



An introduction to Project Management

ESIPAP, Wednesday & Thursday 3-4 March 2021

Seminar lead :

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Housekeeping

Please ask questions and share your ideas/experience :

- It will keep the presentations alive
- It will help you to understand the subject

For questions, interrupts please

- Raise hand in zoom
- Just speak up

If you have 'private' questions, we can discuss "one to one"

- during the coffee breaks
- after the course

Welcome !

Please Introduce yourself :

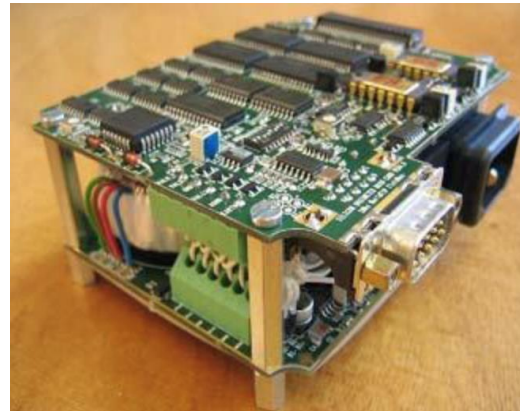
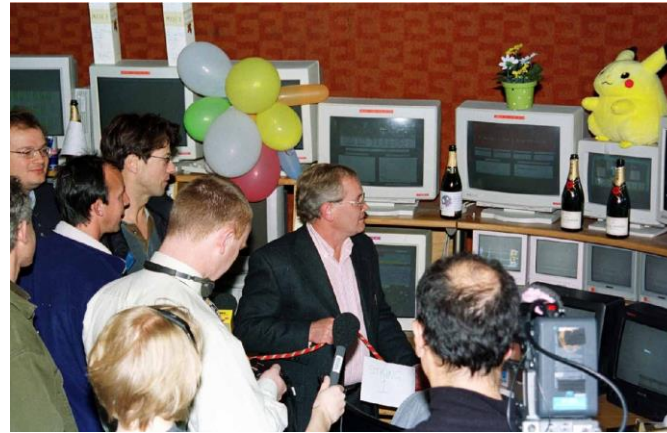
Name, nationality, background ?

Experience with projects ?

What are your expectations ?



About me



BEWARE THE SINGLE HIT!

The first time that single particle effects from cosmic rays on electronics were observed was in 1991, when one of the instruments aboard an ESA satellite broke down after only five days in space. On 5 July, the TS-LEA group will have completed the installation of monitors that will help to reduce similar dangerous effects on LHC electronics.



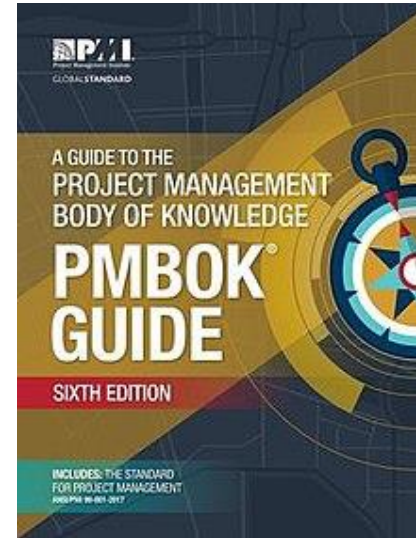
Members of the TS-LEA group with their radiation monitor.

In total, 329 radiation monitors have been installed in the LHC tunnel and its experimental areas. They keep a meticulous check on radiation levels all around the ring and, in particular, in the critical parts, such as the interaction points and the sections where the beam is cleaned. It is well known that radiation dose degrades electronic devices, which will typically start to consume more electrical current. For this

Learning Objectives of this course

This course is an 'appetizer' to learn :

- Some of the basics aspects of project management
- If, when and how to initialise a project in the field of research and development
- How to use some basic tools that you can use to propose your project next week



www.pmi.org



www.ipma.world

Outline of this course

Agenda Wednesday 3 March 2021

09h00 – 09h30 :	Welcome and introduction
09h30 – 10h30 :	Project, Management, Project Environment
	<i>Coffee Break</i>
10h45-12h00 :	How to start a project ?
12h00-12h15 :	Urban Bees Project – exercise 1
	<i>Lunch</i>

Agenda Thursday 4 March 2021

09h00 – 09h30 :	Recap and Questions & Answers from Day 1
09h30 – 10h30 :	Project scope, schedule and budget
	<i>Coffee break</i>
10h45-12h00 :	Project execution
12h00-12h15 :	Urban Bees Project – exercise 2
	<i>Lunch</i>

Vision, Mission, Strategy



Vision Statement: (Desired End-State) A one-sentence statement describing the clear and inspirational long-term desired change resulting from an organization.



Mission Statement (What You Do): A one-sentence statement describing the reason an organization or program exists and used to help guide decisions about priorities, actions, and responsibilities.



Strategy (How you will do it): A one-sentence determining the basic long-term goals and objectives of an enterprise or organization, the adoption of courses of action and the allocation of resources necessary for carrying out these goals.

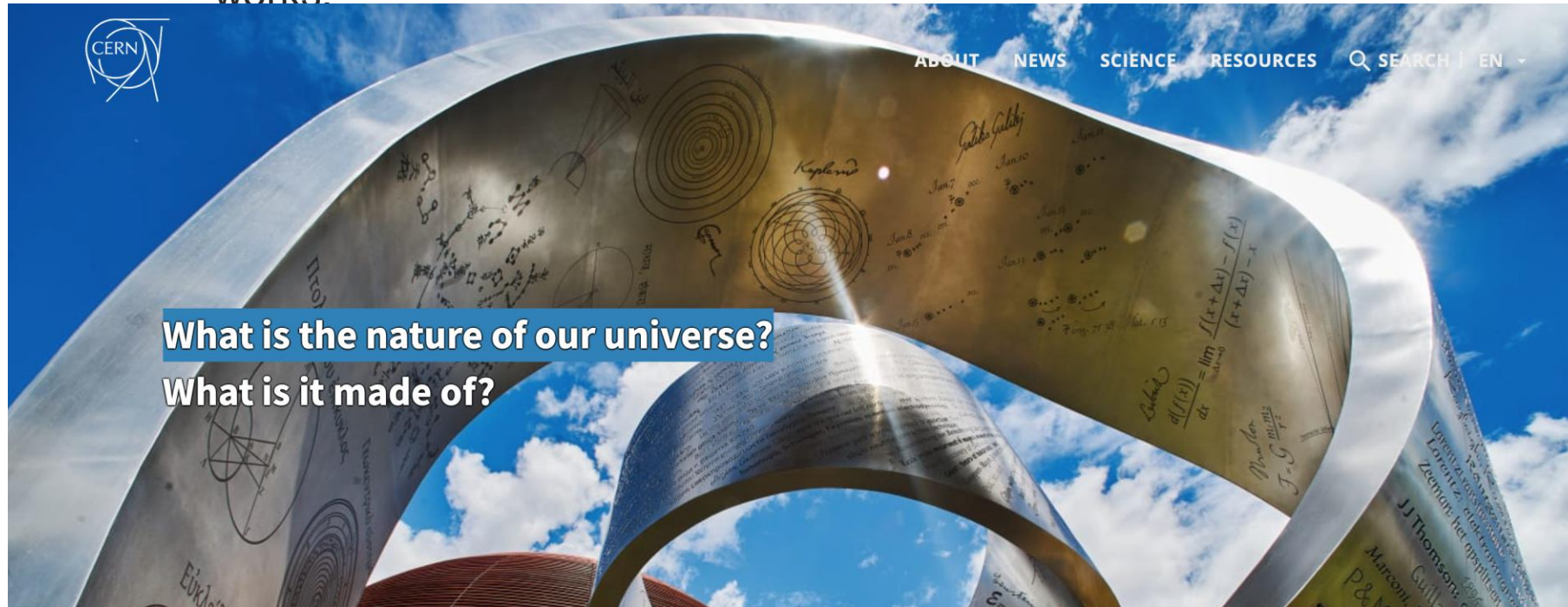


Vision



Vision Statement: (Desired End-State) A one-sentence statement describing the clear and inspirational long-term desired change resulting from an organization.

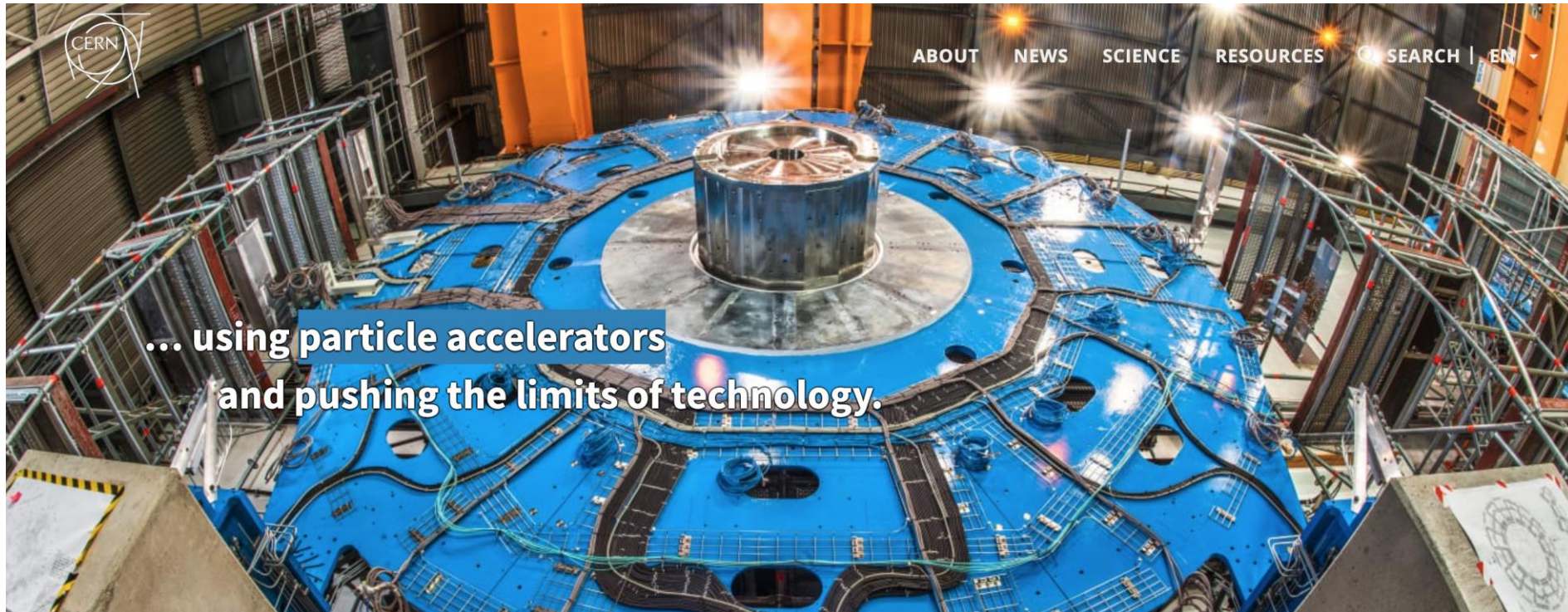
CERN : to uncover what the universe is made of and how it works.



Mission



Mission Statement (What You Do): A one-sentence statement describing the reason an organization or program exists and used to help guide decisions about priorities, actions, and responsibilities.



