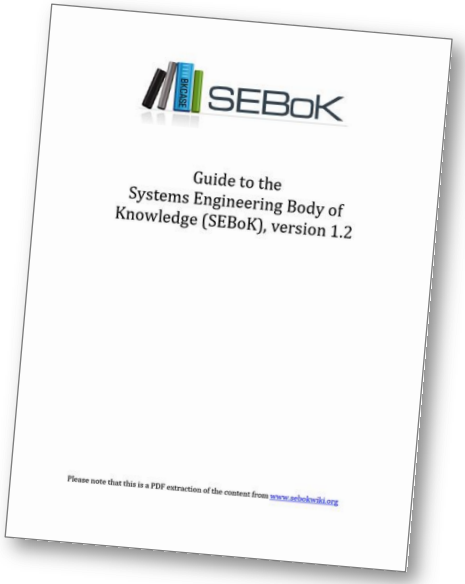
- Accommodates the **typology of projects**
- Is **participative**-based to match the project management culture of scientific organizations
- Is **lean thinking**-based to enhance the value of the PM+SE processes while limiting burden
- Is **open source**-based to ease its sharing, its adaptation, the development of tools, etc.

2. PURESAFE WP1



Preventing hUman intervention for IncREased SAfety inFrastructures Emitting ionizing radiation

What SE is about?



Part 3 – Systems Engineering and Management

- **Lifecycles**
- Concept and systems **definition**
  (architecture design, requirements)
- Systems **realization**
  (development, integration, verification and validation)
- Systems **deployment** and **use**
  (ORAMS: Operability, Reliability, Availability, Maintainability, Safety)
- Systems engineering **management**
  (scope, planning, risk management, configuration management, information management, quality management)

Appropriateness
to scientific facility projects?

WP1 Processes & Modelling

What to enhance?

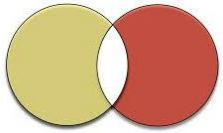
Design for RAMS **RP1**	Intervention planning **RP2**	Design for openness **RP3**	Information management **RP4**	Configuration Management **RP5**
Douzi IMRAN KHAN	**Mathieu BAUDIN**	**Jenni HYPPÖLÄ**	**Marja LINTALA**	**Masoud NIKNAM**
How to better embed **RAMS** aspects into SE?	How to integrate the **collaborative** dimension in planning and scheduling?	How to accommodate **open innovation** in SE?	How to better embed **PLM** aspects into SE?	How to better embed **CM** aspects into SE?

WP1 Processes & Modelling

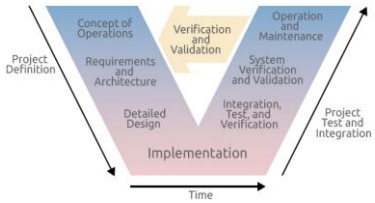
What else to enhance?

- Leanness of PM and SE

- PM vs. SE



- Lifecycle, Roles, Results



- Safety & Radiation Safety

openSE

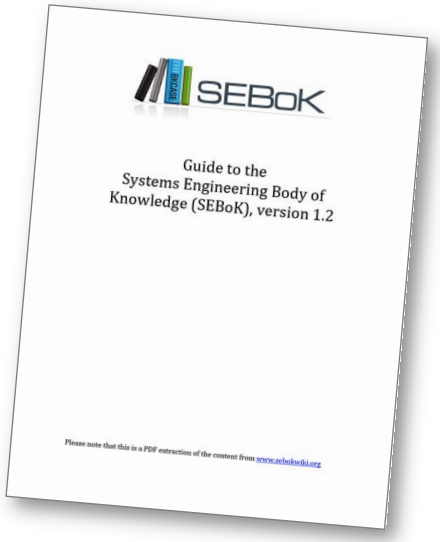
3. openSE at a glance

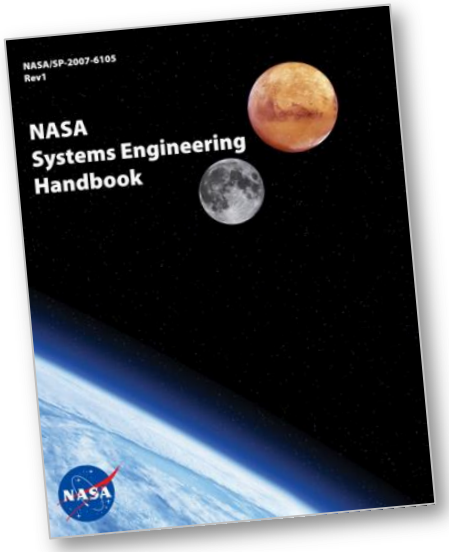
openSE “Business Model”

