# PROJECT MANAGEMENT
## FOCUSED ON SCIENTIFIC PROJECTS
## (AN INTRODUCTION)

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*LTH Lecture*

*15 February 2015*

*M Building, LTH, Lund, Sweden*

# Outlook

- *What is the Project Management (PM)?*
- *A brief history of PM*
- *PM Environment & Project Life-Cycle*
- *PM Organization*
- *PM Stakeholders*
- *The role of Project Managers*
- *Scientific Projects*
- *Project Management Plan*
- *Basic Project Documentation vs. Project Life-time*

# Definition

Project Management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements.

Project is a temporary endeavor undertaken to create a unique product, service or result.

[Ref: PMBOK fifth edition (2013)]
The PMBOK guide is a recognized standard and a guidelines for managing projects.

# The evolution of a discipline (1/4)

Some degree of PM is needed for any project, and the more complex the project, the greater the need of the management and the more formal the processes become.

[Ref: C. Desmond, *Why is PM important, especially in Engineering Project?,* IEEE Engineering Management Review, vol. 40 (2012)

# The evolution of a discipline (2/4)

Project Management, in its modern form, began to take root only during and after the World War II.

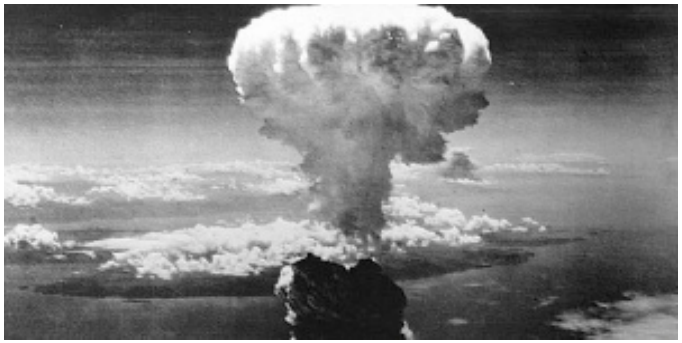
**Why do we recognize Project Management just during/after the World War II?**

**For example, were the Pyramids or the Florence Cathedral (Brunelleschi) not so complex projects?**

# The evolution of a discipline (3/4)

In particular, the Manhattan Project, in which the first atomic bomb was designed and built (in the 1940s) is generally considered the first project to use modern project management techniques. The project involved 125,000 labors, and cost nearly $2 billion.

Why?



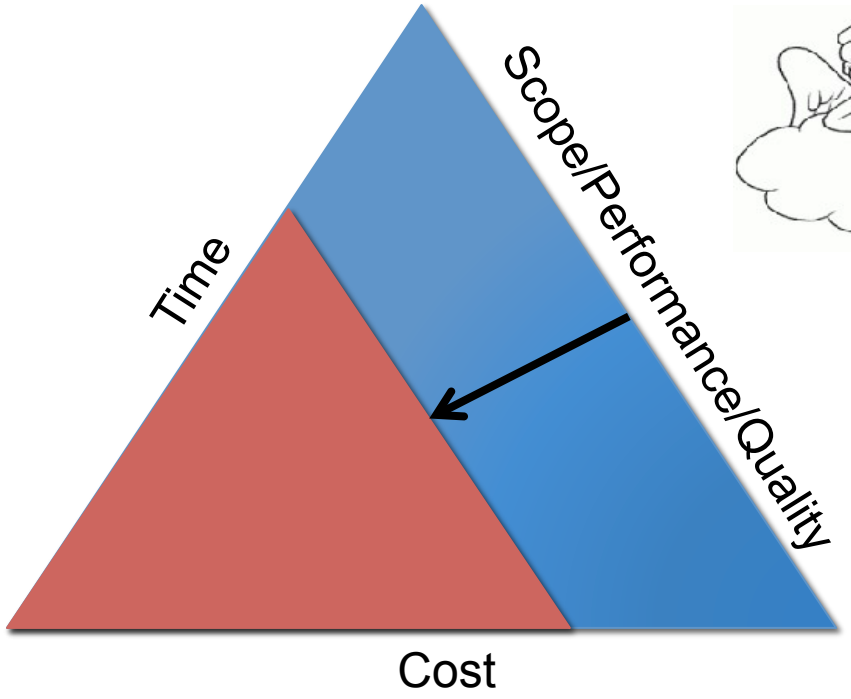
Because there was many facets, no one was able to be responsible for all the technical decision.

# The evolution of a discipline (4/4)

Since then, the U.S. government has been a leader in developing and promoting project management techniques, for the very good reason that these techniques continue to be necessary to manage its huge defense, space, nuclear and civil projects.

# The project environment (1/2)

Scope, Cost and Time are the 3 primary variables of a project.




***Project Management Triangle***
*(or the Triple Constraint or the Iron Triangle)*
*Invented by Dr. M. Barnes (1969)*

The product/service/result should be conformant to the requirements.

The project should meet the forecasted cost estimates.

The product/service/result should be delivered according to schedule.

Change one of more of these variables, and the ones remaining will be also changed.

# The project environment (2/2)

Unfortunately, delivering project on time, on budget with high quality doesn't always mean you are successful….

Why?

**Customers and Executive Managers are the final judges of your project! In their eyes it maybe late, over budget or poor quality!**

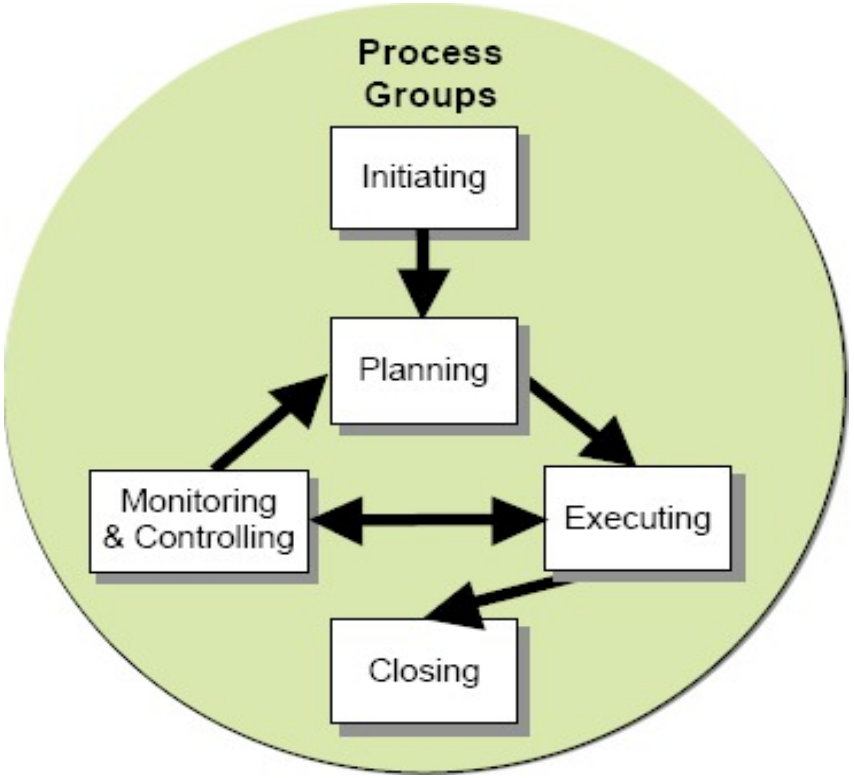
Because **your** definition of the cost-time-scope definition equilibrium may not have been the same as your customer's or executive manager's definition.

[See also: R. Atkinson, *Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria,* international Journal of Project Management, V.17 (1999)
A. Caccamese et D. Bragantini, *Beyond the Iron Triangle: Year Zero,* Proc. PMI Global Congress, Marseille, France (2012)]

# The Traditional Project Management

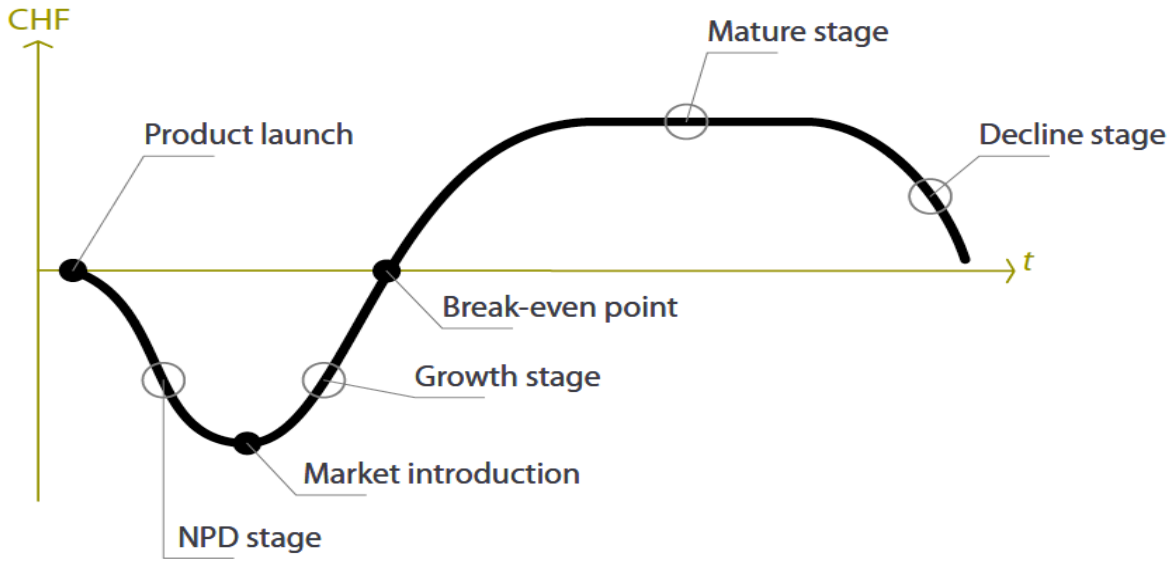
Traditionally the Project Management includes 5 process groups:

1. Initiating
2. Planning
3. Executing
4. Monitoring & Controlling
5. Closing



# The project Life-Cycle (1/7)

The idea of life-cycles were introduced by Cox in the ‘60



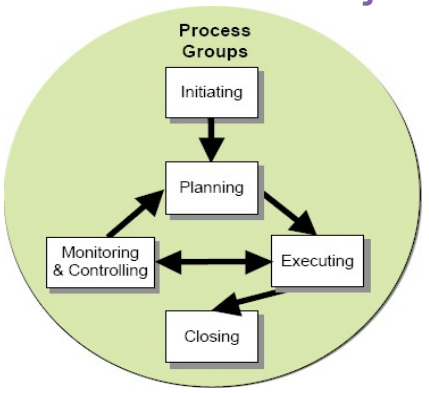

Every product passes through a series of stages in its life, with the total of the stages considered as the product life cycle. At any given time every product is located within one of four life cycle stages - introduction, growth, maturity and decline

# The project Life-Cycle (2/7)

A project life cycle is a collection of generally sequential and sometimes overlapping **Project Phases**