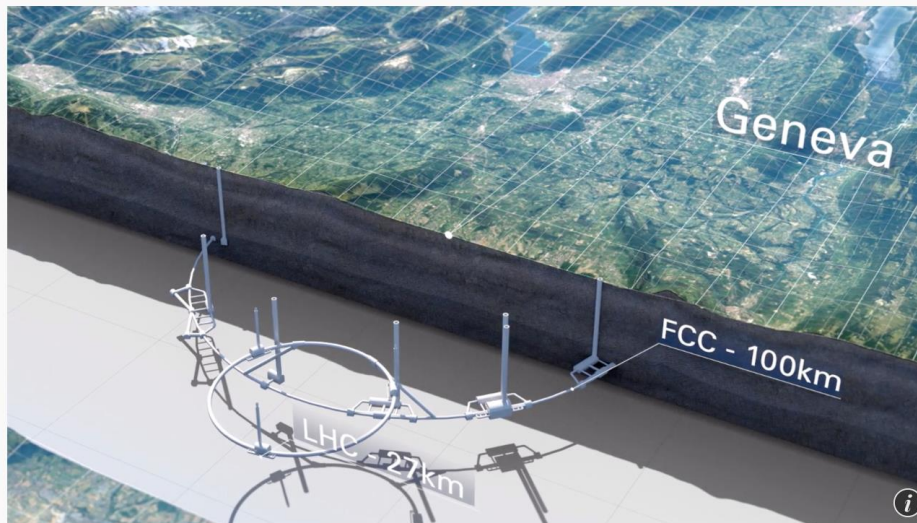
Strategy



Strategy (How you will do it): A one-sentence determining the basic long-term goals and objectives of an enterprise or organization, the adoption of courses of action and the allocation of resources necessary for carrying out these goals.

CERN unveils its new European strategy - it does not rule out a new particle accelerator

par [Sarah Sermondadaz](#)



3 !

High-priority future initiatives

A. An electron-positron Higgs factory is the highest-priority next collider. For the longer term, the European particle physics community has the ambition to operate a proton-proton collider at the highest achievable energy. Accomplishing these compelling goals will require innovation and cutting-edge technology:

· the particle physics community should ramp up its R&D effort focused on advanced accelerator technologies, in particular that for high-field superconducting magnets, including high-temperature superconductors;

· Europe, together with its international partners, should investigate the technical and financial feasibility of a future hadron collider at CERN with a centre-of-mass energy of at least 100 TeV and with an electron-positron Higgs and electroweak factory as a possible first stage. Such a feasibility study of the colliders and related infrastructure should be established as a global endeavour and be completed on the timescale of the next Strategy update.

The timely realisation of the electron-positron International Linear Collider (ILC) in Japan would be compatible with this strategy and, in that case, the European particle physics community would wish to collaborate.

B. Innovative accelerator technology underpins the physics reach of high-energy and high-intensity colliders. It is also a powerful driver for many accelerator-based fields of science and industry. The technologies under consideration include high-field magnets, high-temperature superconductors, plasma wakefield acceleration and other high-gradient accelerating structures, bright muon beams, energy recovery linacs. *The European particle physics community must intensify accelerator R&D and sustain it with adequate resources. A roadmap should prioritise the technology, taking into account synergies with international partners and other communities*

Operations vs Projects

i.e. studies
and projects

Entrepreneurial activities

- ➔ Specific mandates, organizations and objectives
- ➔ Change-oriented
- ➔ Unique product
- ➔ Heterogeneous teams
- ➔ A start and an end

Operations activities

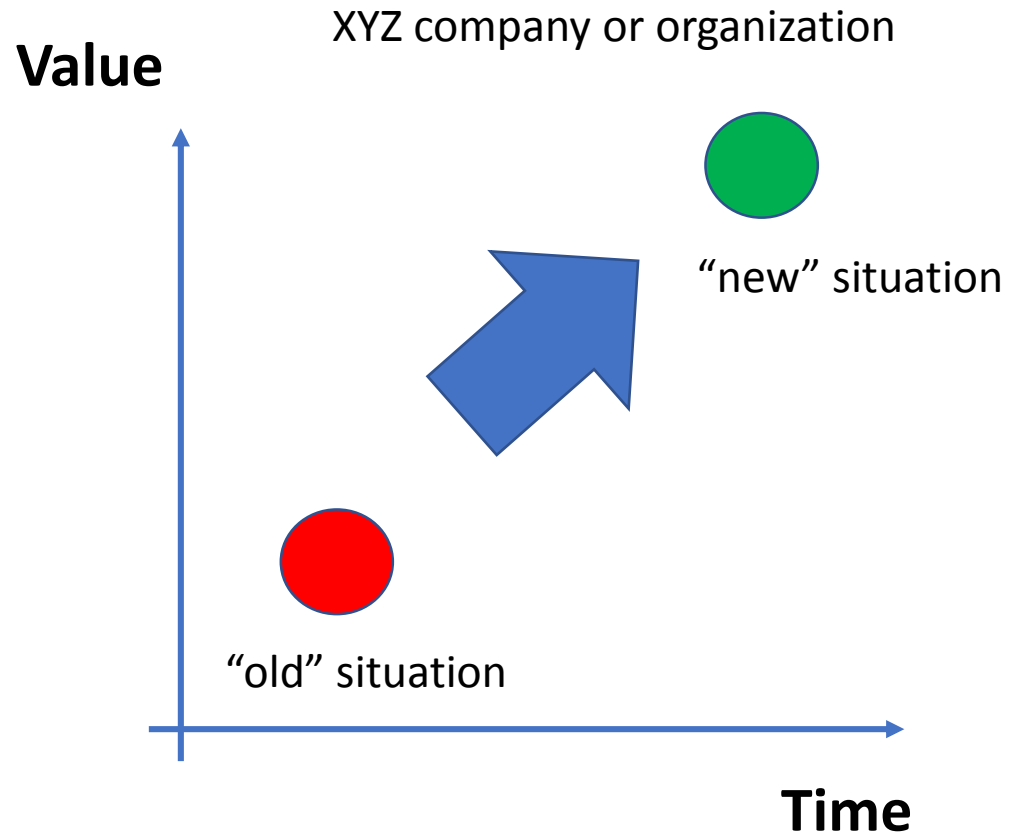
- ➔ Permanent mandates, organizations and objectives
- ➔ Status quo-oriented
- ➔ Standard product
- ➔ Homogeneous teams
- ➔ No temporal limitation

Intrusiveness

- 6 **New projects**
- 5 **Upgrade projects/activities**
- 4 **Consolidation projects/activities**

- 3 **Corrective maintenance activities**
- 2 **Preventive maintenance activities**
- 1 **Inspection activities**

What should a project do ?



What is Value and how to increase it ?



Values is created for stakeholders.

Value Creation - examples



When to start projects ?

The 3 reasons to start a project :

- Pain
- Need
- Desire

At the end of a project you can expect :

- One or several outputs
- Organizational change
- Value added and transferred

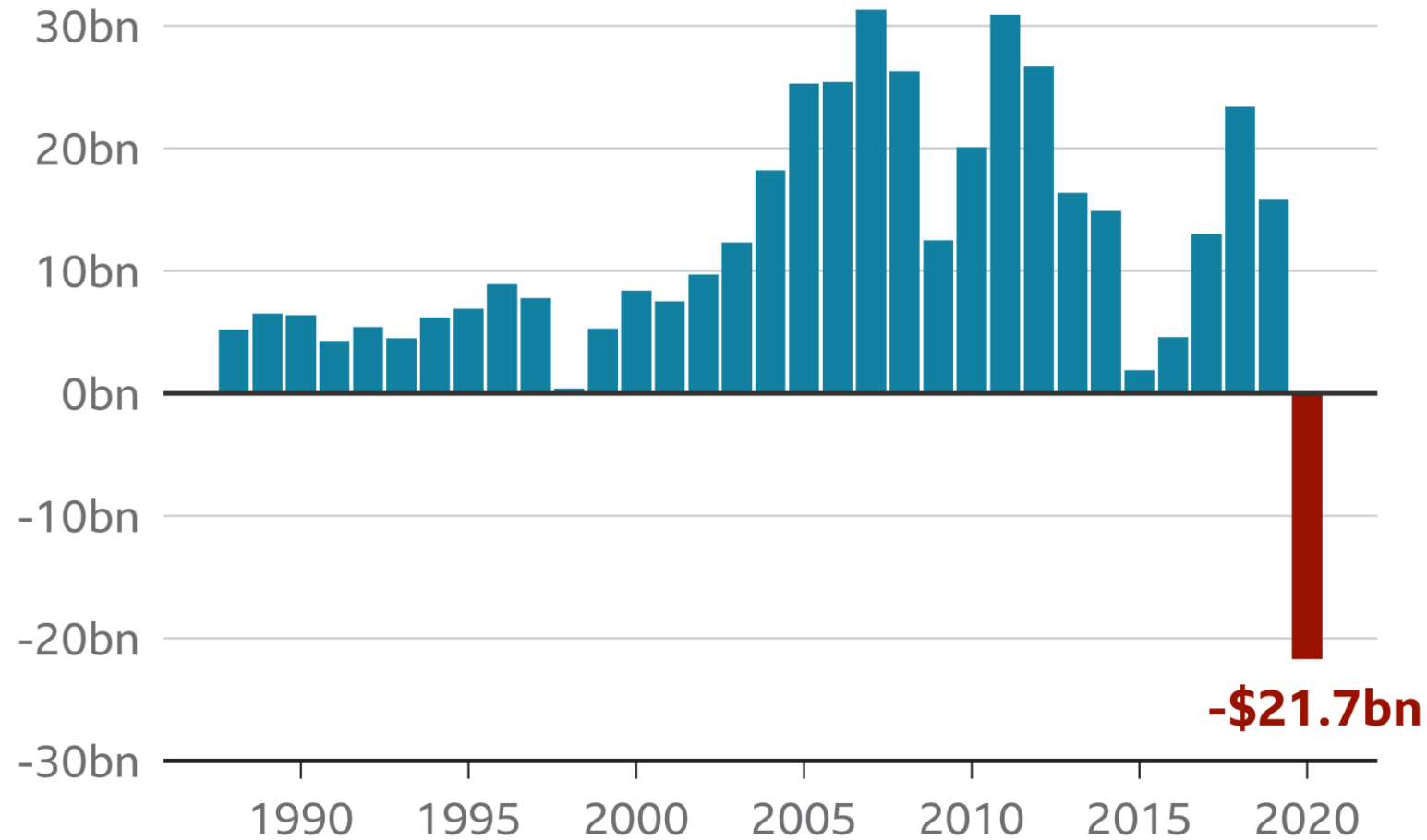
PAIN

NEED

DESIRE

Royal Dutch Shell sinks to record loss

Company's net profit since 1988, US Dollars



Source: Royal Dutch Shell

BBC







 ZAPATA

What is a project ?

A unique set of processes consisting of coordinated and controlled activities with start and end dates, performed to achieve project objectives.