A **systems engineering framework** suited to scientific facilities and systems subject to ionizing radiations

Authored in the spirit of:

Covering the topics covered in:





Editorial Content

Guidelines, *Standards*, Specifications, SW, etc.

Improvement of the editorial content

cern.ch/openSE

Not yet openSE.org

CERN Accelerating science

Sign in Directory

openSE

an open, lean and participative approach to systems engineering

About | Framework | Guidelines & Specifications | Other Resources | Community | News

The openSE Framework

openSE Charter

No available yet

openSE Framework

openSE Framework (80-p. booklet, v.1.0.1)

openSE Framework (80-p. booklet, v.1.0.1)

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Contents

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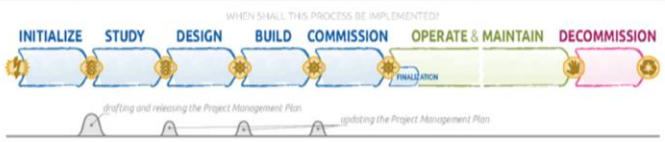
an open, lean and participative approach to systems engineering

TYPE Process | SERIES PM | DOCUMENT NO. 1000 | VERSION 0.0

Setting up a Project Management System
Drafting and Releasing a Project Management Plan



What it is about

Every project team is an organizational entity that should work efficiently and communicate appropriately with *its outside world*. To do so, as from the beginning of the study phase and based on the **Project Roadmap** (see [1]), the project team should conceive and develop a project management system, task that consists among others to draft and release a **Project Management Plan** (PMP). This document is then expected to be updated at the beginning of every of the remaining phases.

The aim of this key project management document is twofold: ensuring that the members of the project teams agree upon and share a common framework for organizing their project; giving the project board the assurance that the project expectations are well understood and that everything is done to ensure the operational success of the project.

Three approaches to draft and release a PMP are proposed in the present brochure, corresponding to projects of different sizes and project teams of different maturity levels. In sake of effectiveness, the present brochure shall be read in conjunction with the document entitled *openSE Framework* (see [2]).

The typical editorial process is featured on the simplified process diagram of Figure 1. Further revisions of the PMP follow a similar process (see also [3]).

From a quality assurance point of view, this document is:

- authored by the project manager and a few key project team members
- verified (i.e. cross-checked) by some others key project team members, and when available, project management experts
- validated and released by the project manager.

The PMP is not expected to be validated by the project board. However, the project board members should receive all released versions of this document. They are not expected to acknowledge its receipt and no response from them shall be understood as a tacit endorsement of the document. If some members of the project board feel that the PMP does not address the project expectations as they have been communicated to the project team by means of the Project Roadmap, the project manager may be asked to improve the PMP until it provides all guarantees or at least sufficient guarantees to the project board that the project expectations can be achieved.

1 Simple approach

This simple approach is rather suited to projects of a small size or to newcomers to project management.

1.1 Editorial process

Even if the PMP is considered as the outcome of a team exercise, it is likely that its writing is initiated by the project manager, then complemented, commented and corrected by key project team members.

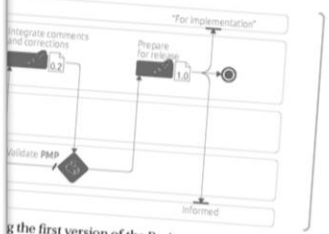
1.2 Typical content

The typical content of a PMP is threefold.