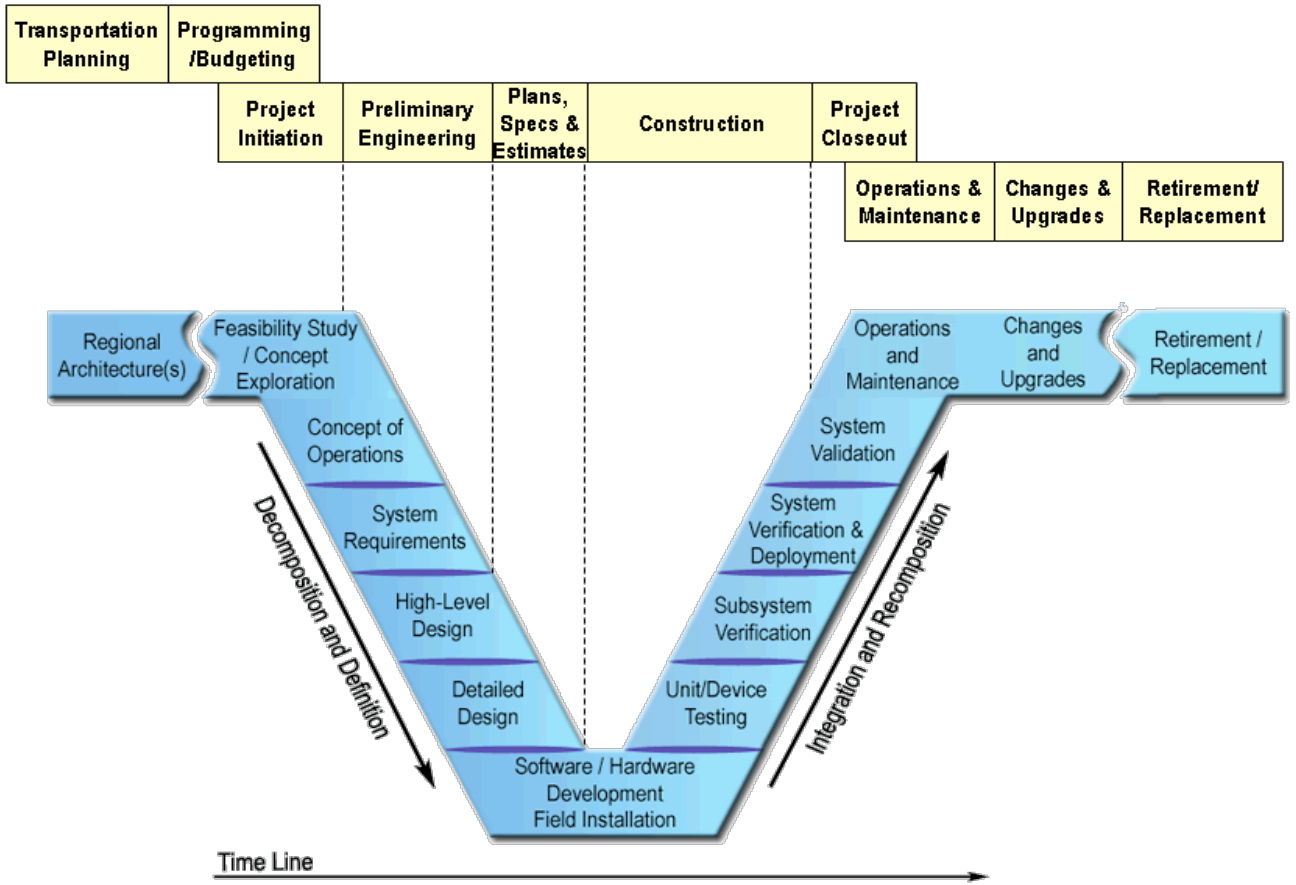

**Deming wheel/cycle**
Invented by E. W. Deming (1950) a s a management method for control and continuous improve of process and products

The **Project Phases** are divisions within a project, where extra control is needed to effectively manage the completion of a major deliverable.



# The project Life-Cycle (3/7)

The V-Model demonstrates the relationships between each phase of the development life cycle and its associated phase of testing.



# The project Life-Cycle (4/7)

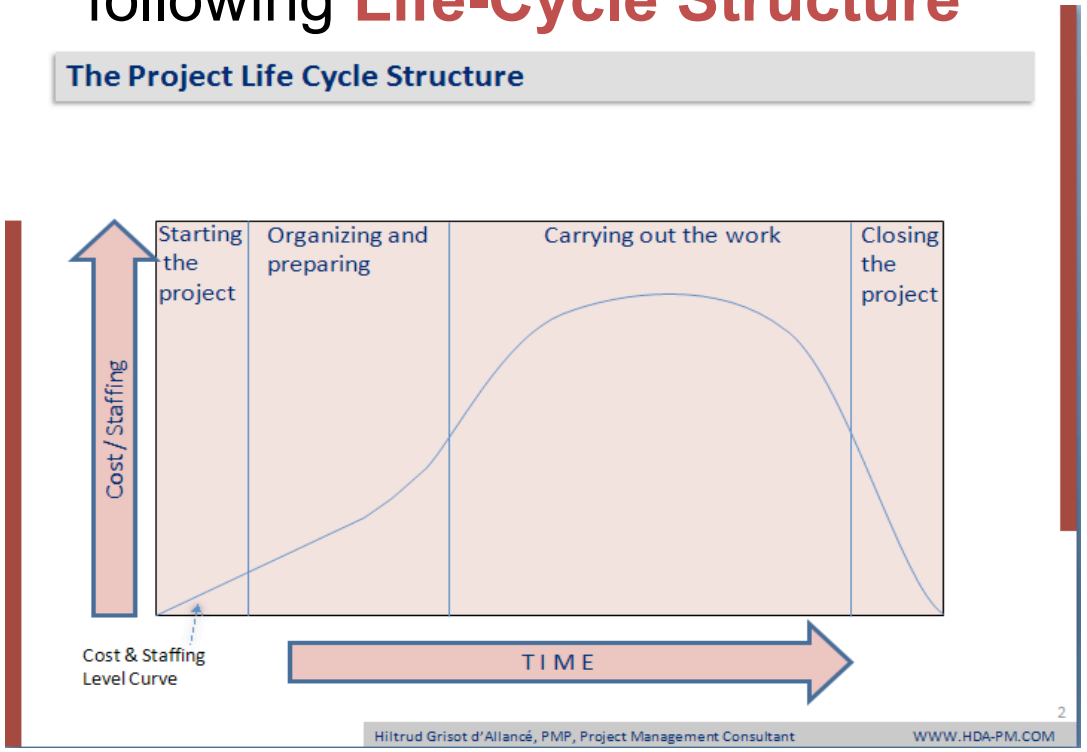

Main advantage in Phasing Projects:

- Phasing divides deliverables into sets of prioritized features → The most needed features are deployed first and others are delivered later.

- Phasing makes the project smaller at any given point in time.

# The project Life-Cycle (5/7)

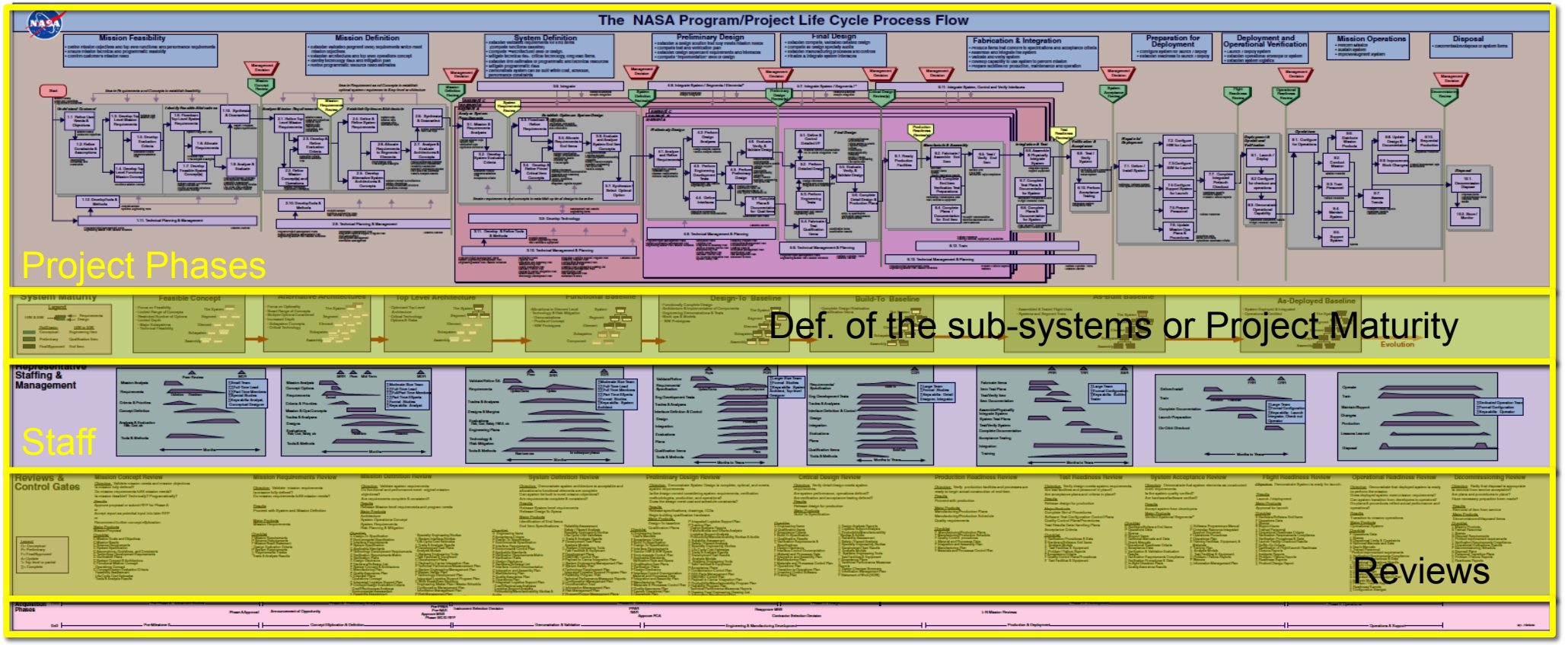
Projects vary in size and complexity. No matter how large or small, simple or complex, all projects can be mapped to the following **Life-Cycle Structure**




[Ref: PMBOK fifth edition (2013)]