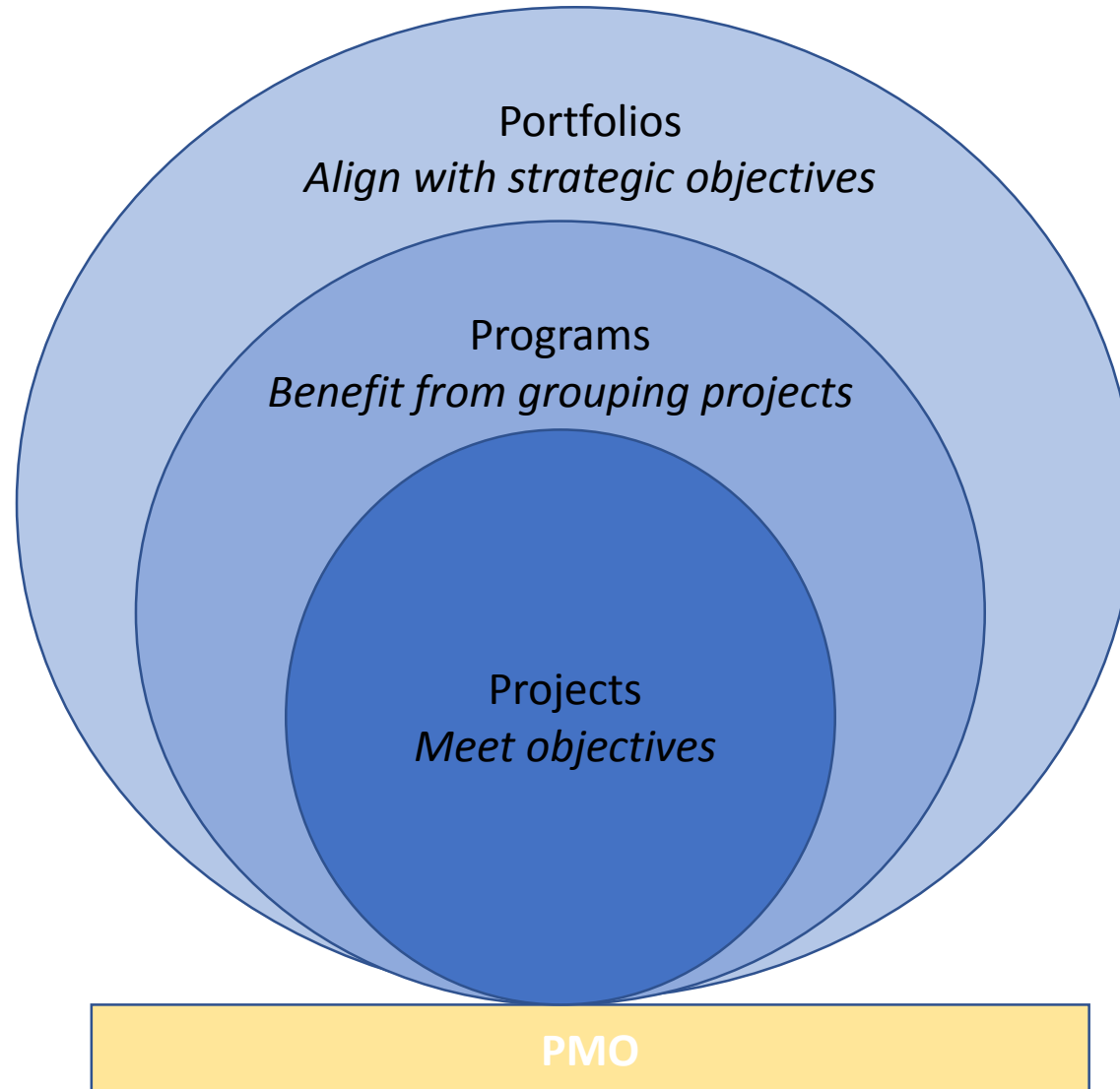
‘A project is a ‘temporary endeavour undertaken to create a unique product, service or result’

PMBok 6th Edition, Project Management Institute

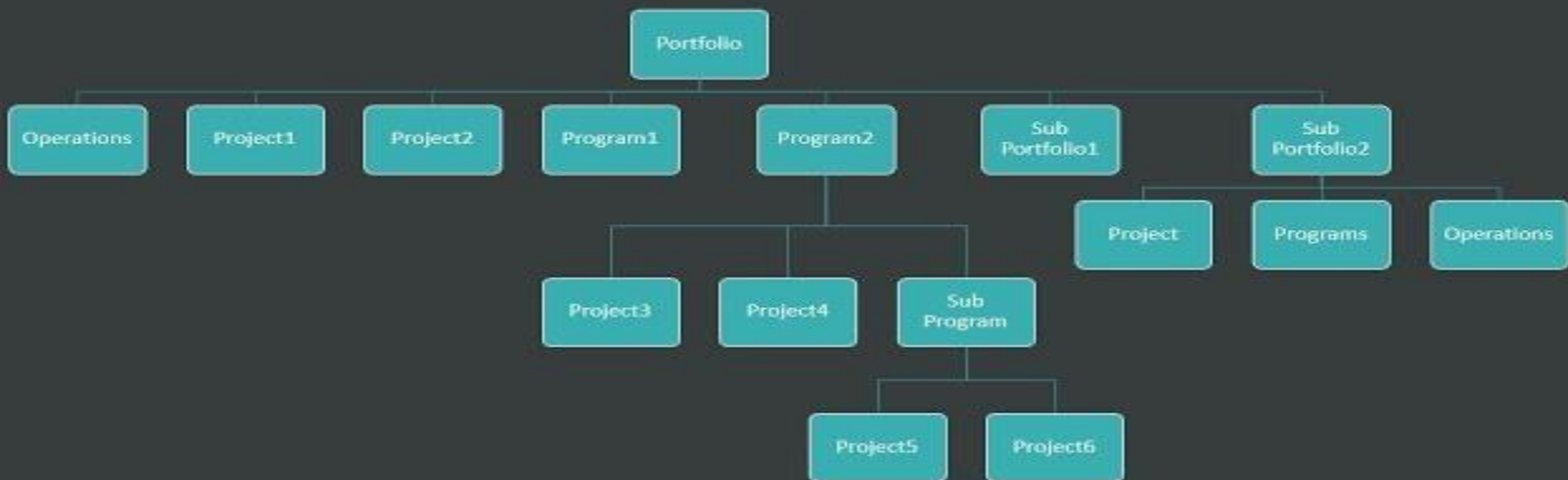
3 main features of a project are :

- Temporary - definite beginning and definite end
- Unique result – even if repeated
- Progressive Elaboration – incremental development

Projects, Programs, Portfolios



Relationship between: Portfolios, Programs, Projects and Operations





Management

Management is about carrying out the directives (from senior management or from the board of directors) to achieve goals and objectives.

Standard phases involved :

- Initialising
- Planning and organizing (making a detailed plan)
- Allocating resources (time, cost)
- Executing (monitoring, steering)
- Closing (goals and objectives achieved)

Project Management

The application of **methods, tools, techniques** and **competencies** to a project

 21500:2012

 PMBOK

 10006:2003

IPMA[»] ICB

Hermes

 #748

CCPM

 Systems Engineering Handbook NASA/SP-2007-6105 Rev1

INCOSE **G2SEBOK**

 EUROPEAN COORDINATION FOR SPACE STANDARDISATION



SCRUM
+KANBAN

RUP
RATIONAL
UNIFIED
PROCESS

 PRINCE2

GDPM

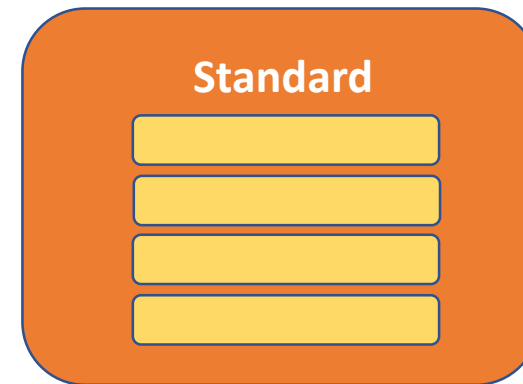
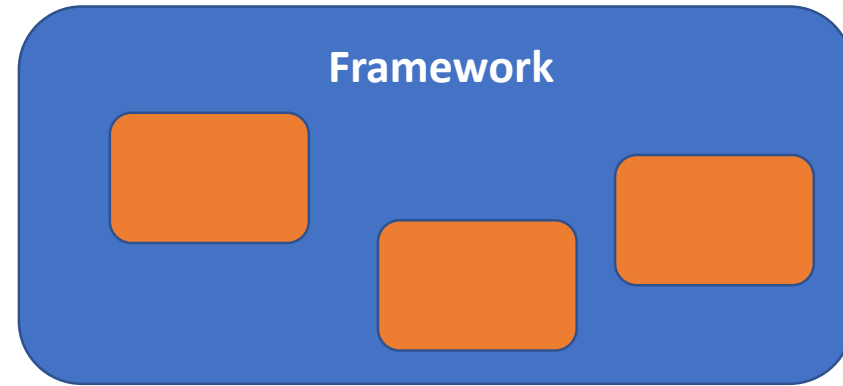
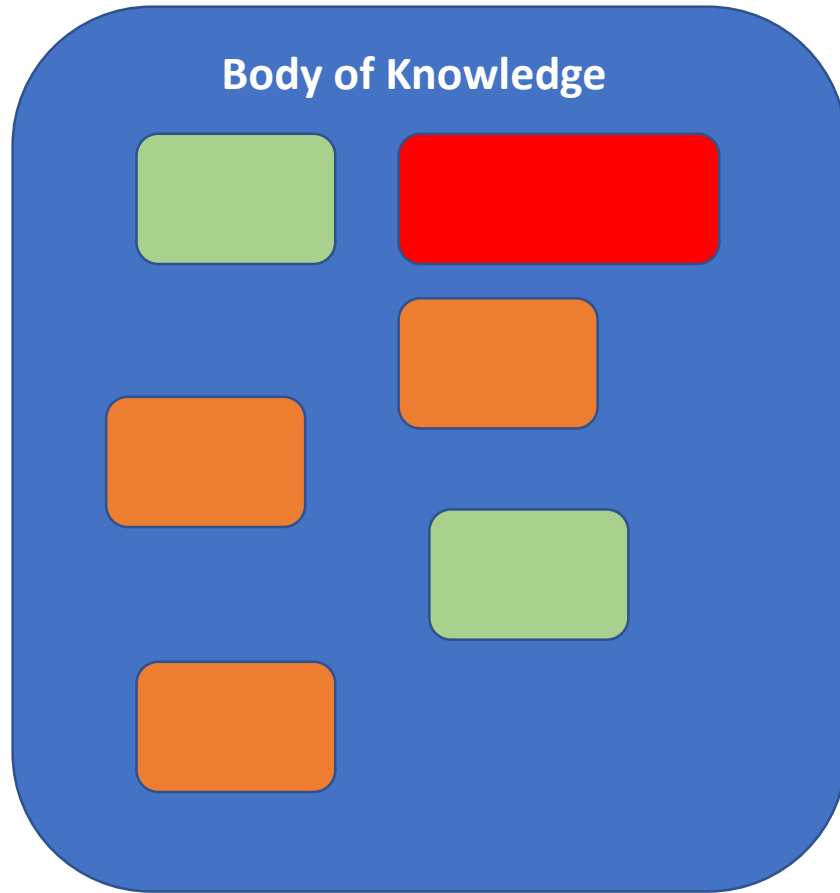
XP
EXTREME
PROGRAMMING

 21500:2012

What is a process ?