Section 1. Overview. This section is a brief reformulation of the Project Roadmap. The project purpose and objectives are recalled and reformulated, the key milestones and deliverables are listed, so the assumptions, dependencies and constraints that may influence the completion of the project from the three usual perspectives: scope, schedule and

budget. All key documents that are of prime importance to understand

the project, the budget breakdown and the project risk registry, if not stand-alone documents, shall be included in this first section.



g the first version of the Project Management Plan.

which measures are or will be set up to ensure the consistency of documents and more broadly of all deliverables released in the framework of the project. The description of the document management framework as well that for configuration management and change management are typically found in this subsection. Additionally, this subsection may provide insights on the organization of reviews, the naming/coding conventions, etc.

Communication Management. This subsection explains how the project team communicates or will communicate inside the project team, towards the project board and the various stakeholders and, if required, towards the general public.

Risk Management. This subsection explains how risks, whether they are perceived as threats or opportunities, are or will be managed, i.e. identified, assessed, treated and monitored.

Contribution Management. Finally, this subsection explains how procurement and external contributions, if any foreseen, are or will be managed, which activities are to be outsourced and what are the specific policies and processes to follow.

ermediate approach

mediate approach is suited to rather challenjects or to project management teams that are perienced.

knowledge areas of the *PMBoK*
PMBoK.

g a Project Management Plan

drafting and releasing the PMP and its associated subdocuments.

3.2 Typical content

In this context, the PMP is necessarily a head document that refers to several subdocuments. Subdocuments will be groups in several families of PMP subdocuments:

- the subdocuments that define the processes (see section 1.2)
- the subdocuments that define the generic and specific roles of project members
- the subdocuments that define the specific project standards, including definitions and document templates

These subdocuments can be assembled in a so-called **Project Management File.**

Key project management documents such as:

- the Work Breakdown Structure and Work Package and Work Unit Description Datasheets
- the Project Master, Coordination and Detailed Schedule(s)
- the Project Budget Breakdown Document(s)
- the Project RACI Matrix
- the Project Risk Registry, the Risk Analysis Documents, the Contingency and Continuity Plans

shall necessarily be considered as stand-alone versionable documents.

Terminology

The following terms are assumed to be equivalent:

Project Roadmap ≡ Project Mandate; Project Charter; Project Mission Statement

Project Management Plan ≡ Project Quality Plan; Project Quality Manual; Project Quality Assurance Plan (a.k.a. Project QAP)

Project Management File ≡ Project Management Portfolio; Project Management Folder; Project Management Dossier.

References

[1] The openSE editorial community (2014) *Initiating a Complex Systems Project — Drafting and Releasing a Project Proposal/Roadmap*, Geneva, Switzerland. openSE Brochure no. 10XX.

[2] The openSE editorial community (2014) *openSE Framework*, Geneva, Switzerland.

[3] The openSE editorial community (2014) *Coding and Versioning Project Documents*, Geneva, Switzerland. openSE Brochure no. 10XX.

andard Committee (2008) *A guide to the management body of knowledge*, 4th ed. Square, PA: Project Management Insti- 3 p. ISBN 1933890517.

All openSE documents are downloadable from

“Target Markets”