# The project Life-Cycle (6/7)

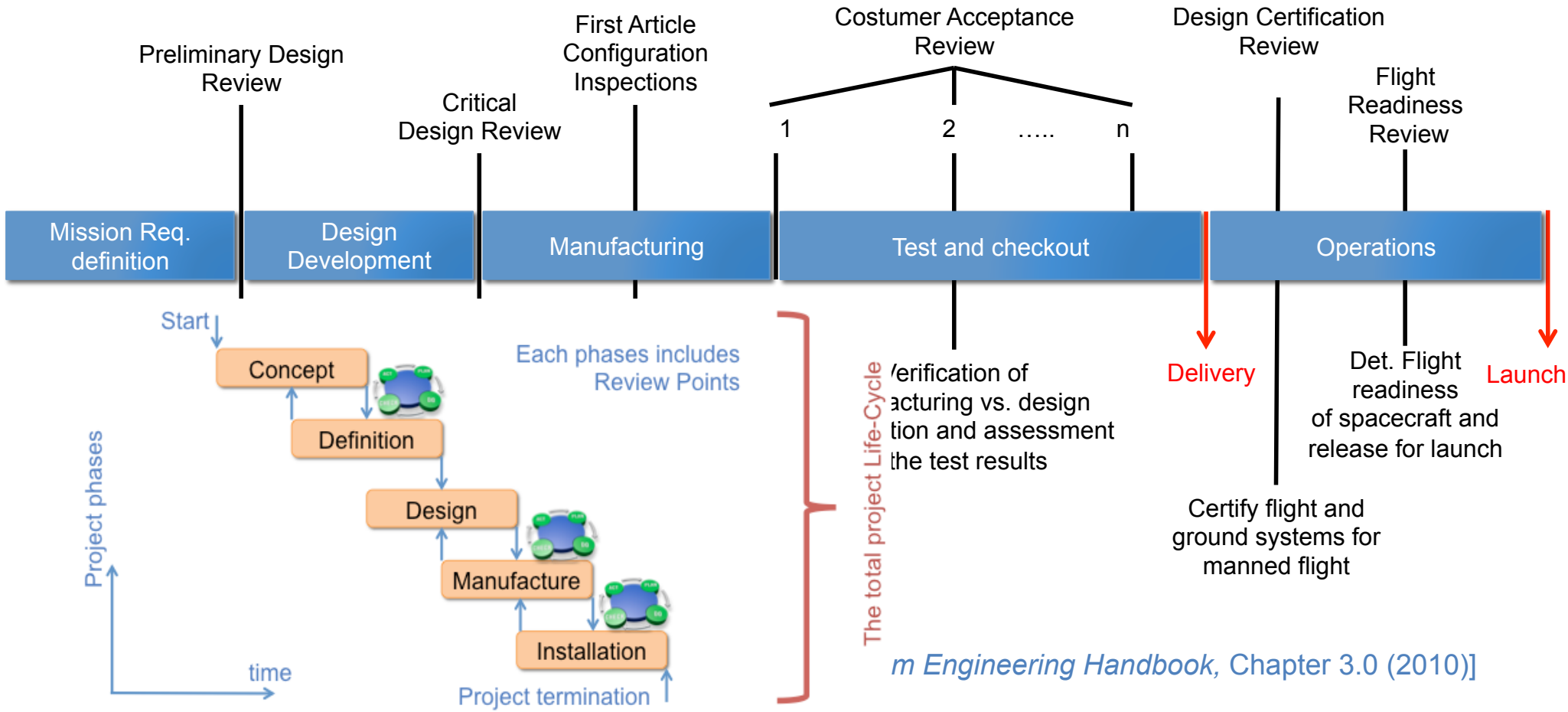
## The NASA **Program**/Project Life-Cycle




Project Macro-Phases summary

# The project Life-Cycle (7/7)

## The NASA **Program**/Project Life-Cycle




*m Engineering Handbook,* Chapter 3.0 (2010)]

# Definitions

- Project is a temporary endeavor undertaken to create a unique product, service or result.

- Program is a collection of correlated projects.

Es: The **NASA Space Program** is such that every launch of a new mission includes several dozen projects in the form of scientific experiments. Except for the fact that they are all aboard the same spacecraft, they are independent of one another and together define a program.

- Portfolio is a collection of projects or programs and other work that are grouped together to facilitate effective management of the work to meet strategic business objectives.

# Definitions

- Project Management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements.
- Program Management is the centralized coordinated management of a program to achieve the program's strategic objectives and benefits.
- Portfolio Management is the centralized management of one or more portfolios, which includes identifying, prioritizing, authorizing, managing and controlling projects, programs, and other related work, to achieve specific business objectives.
- Operation Management for the area of management concerned with overseeing, designing, and controlling the process of production and redesigning business operation in the production of goods or services.

# Project Management Organization (1/3)

The organizational culture, style and structure influence how project are performed.

# Project Management Organization (2/3)

Identifying the appropriate form of organization structure represents for top management a complex choice.

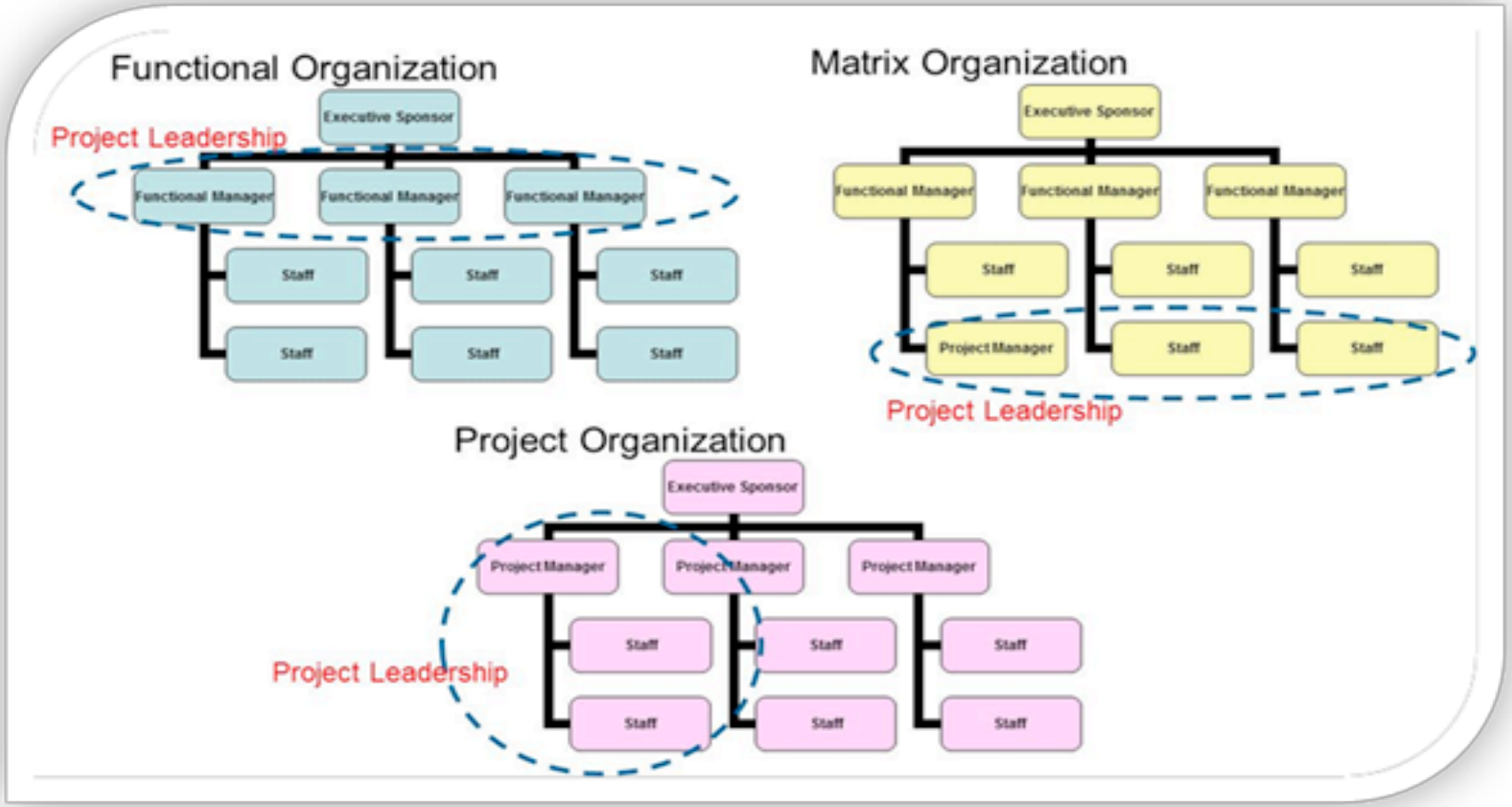

3 Main Organizational Breakdown Structures (O.B.S.):

1. Functional
2. Matrix
3. Pure Project Organization

Importance of projects in the organization

[see also: D. Bodera, *Projet Management Organization,* Management Information Systems, Vol. 3 (2008)]

# PM organization summary (3/3)

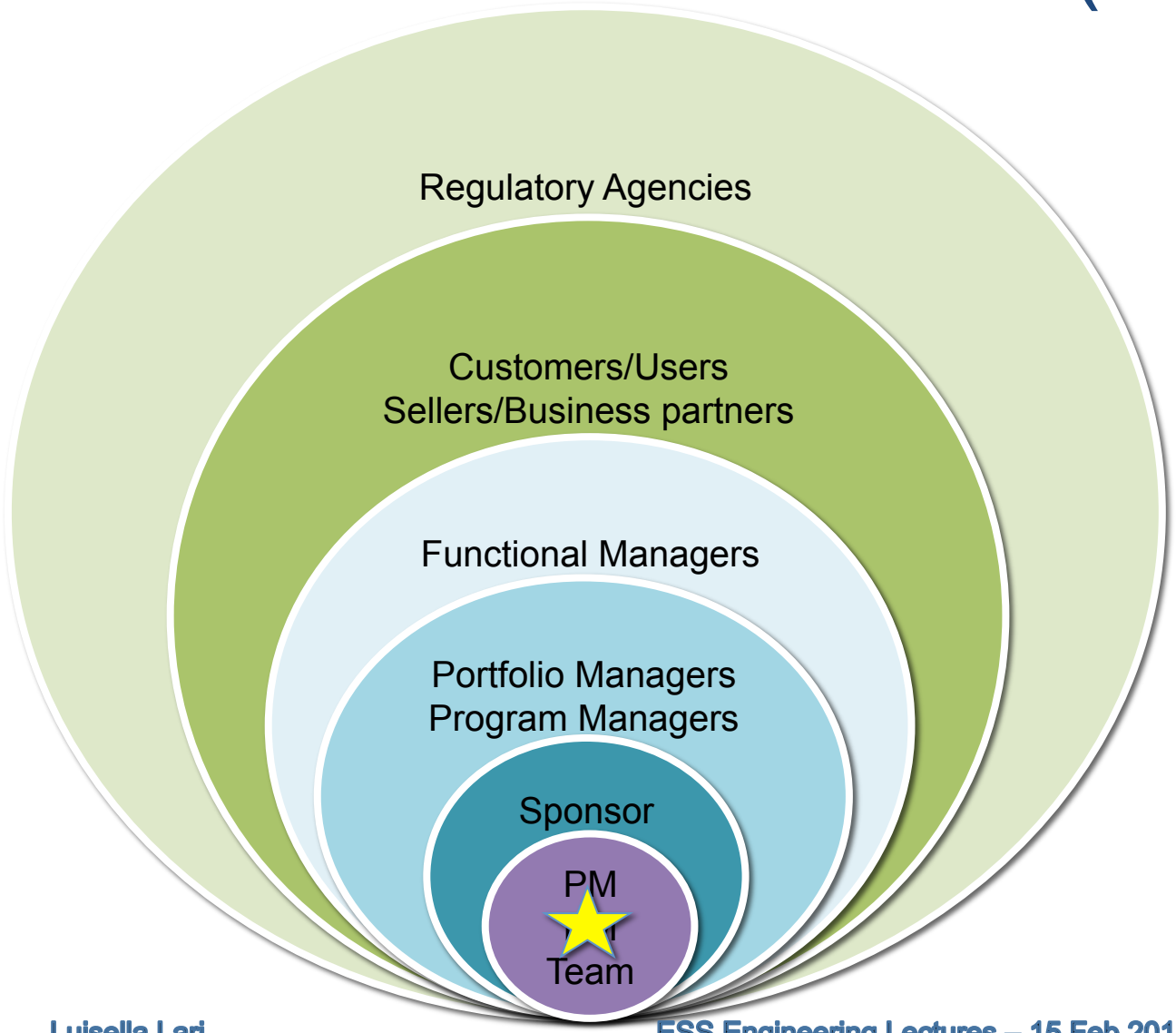


# Stakeholders (1/3)

Stakeholders are people, groups or organizations (i.e. customers, sponsors, etc.) that are involved in the project. They can affect the performance or completion of the project itself. The number of stakeholders vary throughout the project.