Body of knowledge, Framework, Standard



Process map of the PMBok version 6



This course



In a project

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

PMBok Version 6
Page 25

- 10 Knowledge areas
- 49 processes
- 5 process groups

PMBok – PMP exam knowledge areas

Knowledge Area	Percentage
Introduction to Project Management	6%
Project Environment (6%)	6%
Role of the Project Manager	7%
Project Integration Management	9%
Project Scope Management	9%
Project Schedule Management	9%
Project Cost Management	8%
Project Risk Management	8%
Project Procurement Management	4%
Project Stakeholder Management	9%
Project Quality Management	7%
Project Resource Management	8%
Project Communication Management	10%

OpenSE for Science Projects



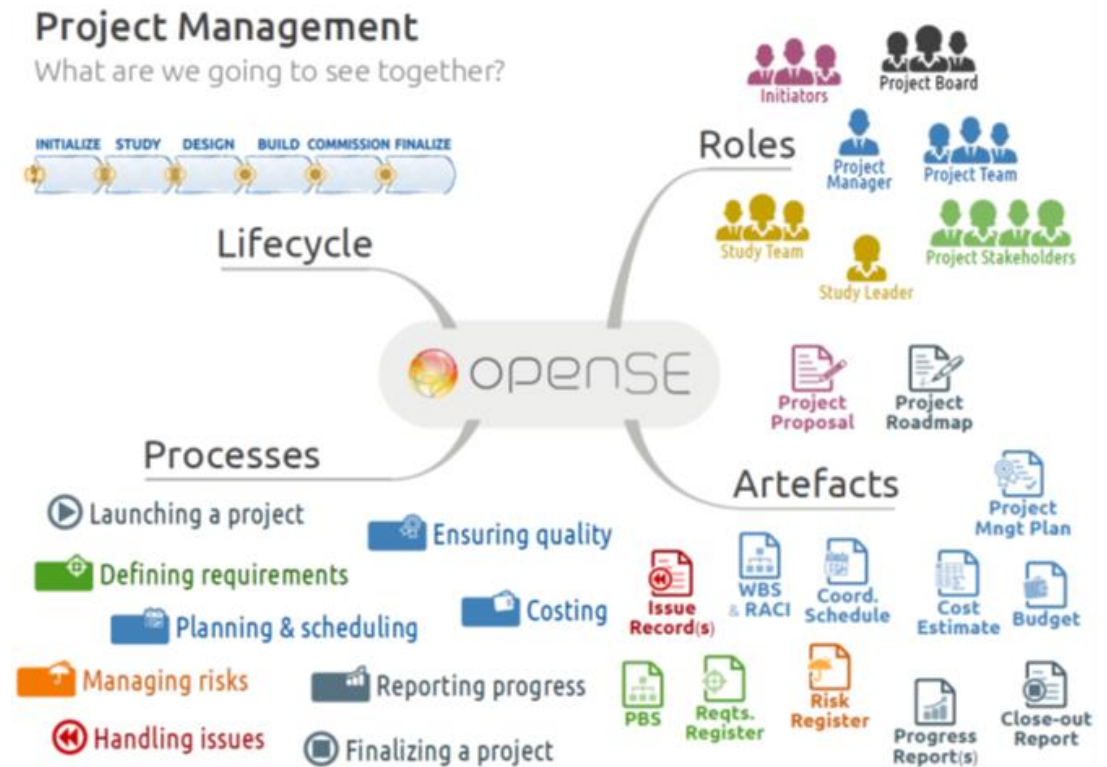
openSE

an **open, lean** and **participative**
approach to **systems engineering**

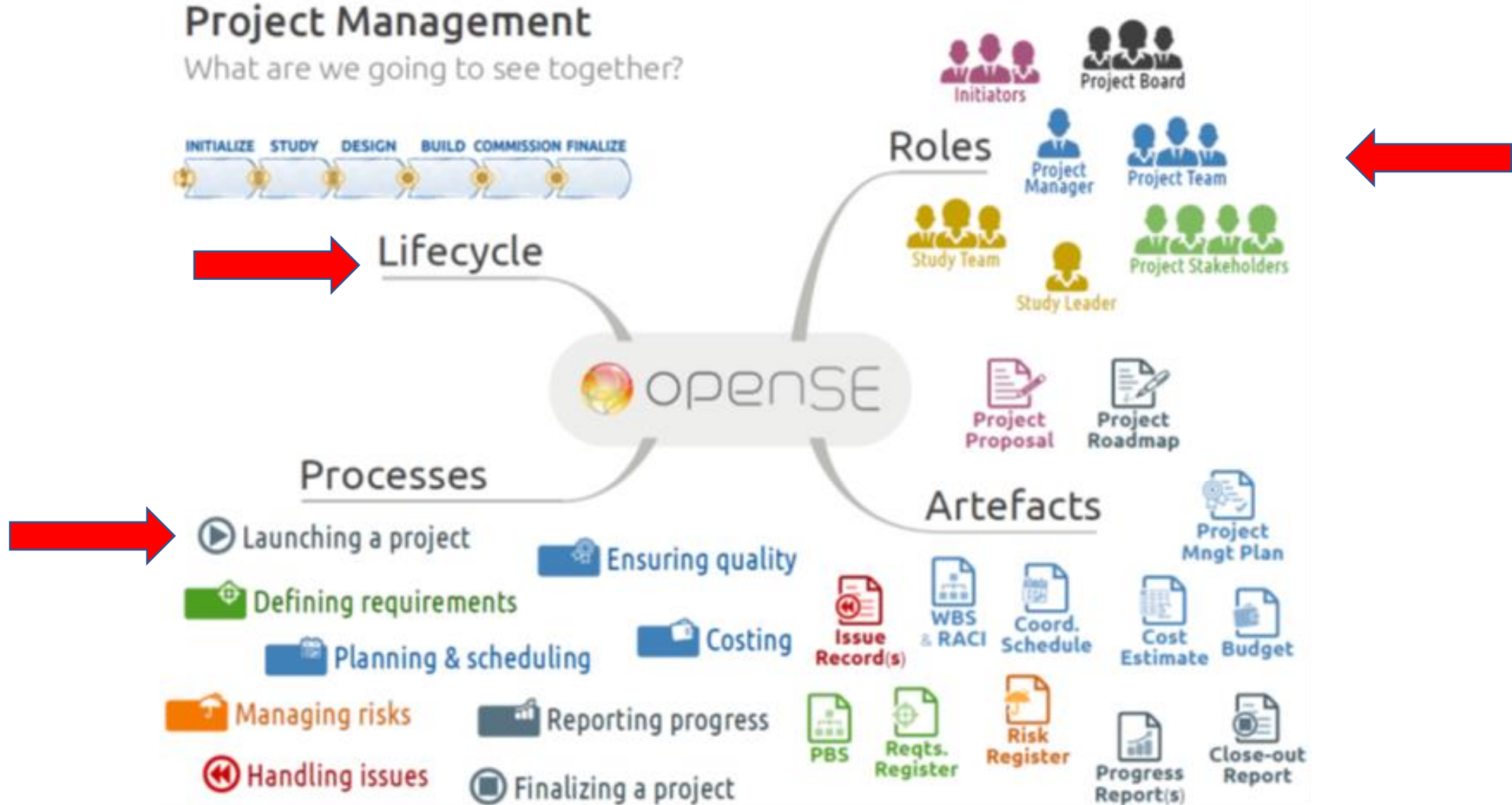


Managing Projects with openSE

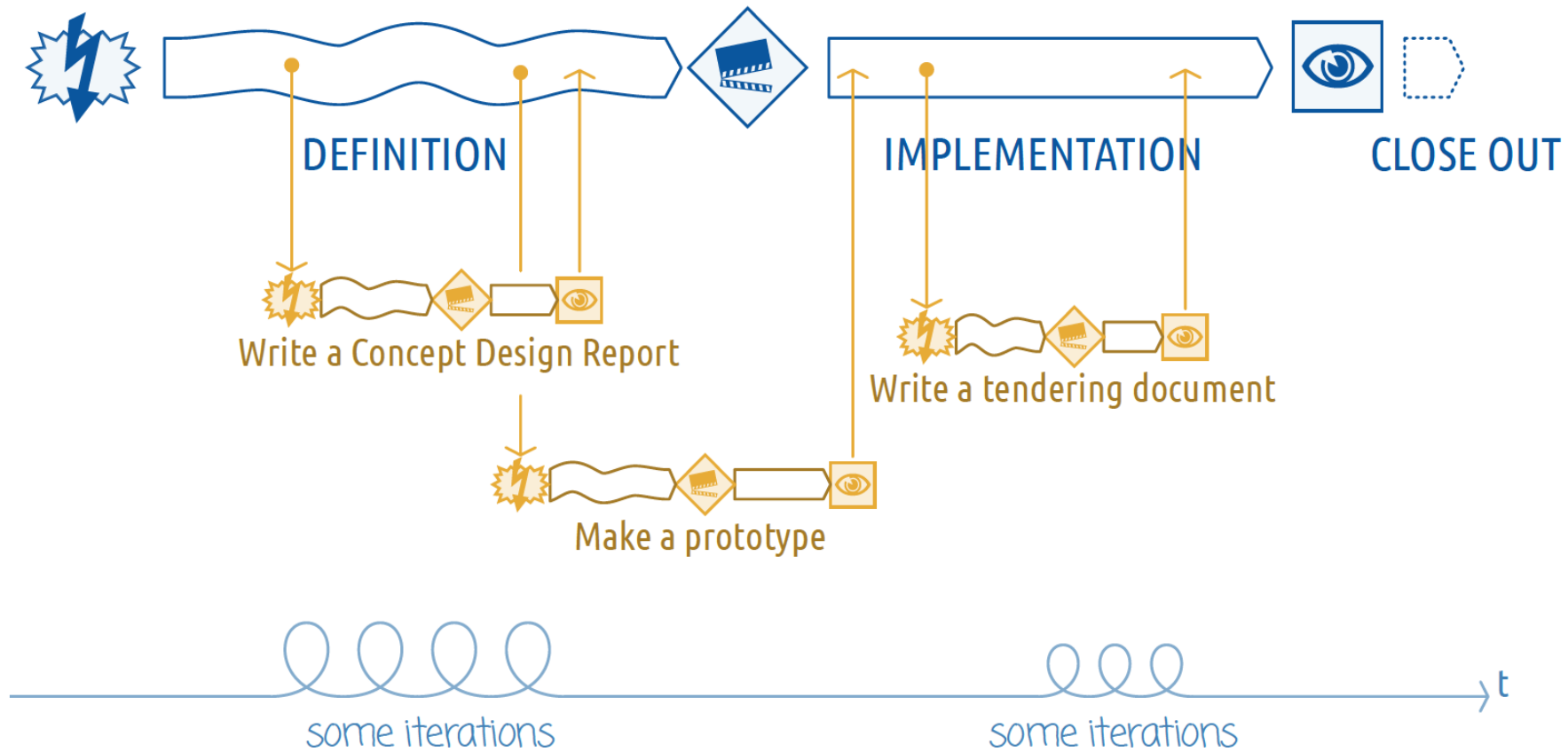
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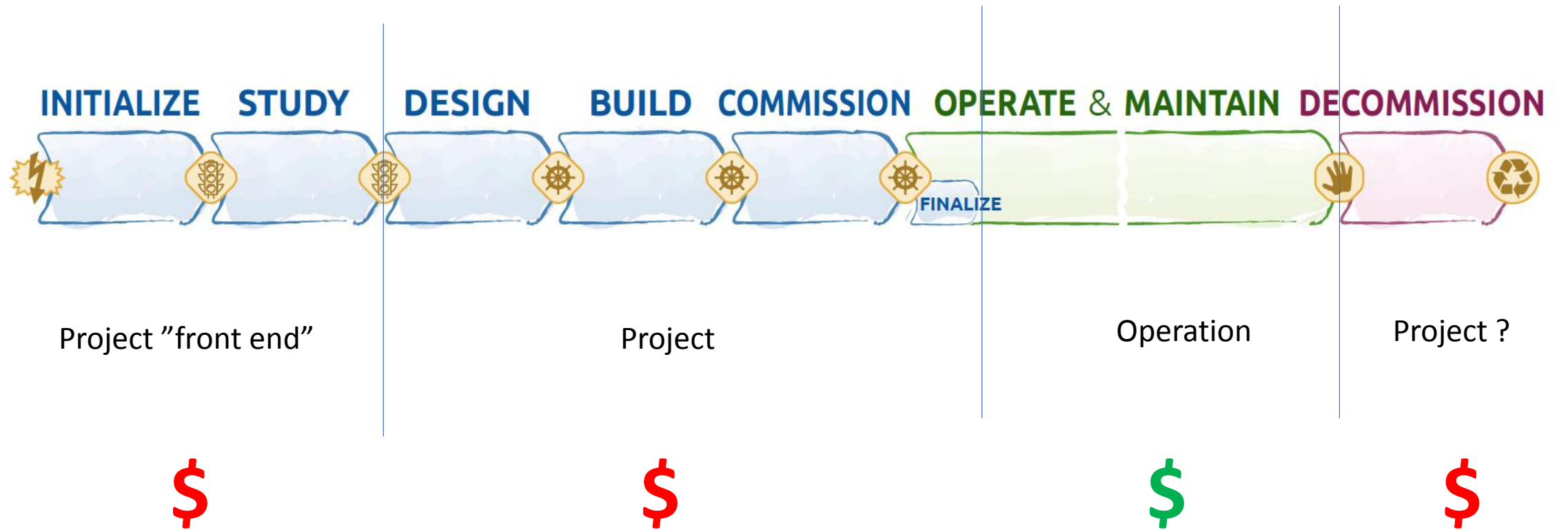
OpenSE - framework