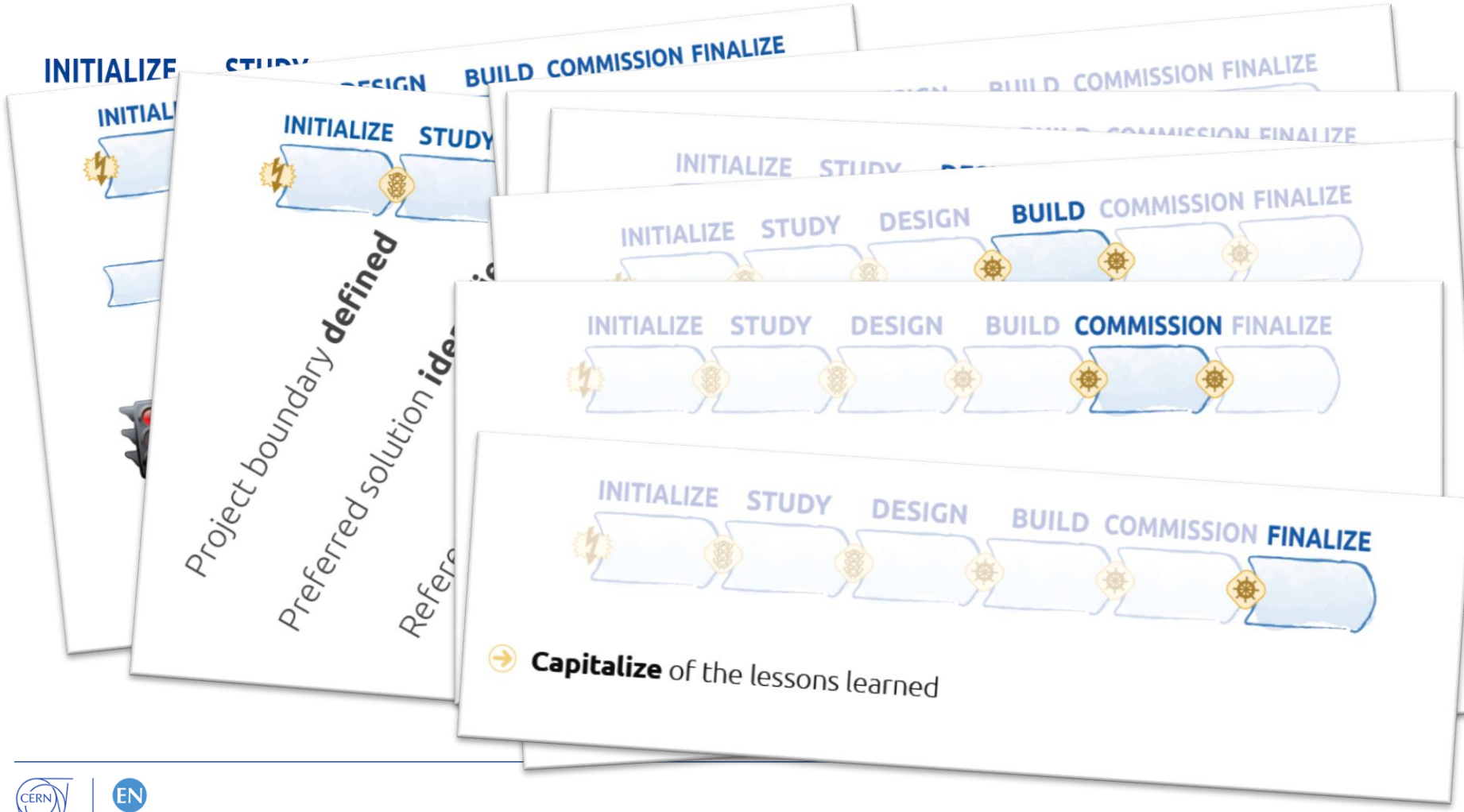
Not necessarily telerobotics experts!

- Primary market: **Project professionals** involved with projects related to scientific facilities or systems subject to ionizing radiation such as the LHC or FAIR
- Secondary market: Project professionals involved with projects related to complex facilities or systems subject to ionizing radiation e.g. NPPs, or in projects related to scientific facilities subject of various hazards
- Tertiary market: **Students** in engineering, applied physics or in PM who wish to better understand SE; **Instructors** and **lecturers** in these fields