Who and how many?

# Stakeholders (2/3)




People directly working on the project.

Within the organization

Outside the organization

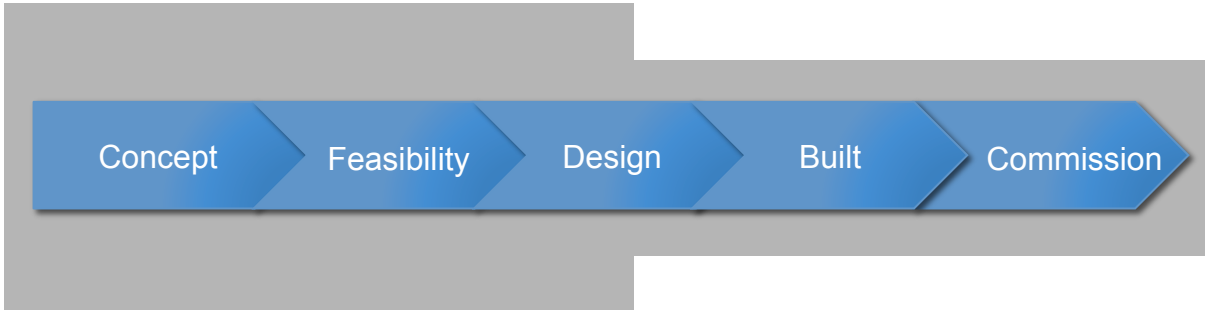
Who are the most critical stakeholders?

**Not** the PM Team and **Not** the Project Manager (PM) who has directed the completion of the project.

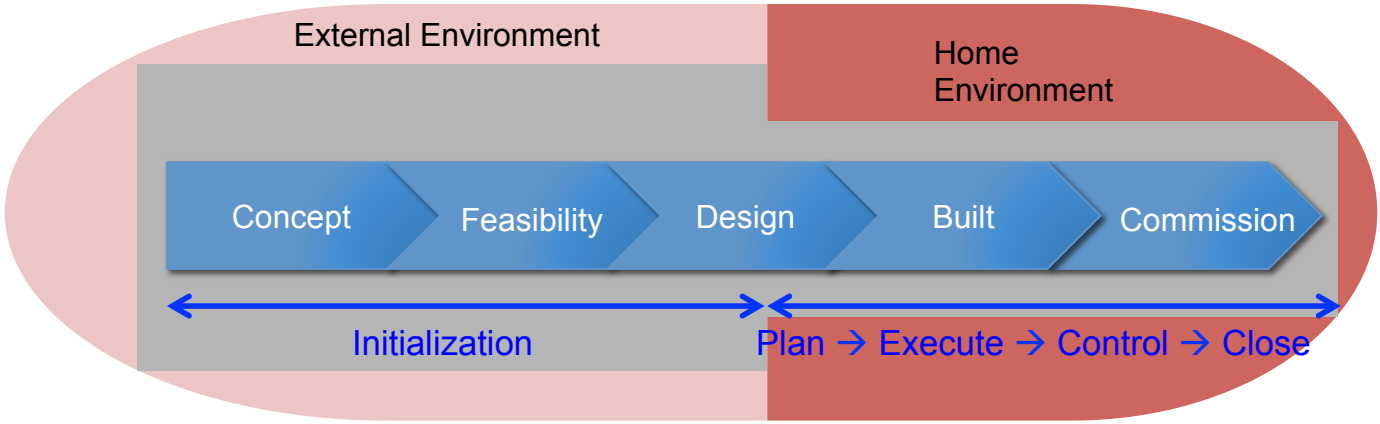
# Stakeholders (3/3)

**Level 1**: the Technical Core (key concern is how to deliver projects efficiently)


**Level 2**: the Strategic Envelop (recognizes the relationship between the project and the various stakeholders strategy)




**Level 3**: the Institutional Context (is about developing an appropriate institutional context for projects and programs to enable them to succeed)




[Ref: P. Morris et J. Geraldi, *Managing the Institutional Context of Projects,* Project Management Journal (2011)
See also: P. Serrador, *Stakeholder Management*, Proceeding of 2009 PMI Global Congress, Orlando, USA (2009) ]

# The Role of Project Manager (1/3)


Project Managers are assigned by the performing organizations to achieve the project objectives. He is in charge of all aspects of the projects and in the center of interactions between stakeholders and the project itself.

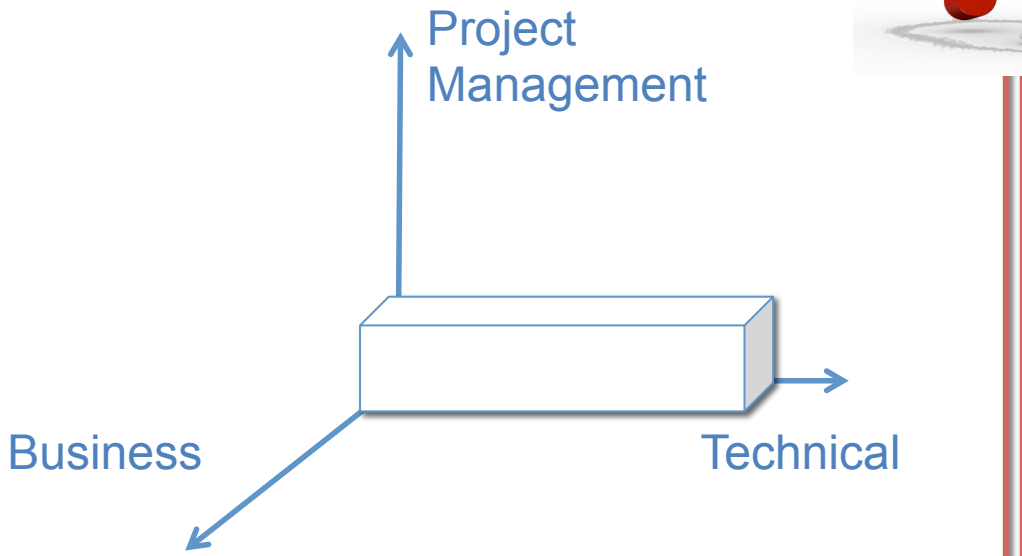
# The Role of Project Manager (2/3)

In particular Project Managers are usually responsible of :

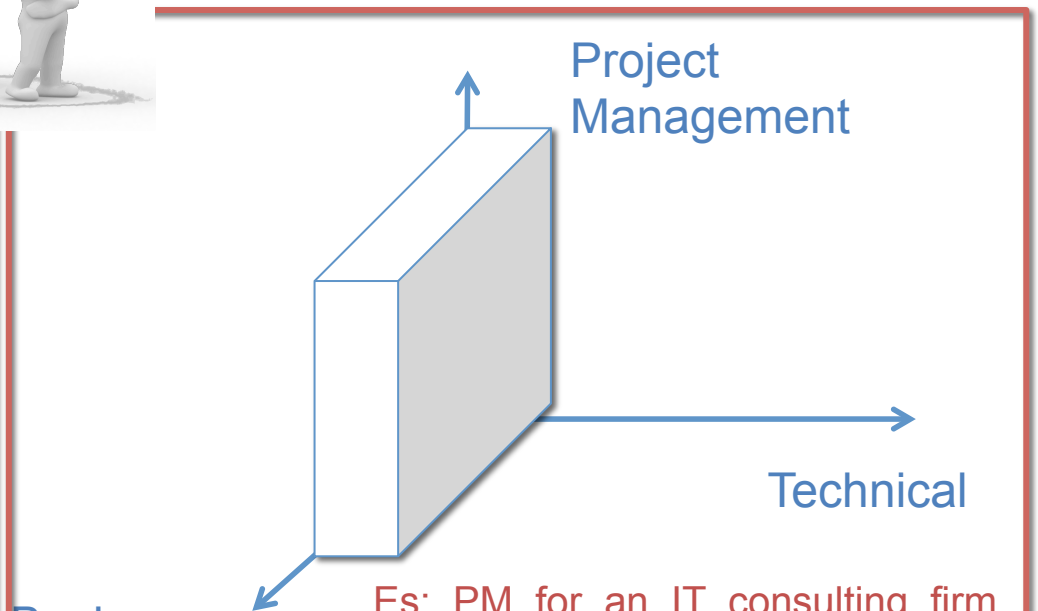
- Developing the ***project management plan*** and all related plans;
- Keeping the project on track in terms of schedule and budget;
- Identifying, monitoring and responding to risks;
- Providing and timely reporting of project metrics;

# The Role of Project Manager (3/3)

The project environment dictates skill requirement for Project Managers.




Es: PM of 8 person R&D project to redesign an aircraft wing



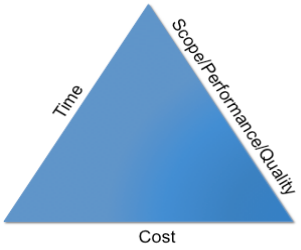

Es: PM for an IT consulting firm, leading 60 person team that is integrating multiple telecommunication technologies

# *Scientific Projects: why are they different for PM? (1/3)*

Scientific Projects have an impact that can go well beyond the immediate completion of the project!

Success is perceived not just by the traditional view of completing the work to time, cost and quality, but also by whether the project delivers the desired outcomes.

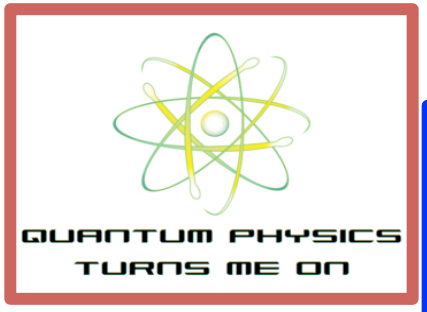

This indicates that the iron triangle is an indicator of project performance but not the best measure of project success.