Project Lifecycle



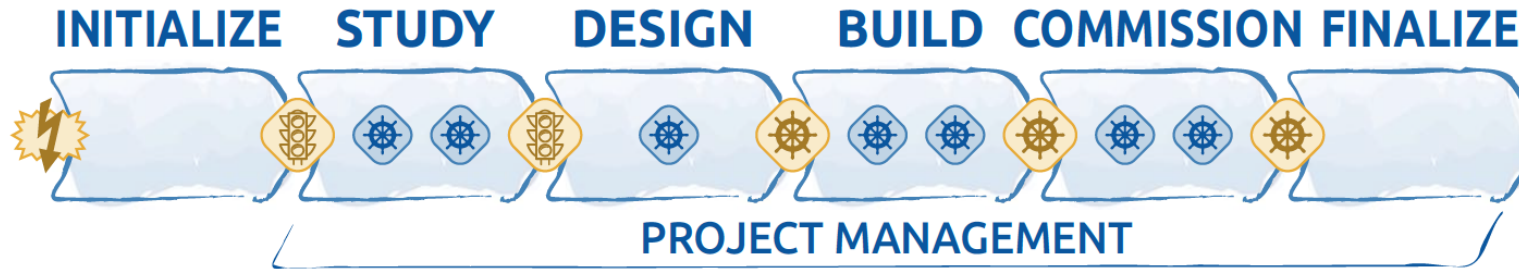
Product Lifecycle





- The A380 came on the market in 2007 the development costs were about \$25 billion.
- AIRbus recently made the decision to stop the production of the A380 as from 2021. There are no more clients for this type of aircraft !
-
- The A380 has been in production since approximately 10 years but the sales were disappointing from the beginning
- The first aircraft was delivered to Singapour Airlines in 2007 but is now headed for the scrapyard
- The catalogue price is 445 Moi USD per plane

Phases and decision points



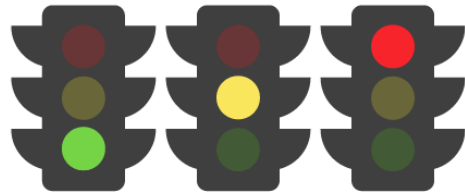
Phase



Support process



Emerging need or problem



Gonogo decision point

Inter-phase decision points

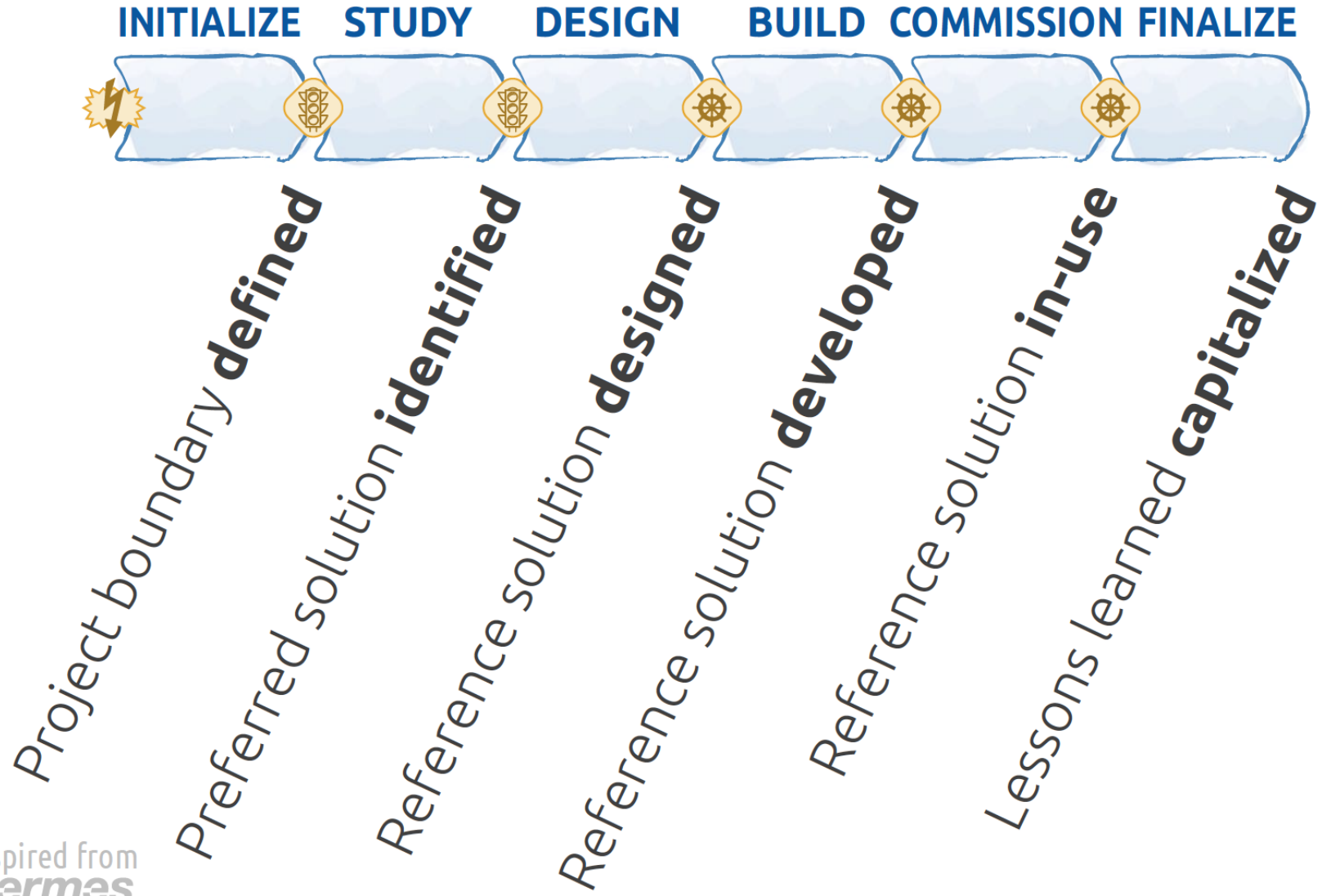


Drift decision point

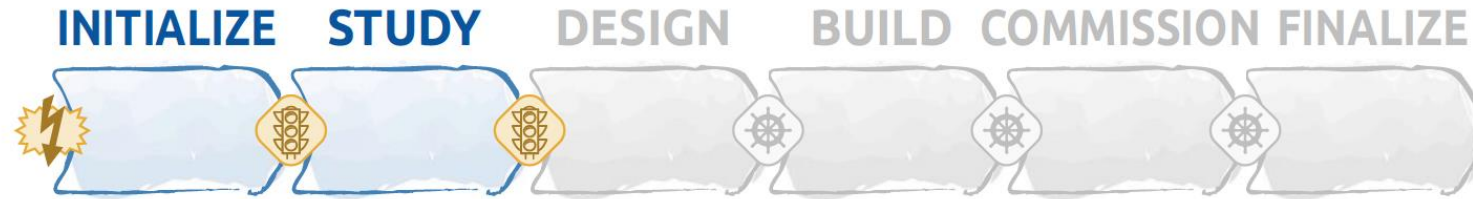


Intra-phase decision point

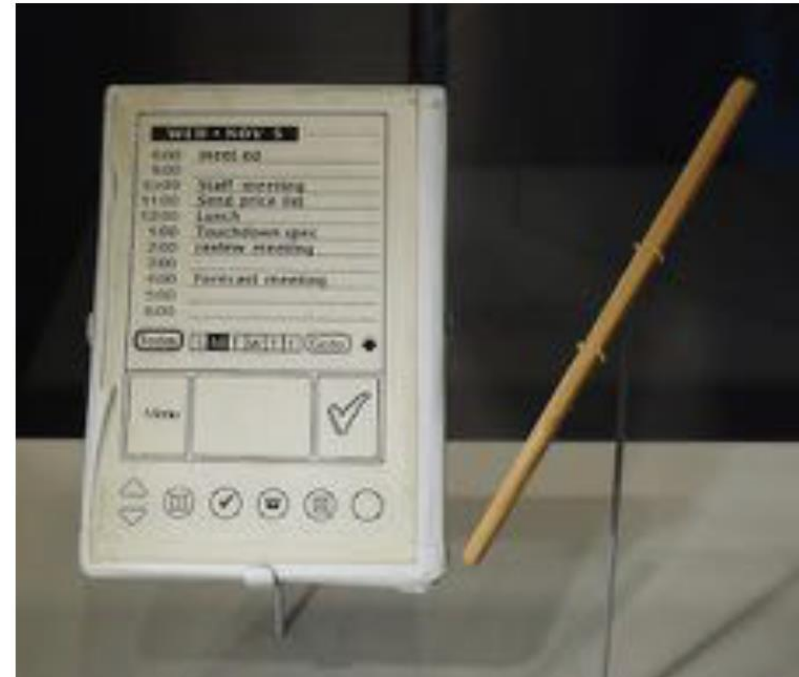
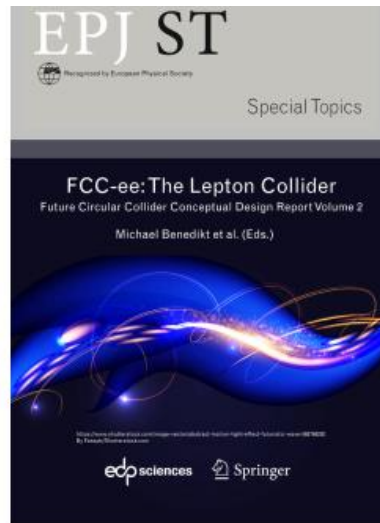
Stepping stones



Study Phase (Project Front End)



CDR
Conceptual
Design Report



Development phase



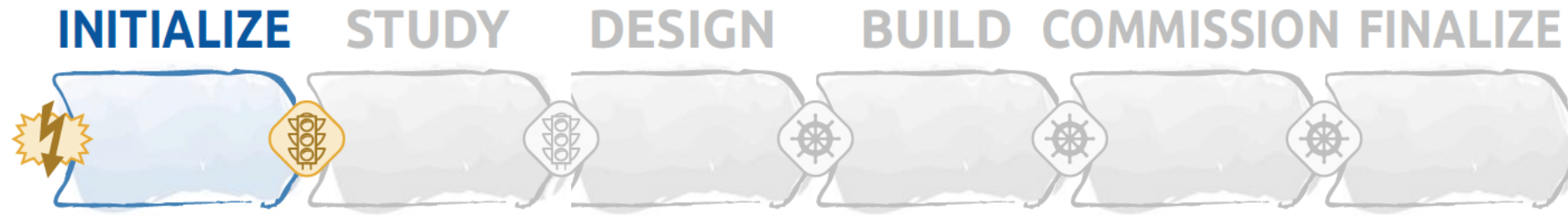

CDR
Conceptual
Design Report


TDR
Technical
Design Report


**Project / Product
Documentation**

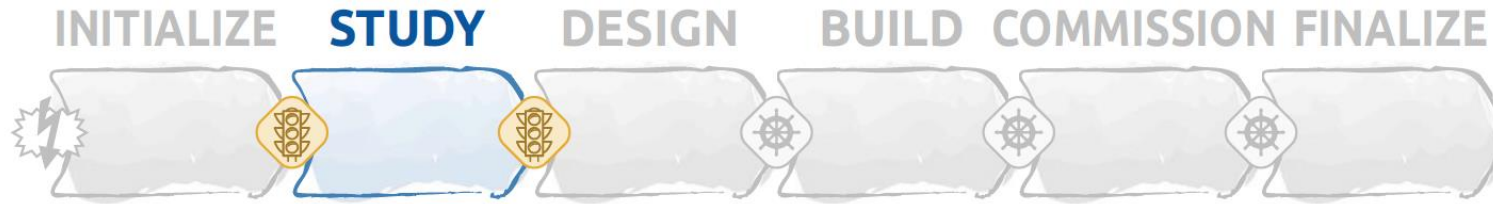


Initialise phase



- ➔ Analyse the **current situation**; define the **problem**
- ➔ Propose some **possible solutions**

Study phase



- Define more precisely the **scientific/user requirements**
- Convert the gathered UR's into **product/systems requirements**
- Identify straightforwardly all possible solutions
- Propose one solution and demonstrate its **feasibility**
- If required, develop **prototypes**, mock-ups...