3.1 openSE key features

Lifecycle

A common understanding of a facility or system lifecycle



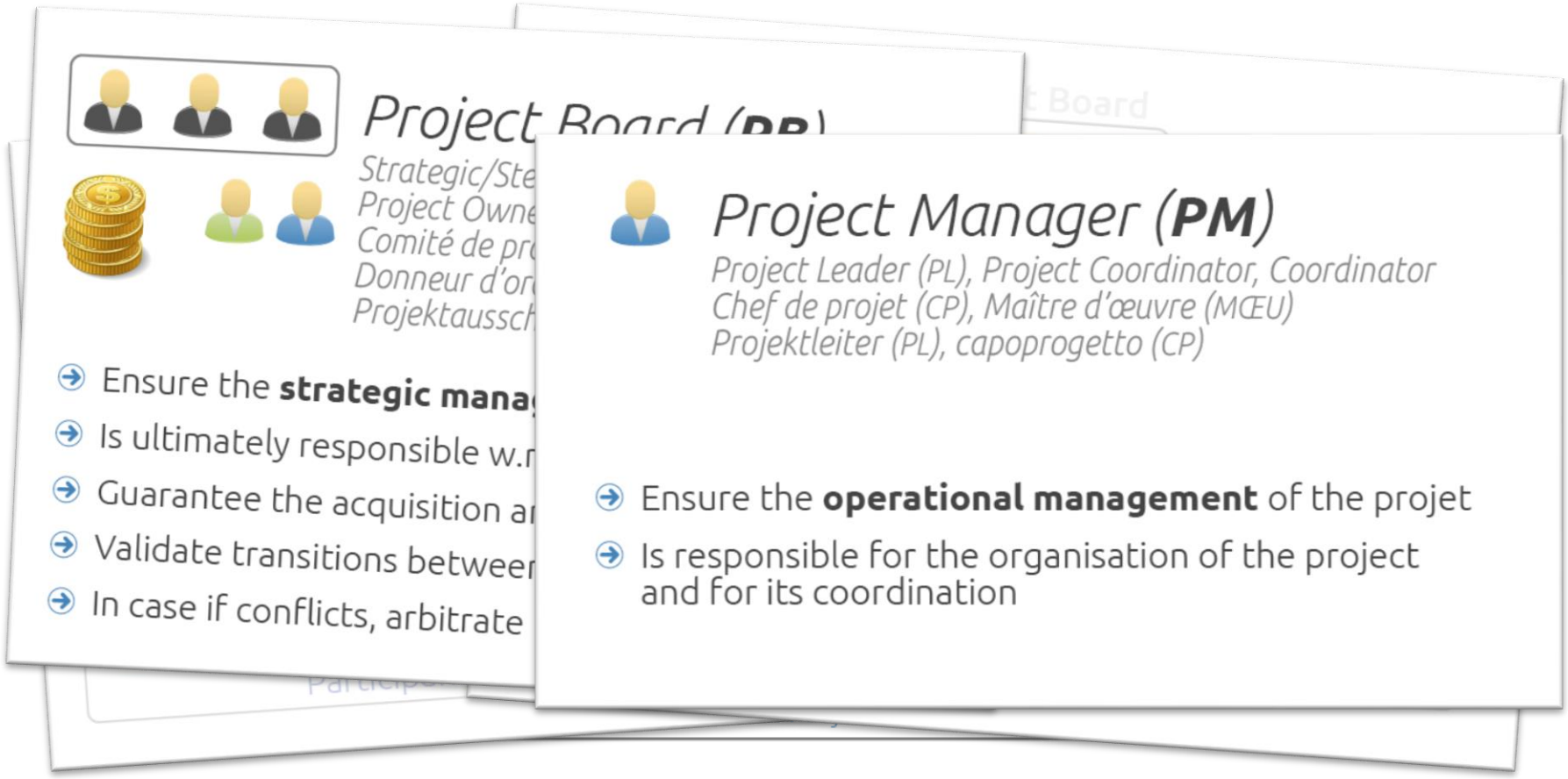
Processes

A common understanding of key processes

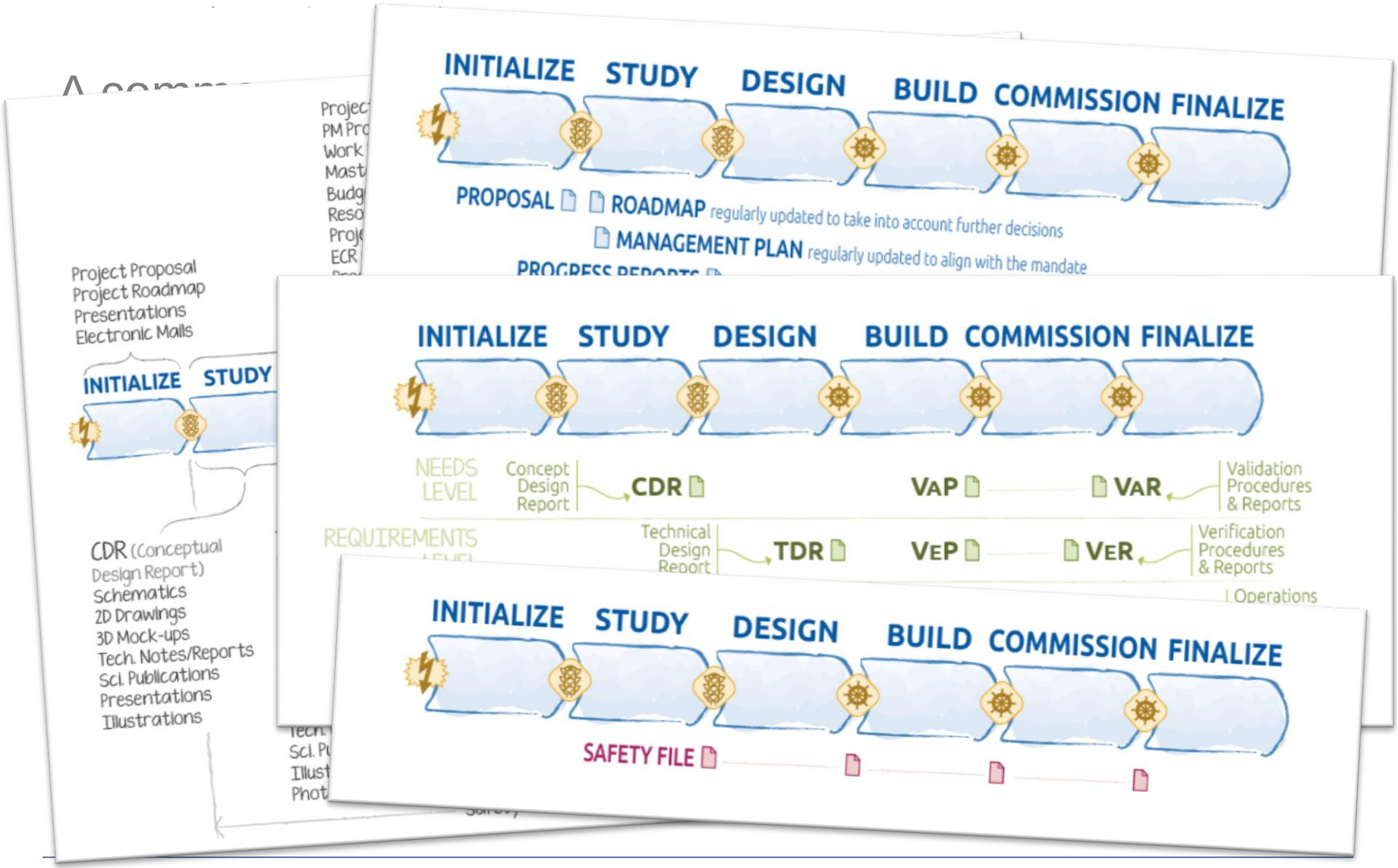
- Systems Engineering processes:
  gathering needs and defining requirements,
  systems architecting and modelling, verifying & validating,
  managing product risks, managing configuration & quality
- Project Management processes:
  scoping, planning and scheduling, costing,
  managing project risks, supplying components
- Design and Engineering processes:
  DfS, DfE, DfMA, DfP, DfC, DfO, DfR, DfA, DfM, **DfT/DfRH***
  * Design for Telerobotics / Design for Remote Handling ??

openSE Roles

A common understanding of roles and responsibilities



openSE Results



What's next?

- Using openSE for sharing and collecting **PM and SE good practices**
  e.g. document templates, case studies
- Using openSE for specifying tools
  e.g. **requirement engineering**
- Using openSE for PM and SE **training**
- Keeping it **lean**, **open**, and **collaboration-oriented**

All my thanks to all those who contributed
and by anticipation, to those who will join the initiative