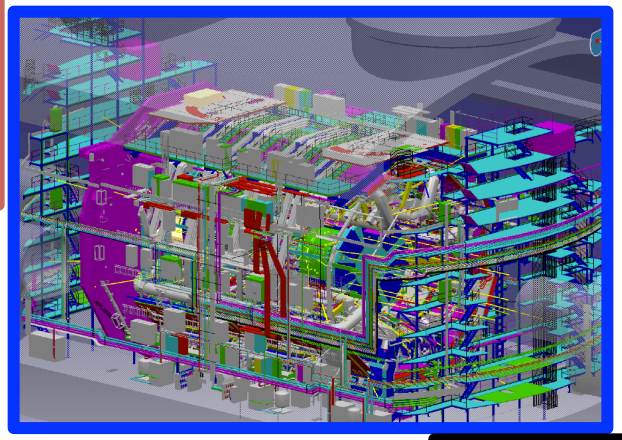
# *Scientific Projects: why are they different for PM? (2/3)*

Simplifying there are 3 disciplines needed for a successful Scientific Project:

- Physics design;




- Engineering design;



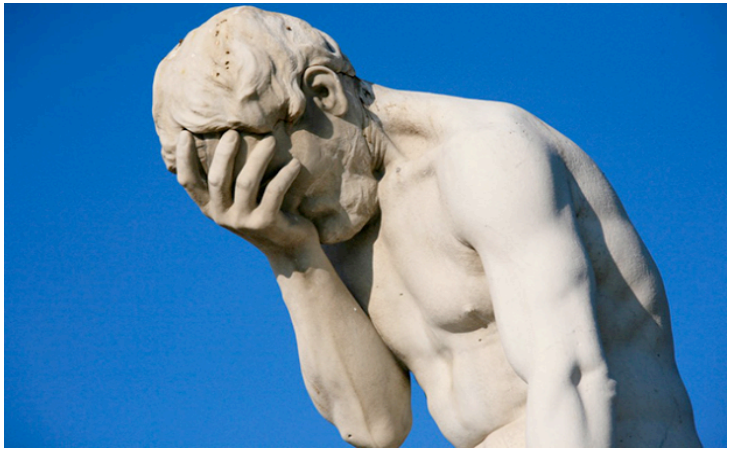
- PM, as an integrating element to assure on time, in budget and desired performance;

# *Scientific Projects: why are they different for PM? (3/3)*

So, everyone in the team has to understand the spirit and method involved in PM to e an effective contributor, no matter what your specialty and position.

Cost of typical mistakes:

- by Physicist/Engineer: ~ $10-100k,
- by Manager: ~ $100k-Few Millions, even the Whole Project



Cost of PM generally less than 10% of the Scientific Project

# *Scientific vs. Research Projects (1/3)*

## Scientific Project

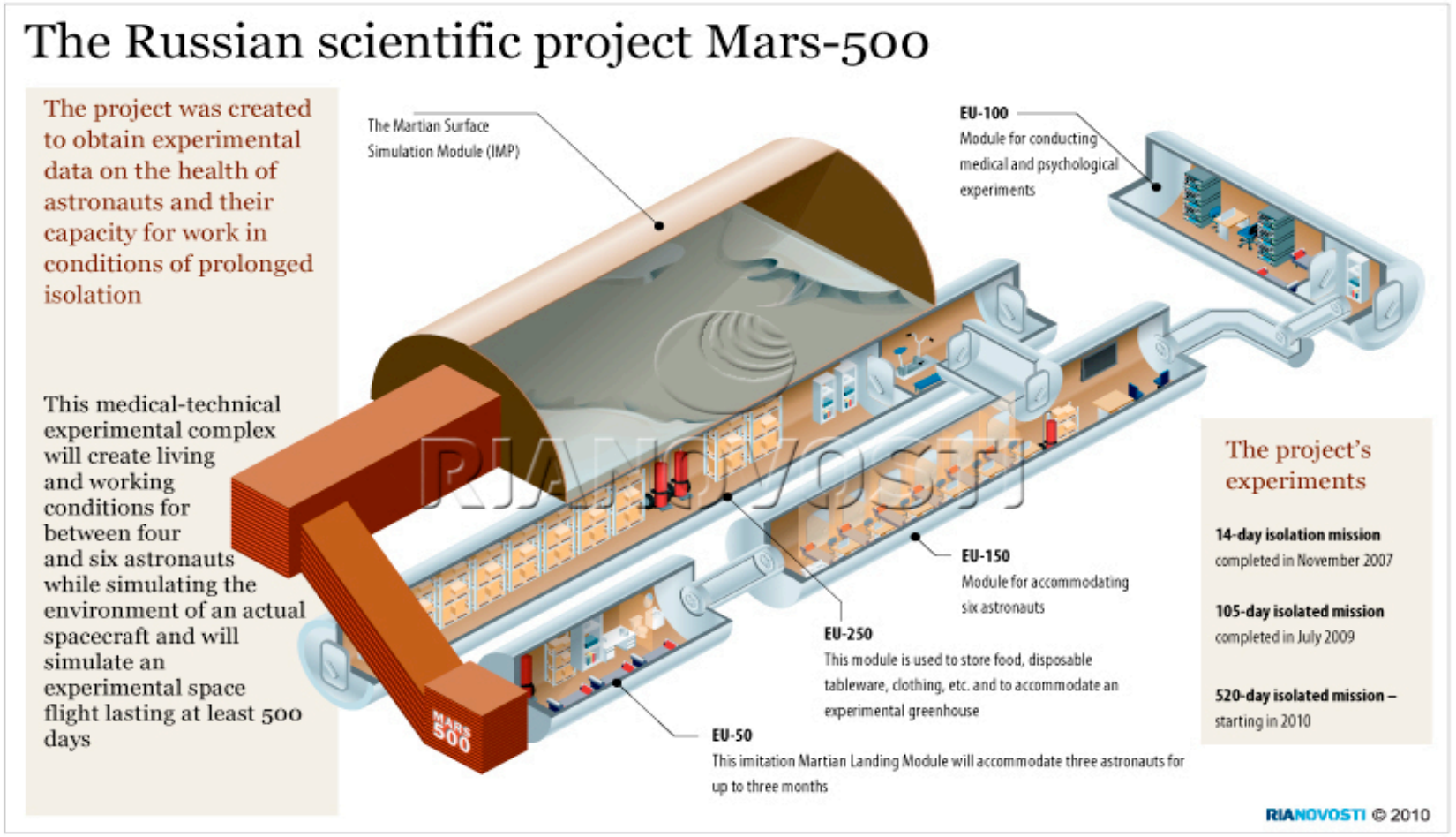
- **Scientific project** relies on the application of the scientific/ systematic method.
- LHC is a scientific project.
- The Project Management discipline is applied to Scientific Projects.

## Research Project

- **Research project** is formal work which is undertaken systematically to increase the stock of knowledge.
- PhD work is a research project.
- No PM application → Outcomes of a research effort often lack a precise definition.

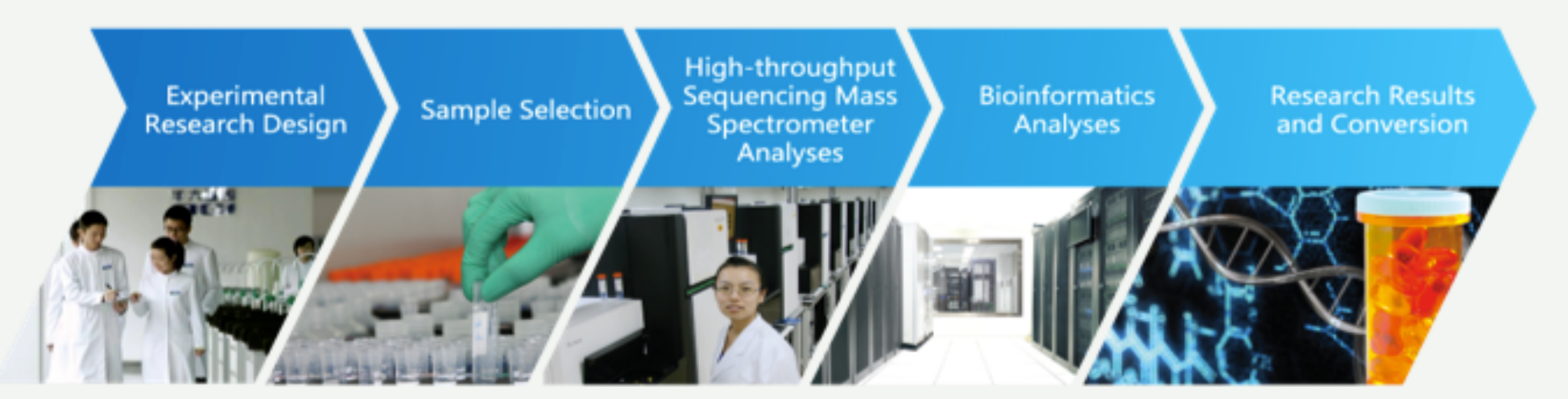
# Scientific vs. Research Projects (2/3)

## Scientific Project



# *Scientific vs. Research Projects (3/3)*

## Research Project




Research strategy for the Million Micro-ecosystem Genomes Project

# *Scientific vs. R&D Project*

## Scientific Project

- Focus on Prototype projects.
- Specified Performance.
- Controlled Schedule.
- Close-loop Control.
- Large and Diverse Groups.
- Proactive (e.g. preventive).

## R&D Project

- Focus on sub-system.
- Flexible Performance.
- Flexible Schedule.
- Open-loop Control.
- Small and Familiar Groups.
- Reactive.

# *Parallel with Industrial Practices*

## Scientific Project

- Limited Component Prototype and it is the Only and First System.
- Higher risks in Technology and System Integration.
- Difficulty in Personnel Transfer or Termination.

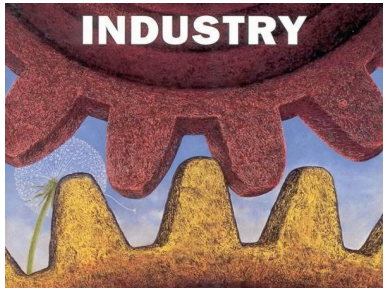
## Industrial Project

- Component and System Demonstration before Mass Production.
- Higher risks in Marketing, less in Technology.
- Flexible Transfer and Termination.