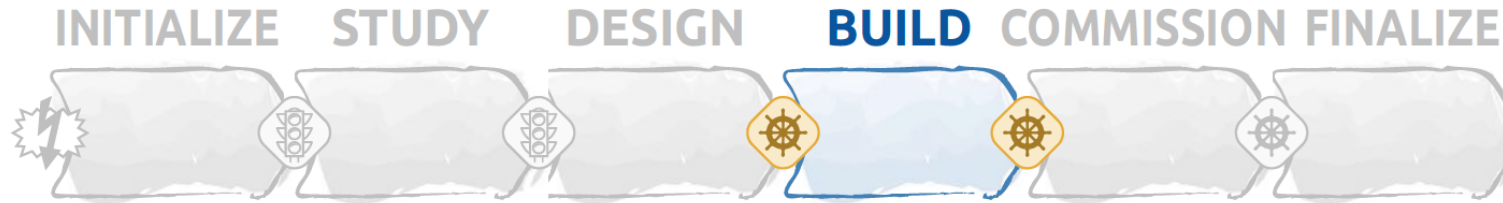


Design phase

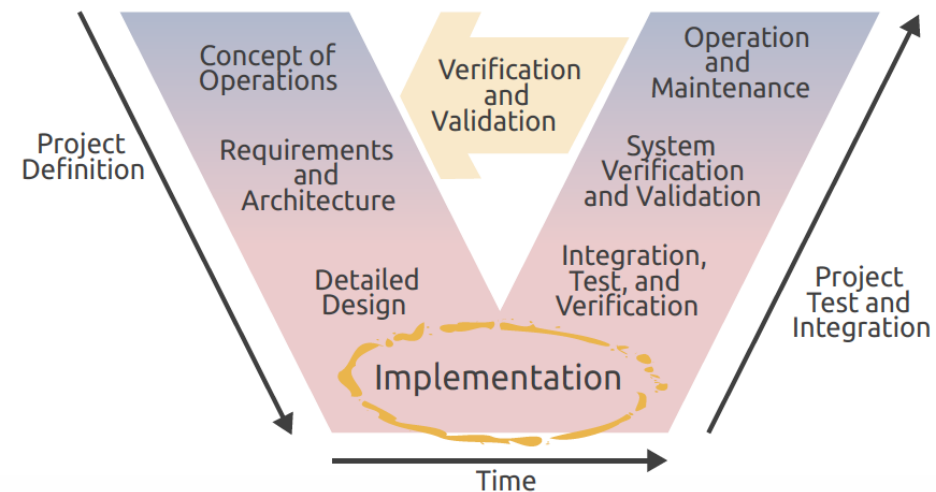


- Finalise the definition of the **scientific/user requirements**
- Finalise the **product/systems requirements** accordingly
- Design the solution (design and engineering tasks)
- Plan the **BUILD** and **COMMISSION** phases
- If required, develop further prototypes, mock-ups...

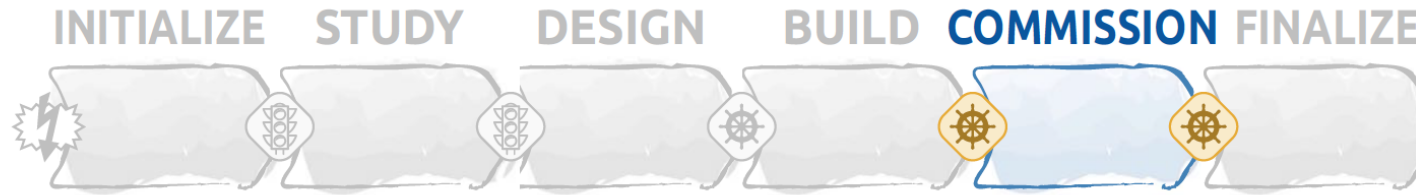
Build phase



- Perform the **detailed design**
- **Materialize**, i.e. procure, manufacture, assemble...
- **Verify** and **validate** at components and subsystems levels

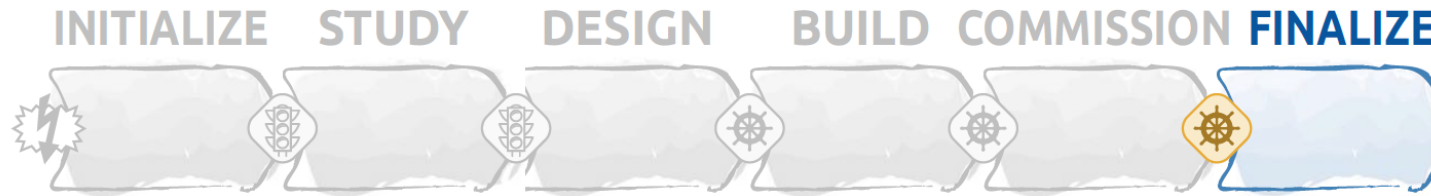


Commissioning phase



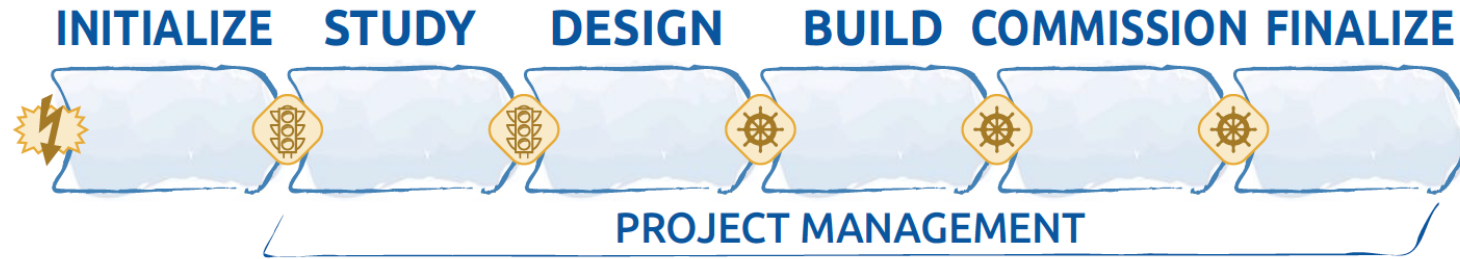
- Further **validate** (i.e. commission) at systems level
- Refine and ramp-up
- **Train** of the users
- Adapt to the evolving context

Finalising phase



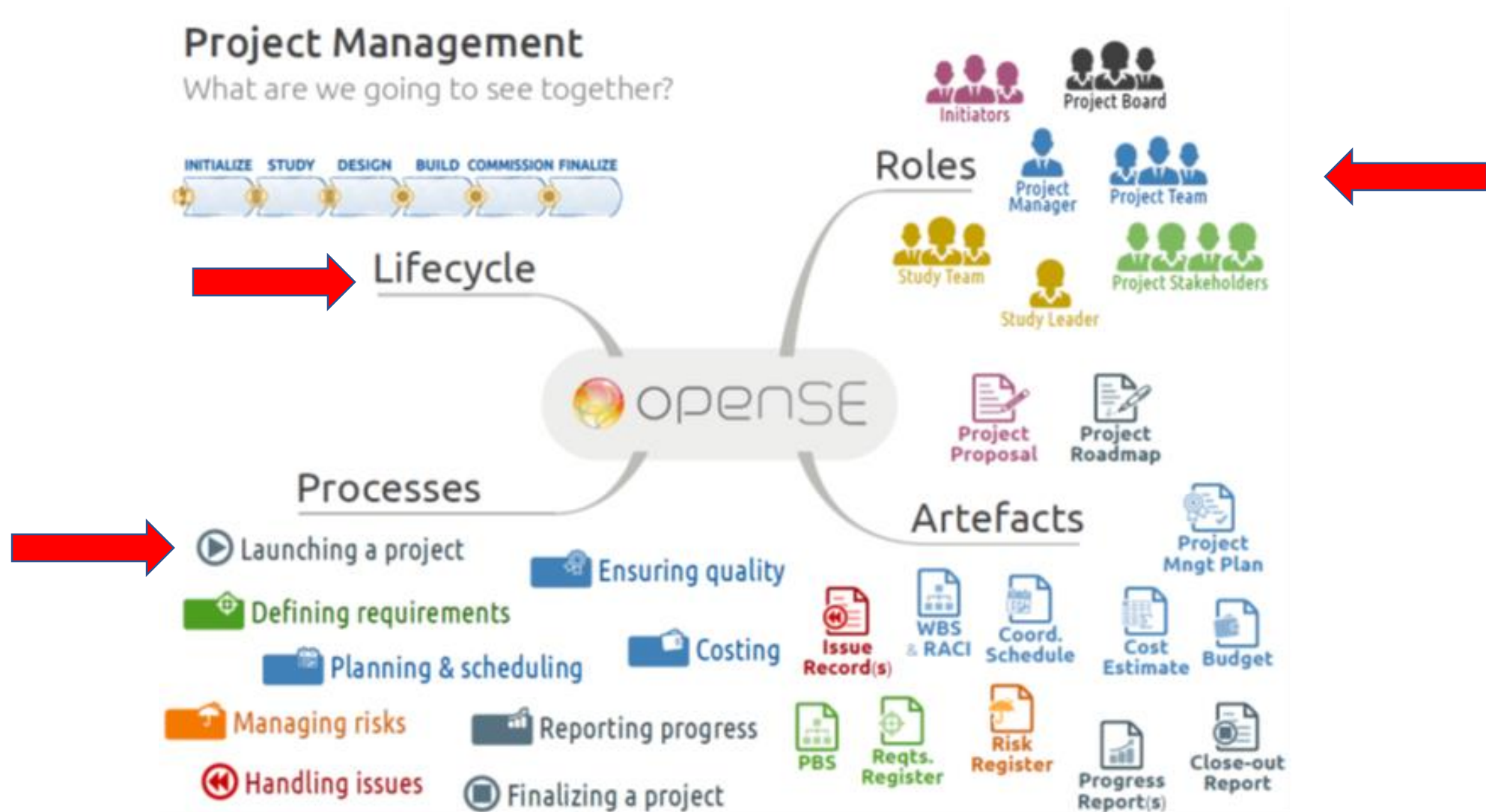
➔ **Capitalize** of the lessons learned

Finalising phase

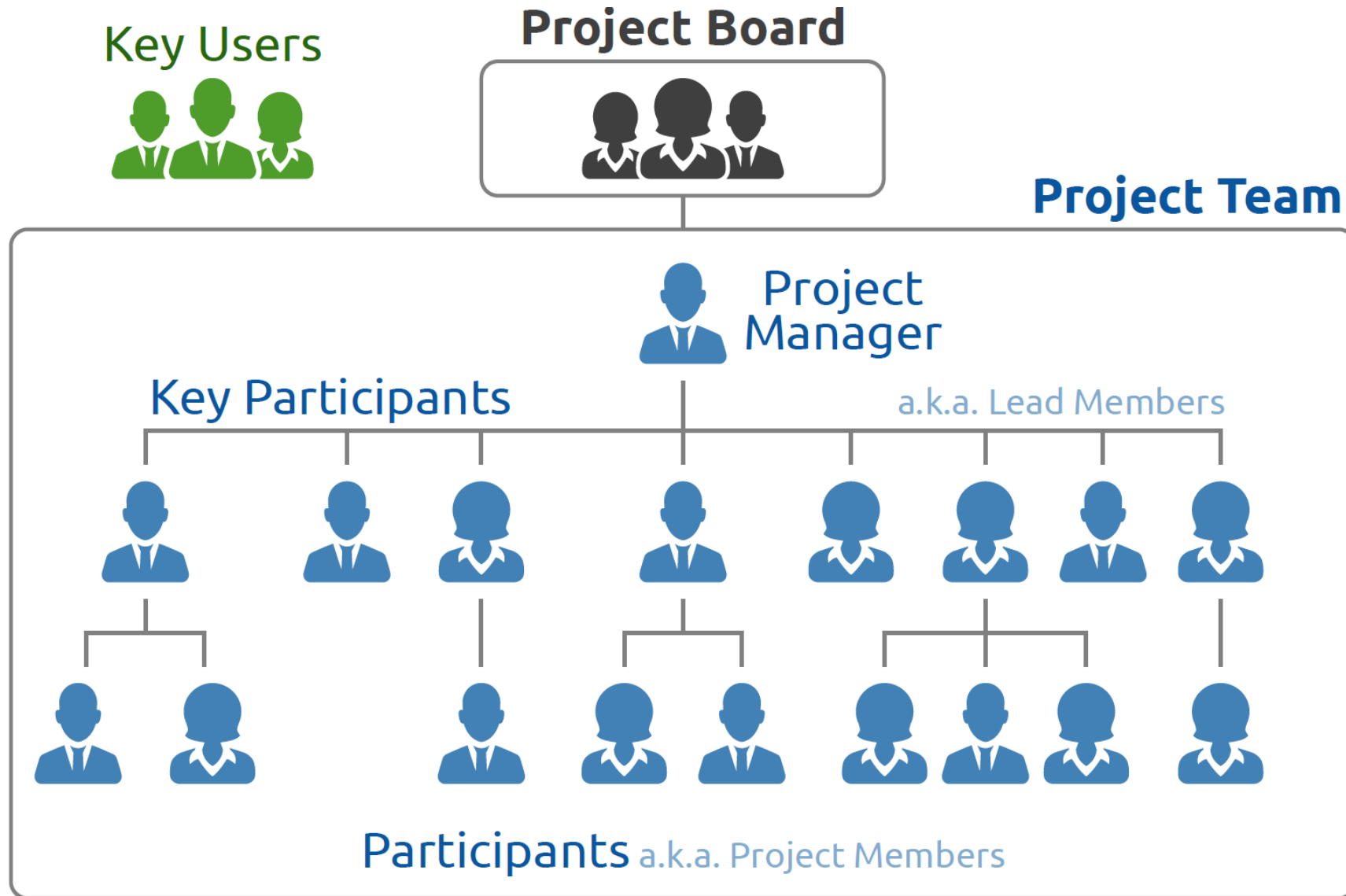


- Project **Integration** Management
- Project **Scope** (i.e. various Breakdown Structures) Management
- Project **Time** (i.e. Project Master and Coordination Schedules) Management
- Project **Resource** and **Cost** (incl. Budgets and Follow-up) Management
- Project **Human Resource** (i.e. Project Staffing and Leadership) Management
- Project **Quality** (incl. Configuration Management) Management
- Project **Communication** (incl. Project Marketing) Management
- Project **Risk** (incl. Safety, Security, Environmental Impact) Management
- Project **Procurement** (incl. Supply Chain, In-kind Contributions) Management

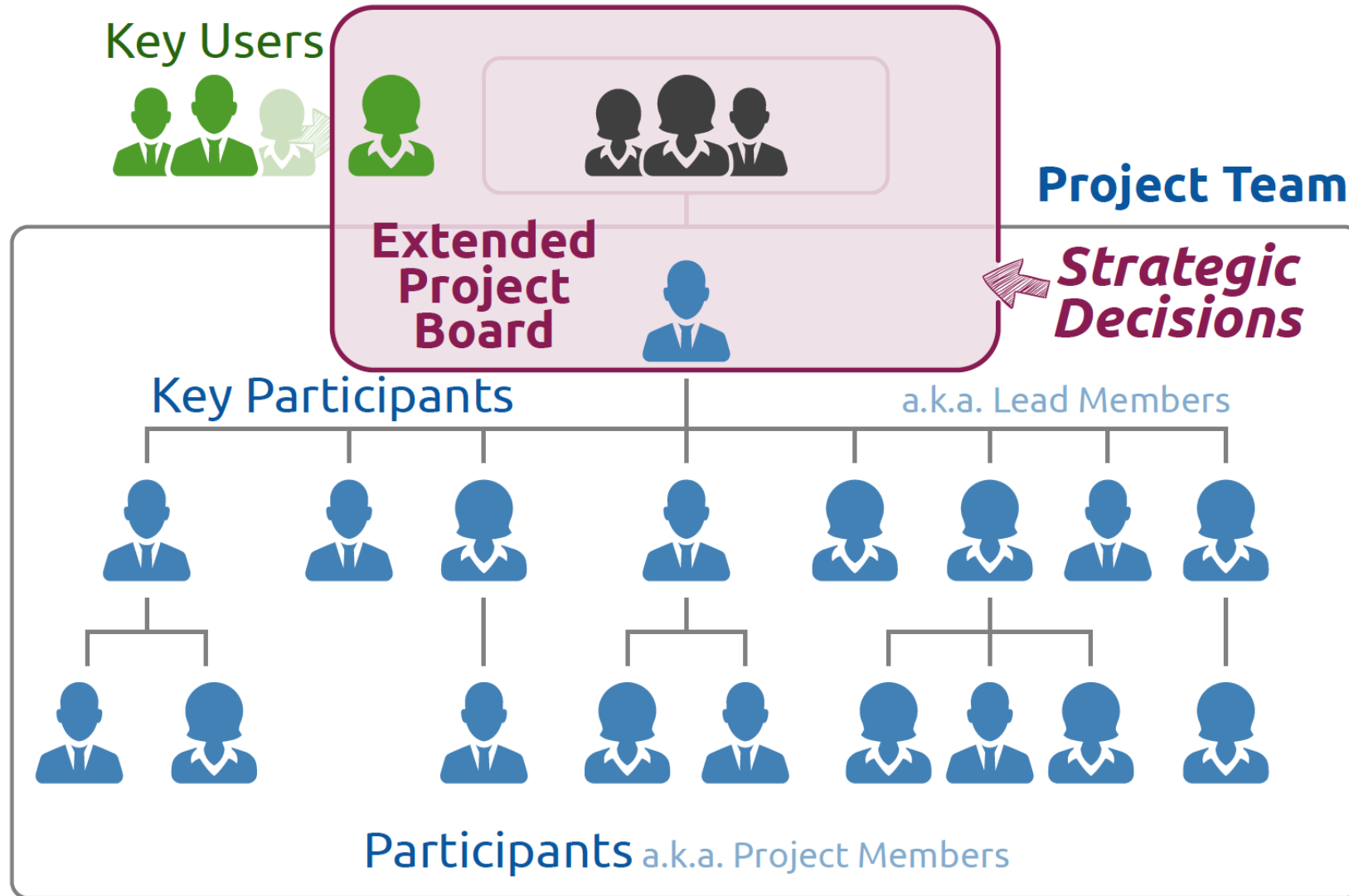
OpenSE - framework



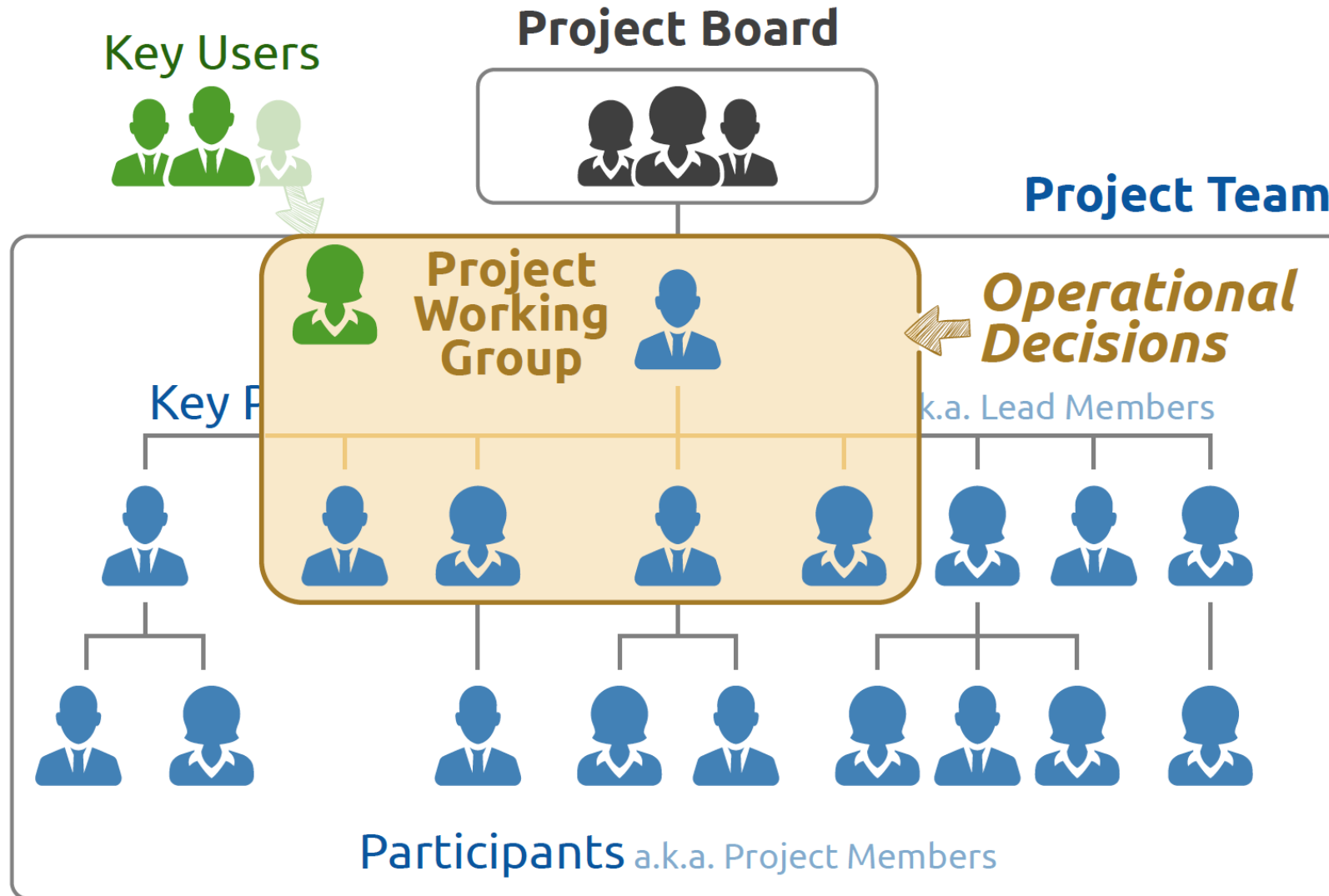
OpenSE - roles



OpenSE – strategic decisions



OpenSE – operational decisions



OpenSE – project board



Project Board (PB)

Strategic/Steering Board/Committee,
Project Owner, Product/Systems Owner,
Comité de projet (CoP),
Comité de pilotage (COFIL),
Donneur d'ordre,
Maître d'ouvrage (MOU),
Projektausschuss,
Comitato di progetto...