# *Key topics for Scientific Projects*

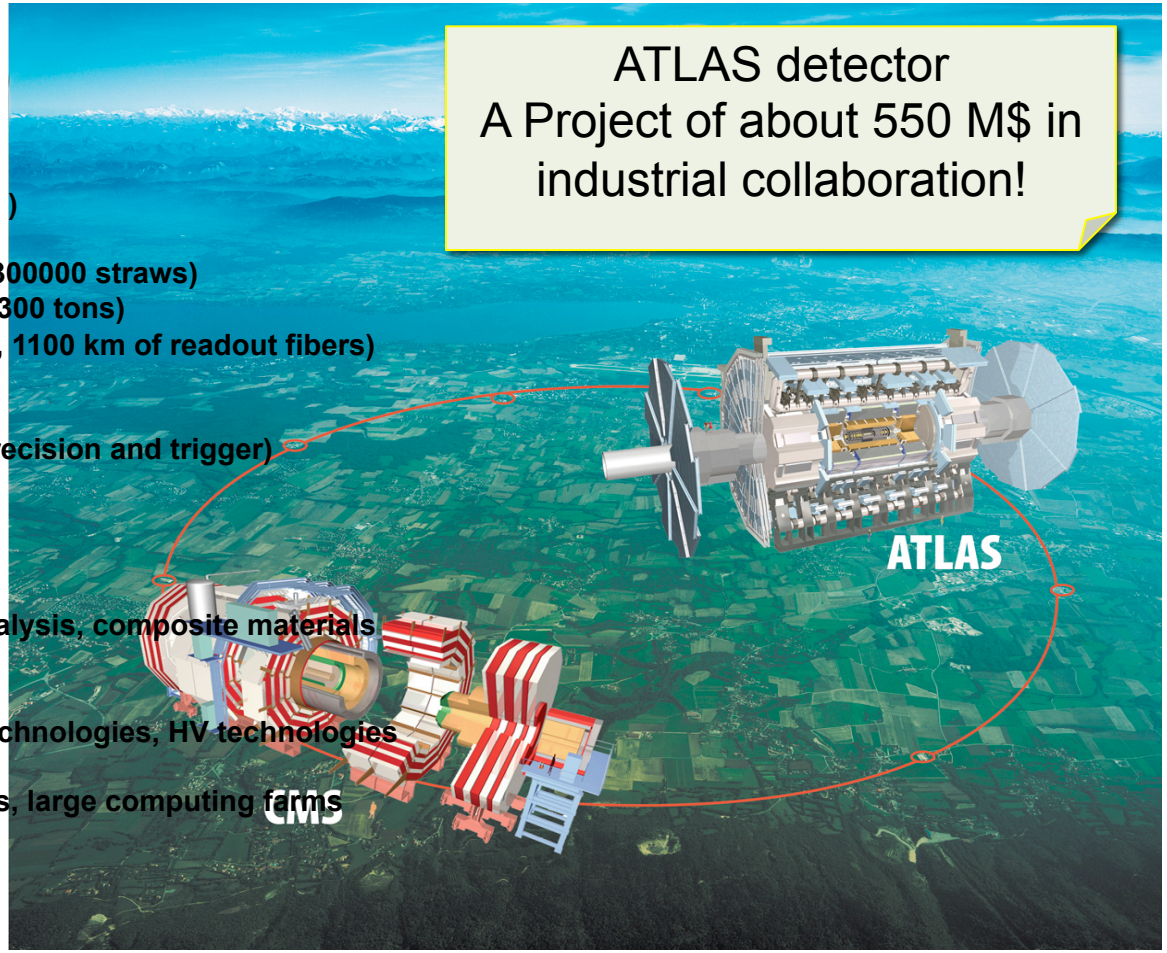
Highlight on particular key topics to manage successfully complex Scientific Projects:

- *The industrial collaborations or the Role of the Procurement.*
- *The experts reviews or the Role of Transfer Knowledge and Lessons Learned.*
- *The Project Management Plan or the "Rule of the Game".*




# *Industrial collaborations*

1. Silicon pixel detector (80M channels)
2. Silicon strip detector (~100 m2 of silicon micro strips )
3. Diamond pixel/strip detectors
4. Gas straw detector using transition radiation effect (300000 straws)
5. Liquid Argon electromagnetic sampling calorimeter (300 tons)
6. Scintillating Tiles calorimeters (42 tons of scintillator, 1100 km of readout fibers)
7. Scintillating fibers techniques
8. Cerencov counters
9. Large area gas drift chambers for muon detection (precision and trigger)
10. Radiation hard nsec electronics, mostly digital
11. Analog and Digital pipeline
12. Optical fibers readouts and transmission
13. Superconductivity and cryogenics
14. Complex mechanical structures analysis, seismic analysis, composite materials
15. Ultra vacuum techniques
16. Detectors, cables and electronics cooling
17. Large scale connectivity, DC-DC power converters technologies, HV technologies
18. PVSS slow control architecture
19. Scalar data acquisition and multilevel trigger systems, large computing farms
20. GRID environment
21. Fancy (spectacular !) transports and logistics



# *Experts reviews*

Scientific Projects need several experts reviews during the several project life-cycles. For what?

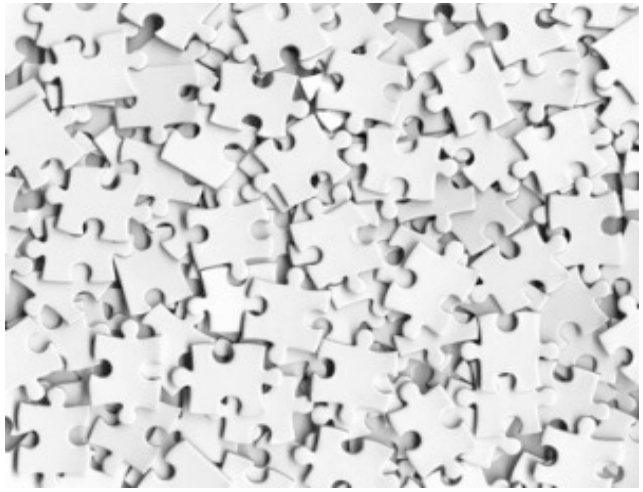
- **evaluation** of research and innovation proposals;
- **monitoring** the progress, outcome and impact of research and innovation programs as well as giving advice on the shape of future activities;
- **motivating** the project team to progress in the project in order to reach the project milestones**;**
- **encouraging** exchanges;
- **facilitating** consensus;

# *Project Management Plan (1/5)*

A Project Management Plan is an approved document, defining how the project is managed during its entire end-to-end life, covering all project phases, from initiation through planning, execution and closure.

# *Project Management Plan (2/5)*

Complex Scientific Projects generally require the development of an articulate Project Management Plan.



It should include (as a minimum)

# *Project Management Plan (3/5)*

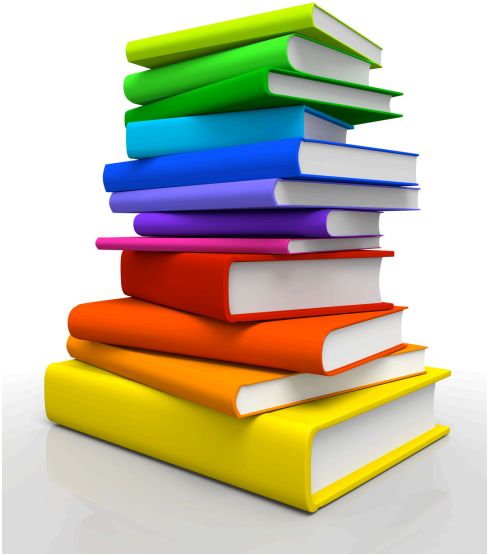
1. **Overview on the Project**: including the purpose and objectives of the project, the key milestones and deliverables, dependency and constraints that may influence the the completion of the project.

# *Project Management Plan (4/5)*

2. **Project Organization**: e.g. name of the Project Manager, key project team members and other project team member. For complex Research Projects also the staff Organizational Structure.

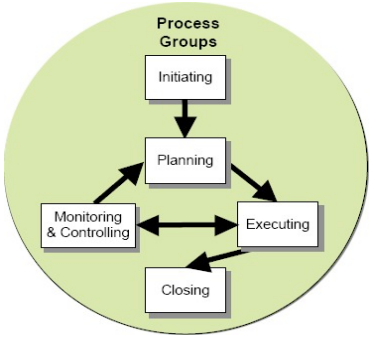
# *Project Management Plan (5/5)*

3. **Project Management Processes**: including i.e. Scope Management Plan, Time Management Plan, Resource Management Plan, Quality Management Plan, Communication Management Plan, Risk Management Plan, Contribution Management Plan.



# *Basic project life-cycle*

Scientific Projects like any other project can be summarize in the 5 process groups.