- Ensure the **strategic management** of the project
- Is ultimately responsible w.r.t. successful completion of the project
- Guarantee the acquisition and availability of resources
- Validate transitions between phases (and intra phases also)
- In case of conflict or disagreement within the project team, arbitrate

OpenSE – project manager

Responsibilities



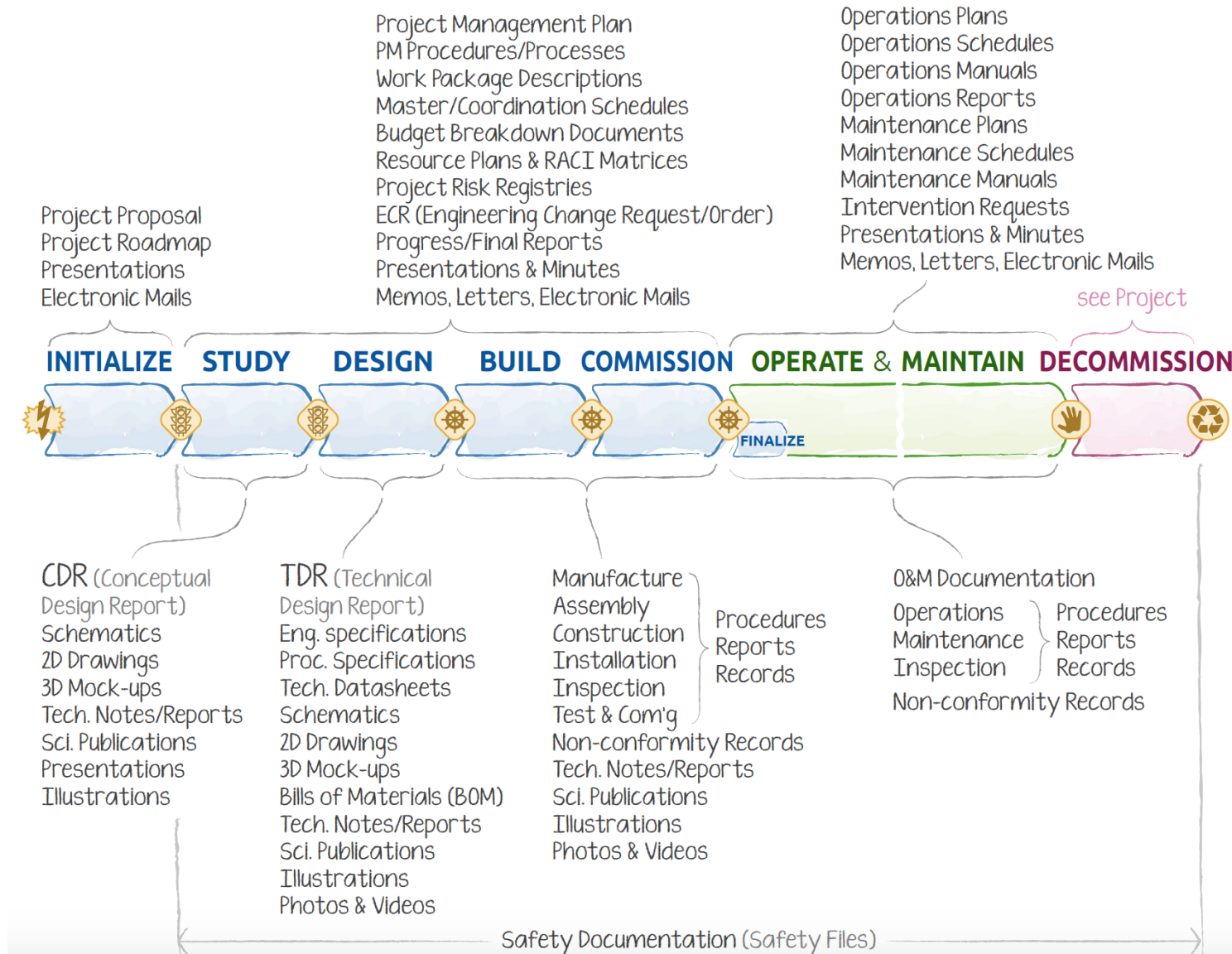
Project Manager (PM)

Project Leader (PL), Project Coordinator, Coordinator,
Chef de projet (CP), Maître d'œuvre (MŒU),
Projektleiter (PL), capoprogetto (CP)...

- Ensure the **operational management** of the project
- Is responsible for the **organisation** of the project and for its coordination

Most of **project management**
is about setting this organisation

Project Management Artefacts



OpenSE – artefacts

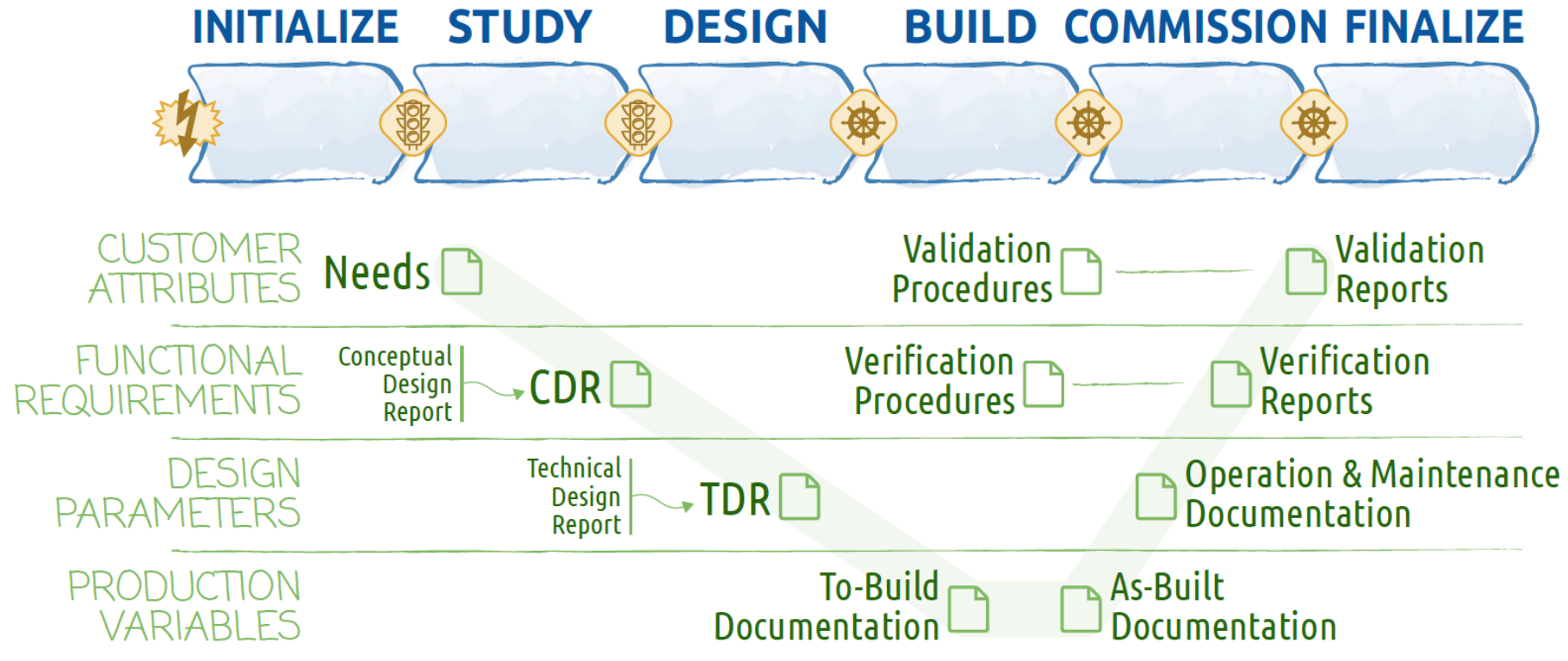


8 documents!

OpenSE – artefacts for managing the project



OpenSE – technical project documentation

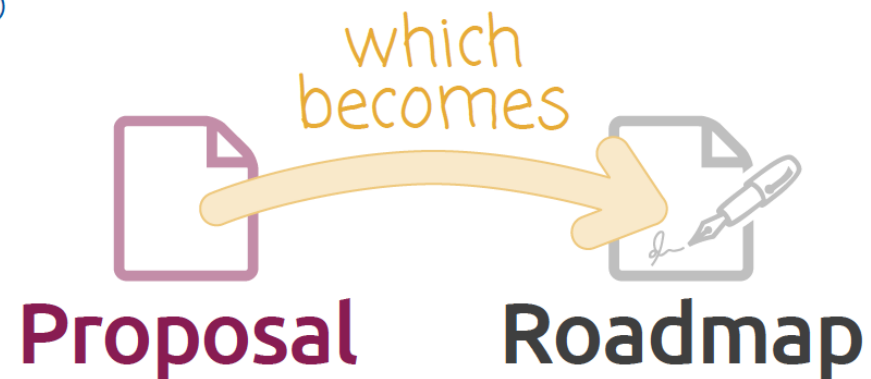


OpenSE – project charter

It is a document that summarizes the direction to be followed by the project team (for the **STUDY**, **DESIGN**, **BUILD** and **COMMISSIONING** phases)

Other names for this document:

- ➔ (Project) Charter
- ➔ (Project) Mandate ← (e.g. GDPM)
- ➔ (Project) Mission Statement
- ➔ (Project) Brief



OpenSE – project charter contents

- 0 **Executive Summary** To the attention of the Project Board
- 1 **Initial Situation** Problem statement, rationale, current situation
- 2 **Project Objectives**
- 3 **Possible Solutions**
- 4 ***A priori* Preferred Solution**
 - 4.1 Description of the preferred solution
 - 4.2 Stakeholders and “approched Project Board” membership
 - 4.3 Phasing, project organization, masterplan
 - 4.4 Required resources
 - 4.5 Outcomes and benefits of the project
- 5 **Preliminary Risk Register**

OpenSE – editorial process for charter

➔ **Authoring:**

Project Initiators



➔ **Verification:**

Some experts in the field

The foreseen Project Manager

A few possible Key Project Participants

➔ **Validation:**



OpenSE – project roadmap

- 0 Executive Summary
- 1 Initial Situation
- 2 Project Objectives
- 3 Possible Solutions
- 4 *A priori* Preferred Solution
- 5 Preliminary Risk Register
- 6 **Decisions**
 - 6.1 Decisions w.r.t. the **STUDY** phase
 - 6.1.1 Validation of the PB membership and project organization
 - 6.1.2 Decision w.r.t. the preferred solution
 - 6.1.3 Decision w.r.t. budgets and masterplan
 - 6.2 Decisions w.r.t. the **DESIGN** phase
 - ⋮

OpenSE – editorial process project roadmap

➔ **Authoring:**

Project Initiators



➔ **Verification:**

Some experts in the field

The foreseen Project Manager

A few possible Key Project Participants

➔ **Validation:**

Project Board





University laboratory in urban ecology

Bee collapse syndrome of urban bees

200 beehives located on urban roofs

To date: limited to chemical analyses of honey

Need for a remote monitoring of the hives:

- ➔ Monitoring of the external environment, temperature, NO_x, etc.
- ➔ Monitoring of the internal environment, temperature, moisture, "activity" (number of bees moving in and out), etc.

Your task: drafting the **Project Proposal**