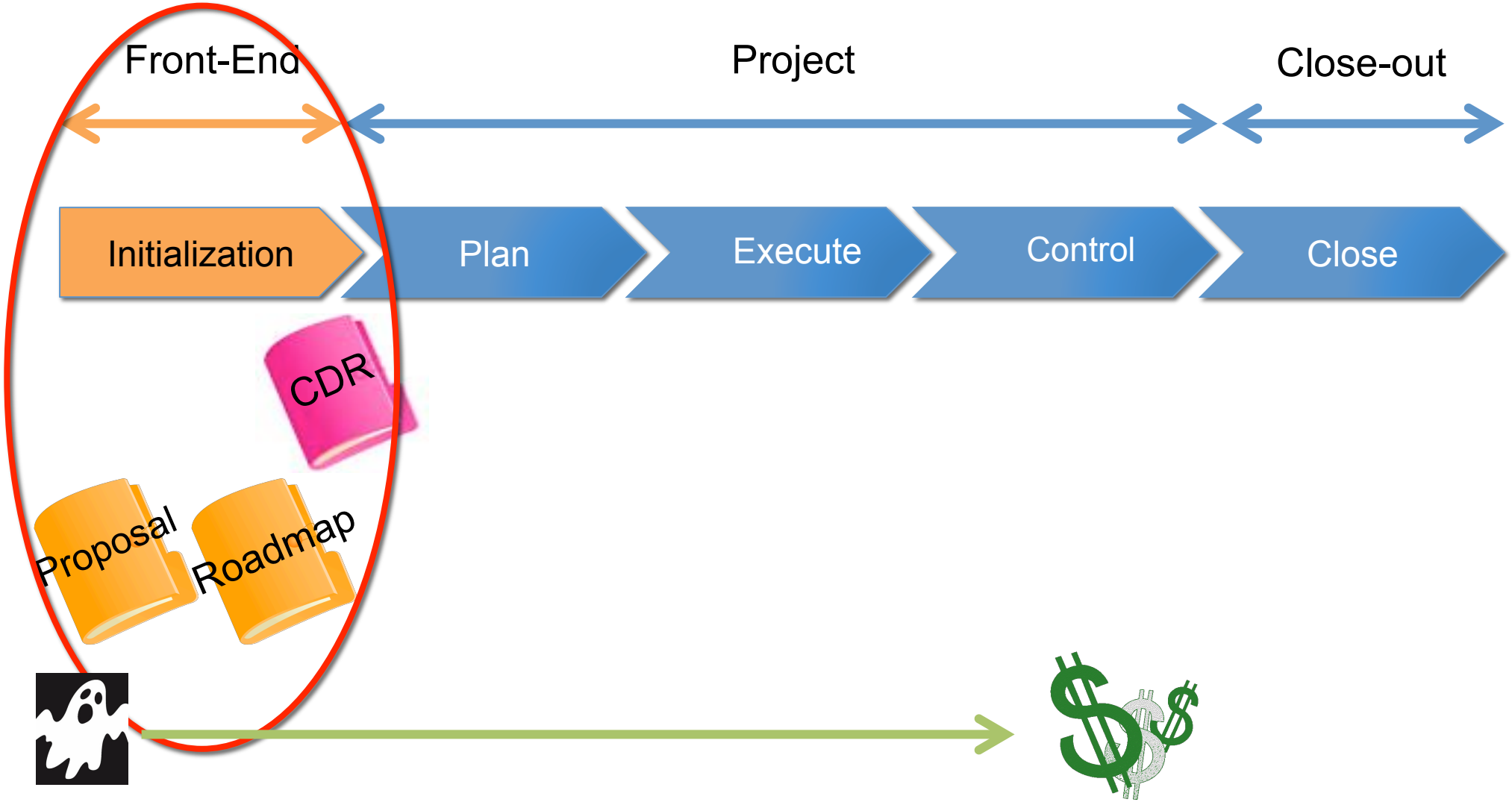



Creative phase

Rigorous phase

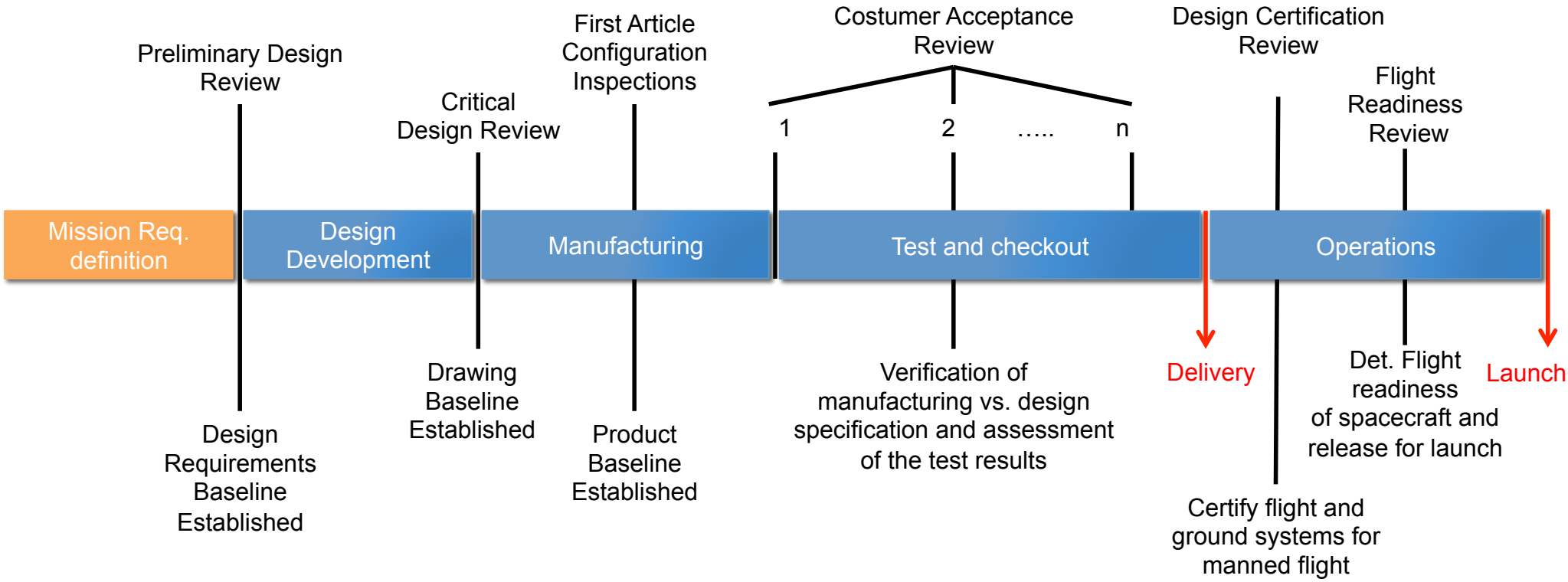
Initialization → Plan → Execute → Control → Close

# Basic Project Documentation (1/2)



# Basic Project Documentation (2/2)

## The NASA **Program**/Project Life-Cycle



# *Special topic: draft WBS*

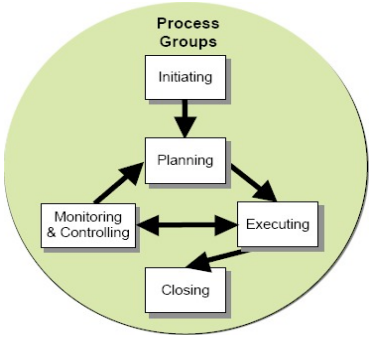
**Work Breakdown Structure (WBS)**, in PM is a deliverable oriented decomposition of a project into smaller components

First appear of High level WBS and main project phases could in the Proposal doc.

i.e. the Level 0

# Basic project life-cycle

Scientific Projects like any other project can be summarize in the 5 process groups.

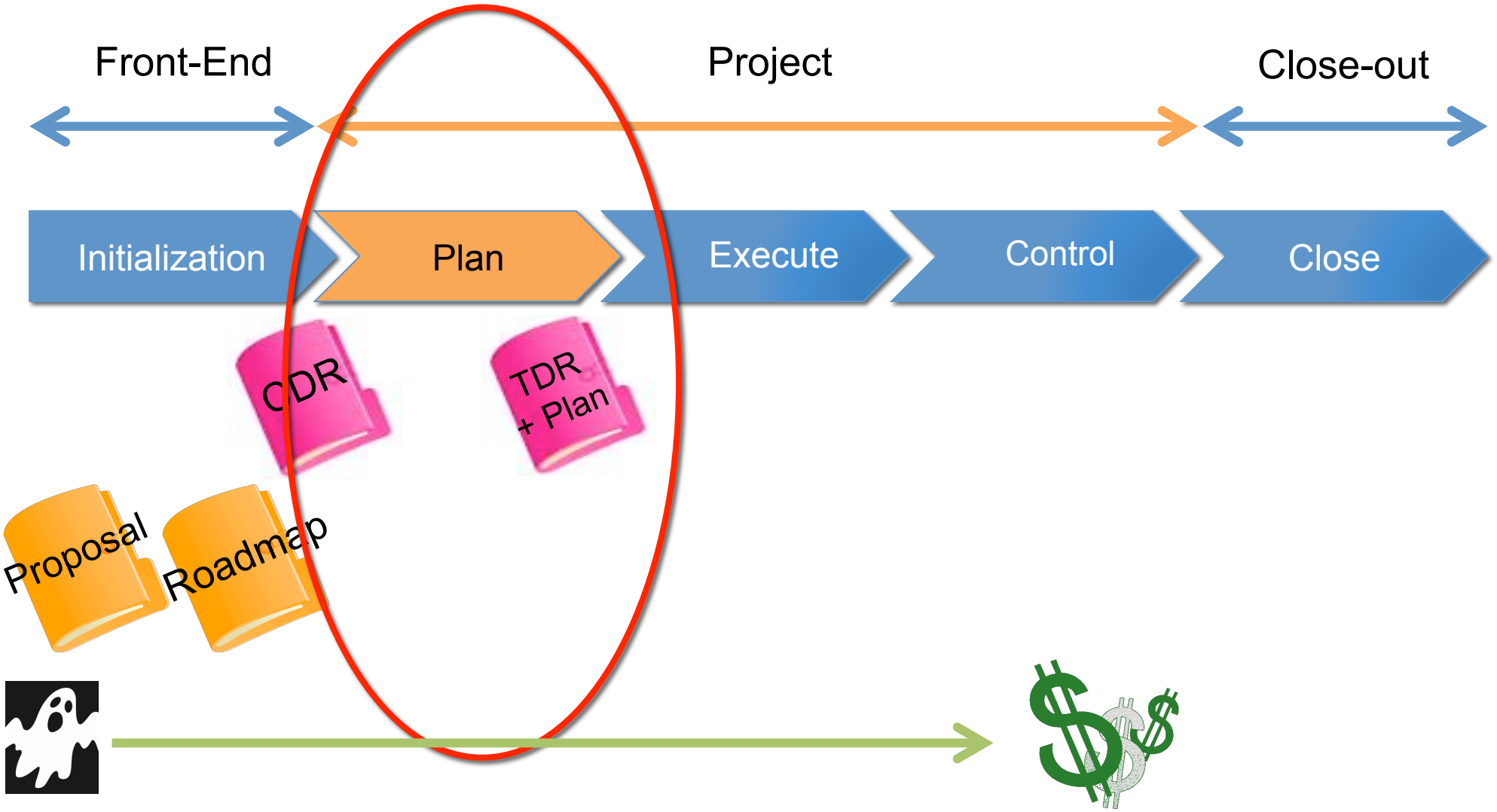



Creative phase

Rigorous phase

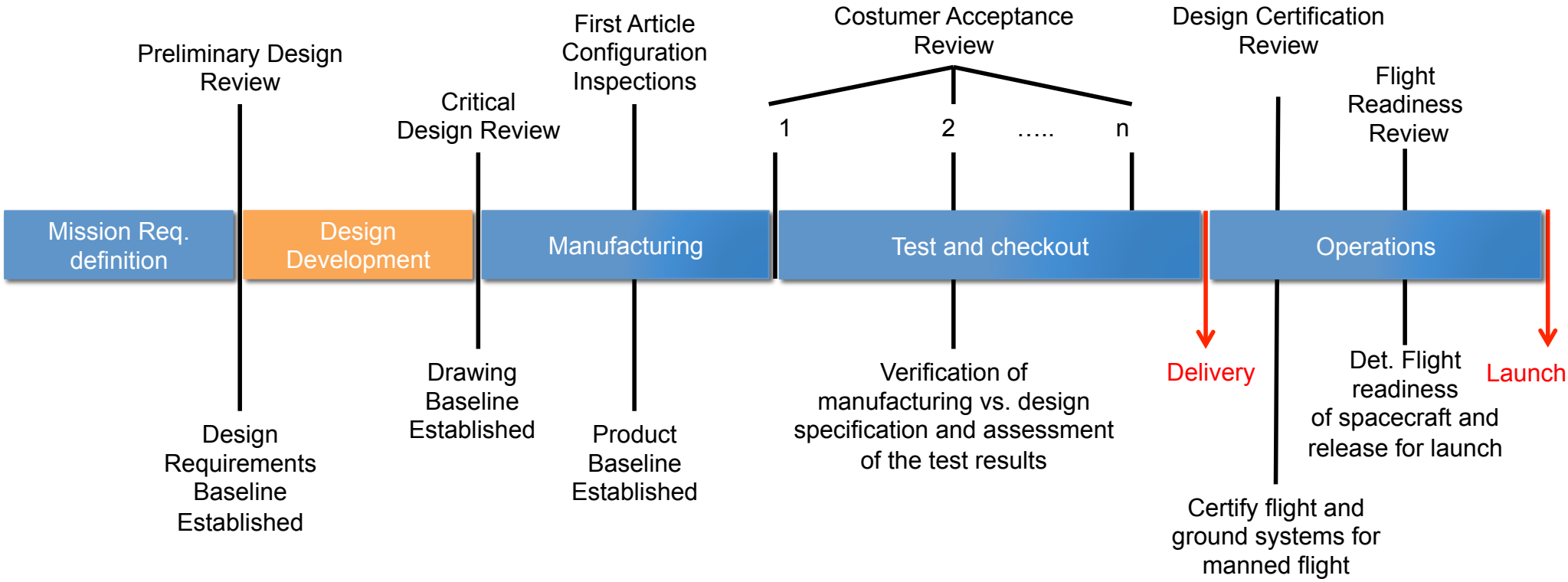
Initialization → Plan → Execute → Control → Close

# Basic Project Documentation (1/2)



# Basic Project Documentation (2/2)

## The NASA **Program**/Project Life-Cycle



# *Special topic: WBS*

**Work Breakdown Structure (WBS)**, in PM is a deliverable oriented decomposition of a project into smaller components.

**Work Package** is the lower level in the WBS.

**Activities/Tacks** are the smaller components of work package.

Activities/Tacks provide a basis for estimating/scheduling/ executing/monitoring and controlling the project


# *WBS Rules*

Building a good **WBS**:

few rules to follow

1. Define activities
2. Sequence activities;
3. Estimate activities durations;
4. Estimate activities resource requirements;
5. Develop schedule

# *The cost of the project (1/3)*

the estimation of Activity Duration and the method to estimate Activity Resource Requirements

…. establish the COST of the Project

# *The cost of the project (2/3)*

The size of a Scientific Project is a **DOMINANT factor** that drives the variation of costs

The scale-effect model is based on the determination of the unit of production

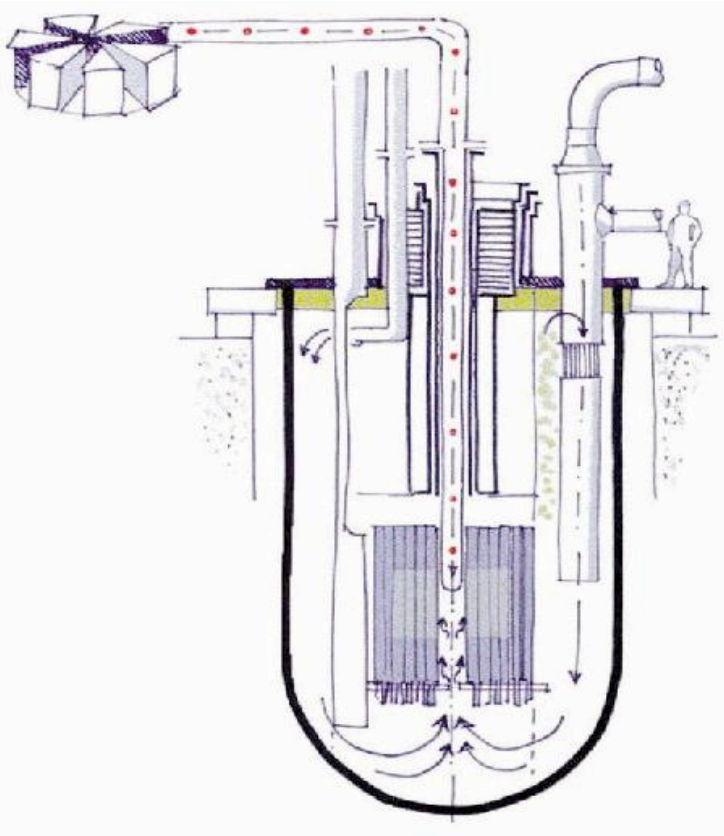
# *The cost of the project (3/3)*

The scale-effect FORMULA refers to the relationship between the cost C of (for example) a facility of capacity P and the cost $C_0$ of an equivalent facility of capacity $P_0$

Example: the construction cost of a 130 MW ($P_0$) energy amplifier has been estimated $C_0$ = 500 M$, then the construction cost of a P-MW Energy Amplifier is given by

$$C = 500x(P/130)^k,$$

where k is [0.7;0.85]



# Project Management Plan

The Cost Baseline is included in the Project Management Plan

## Project Management Plan

3. **Project Management Processes**: including i.e. Scope Management Plan, Time Management Plan, Resource Management Plan, Quality Management Plan, Communication Management Plan, Risk Management Plan, Contribution Management Plan.

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See Slide 44

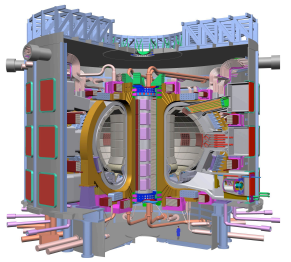
# *Develop schedule*

It is the process to analyzing activity sequences, duration, resource requirements and schedule constraints

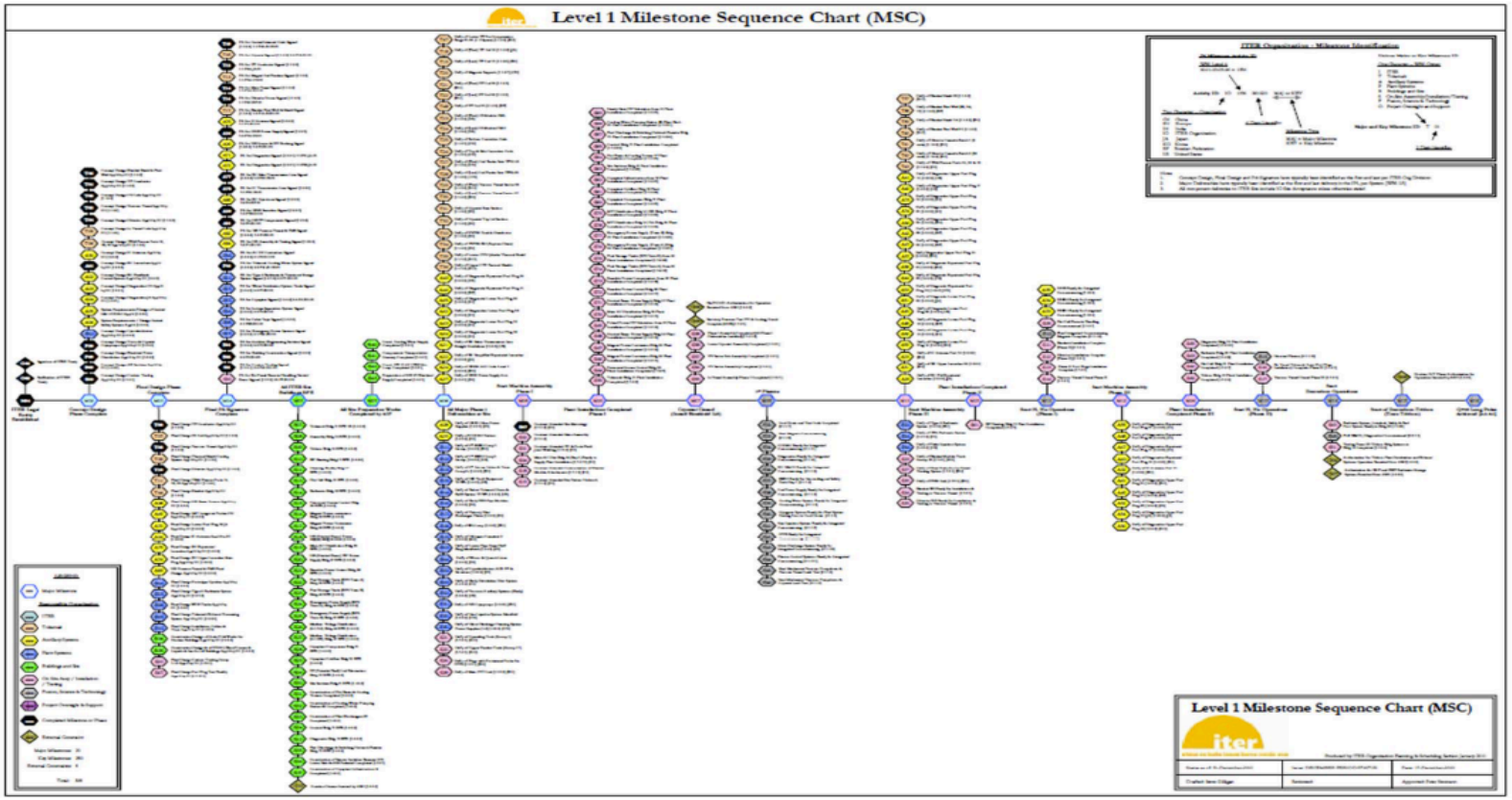
*Milestones*

*A significant point or event in the project*

# Milestone Schedule



Understanding the overall logic – 1st step to scheduling



# *Critical Path Method (1/4)*

The Critical Path is the longest path or sequence of activities (in terms of activities duration) through the Network diagram

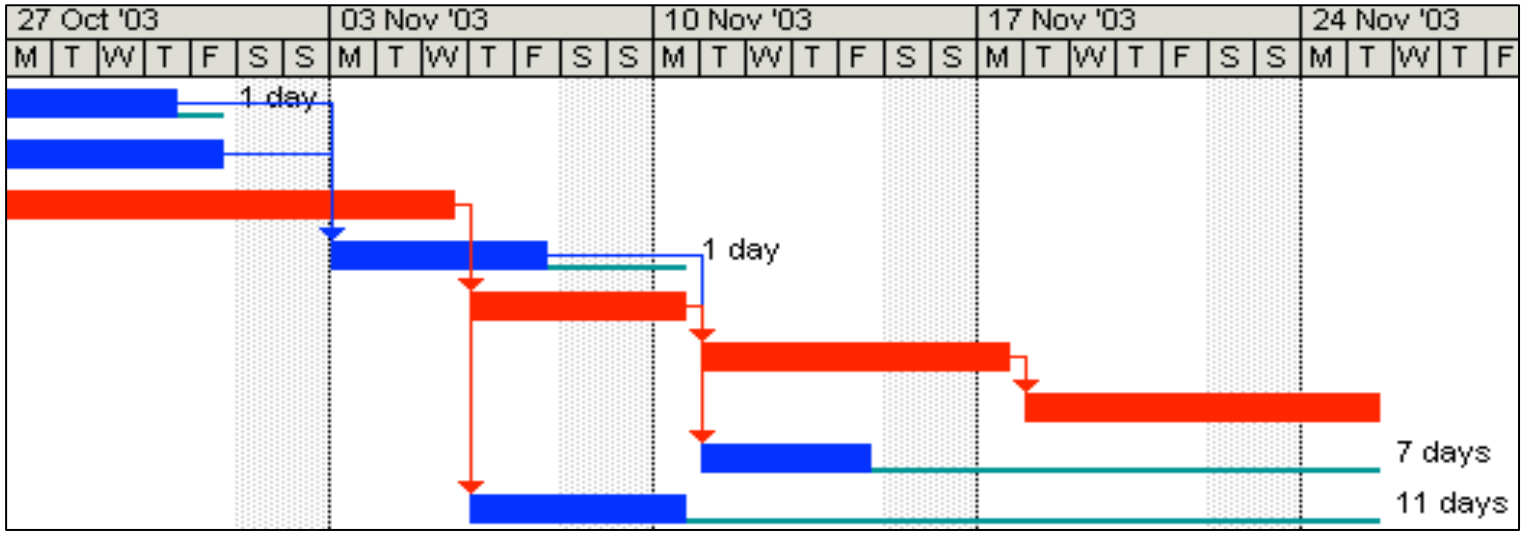
The Critical Path drives the completion date of the project.

It is the path with the longest duration time of the project!

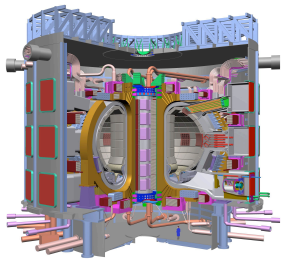
[ Ref: J. E. Kelley, *Critical-Path Planning and Scheduling: Mathematical Basis*, Operation Research Article (1961)]

# Critical Path Method (2/4)

Critical Path in evidence in a Gantt diagram



# Critical Path Method (4/4)



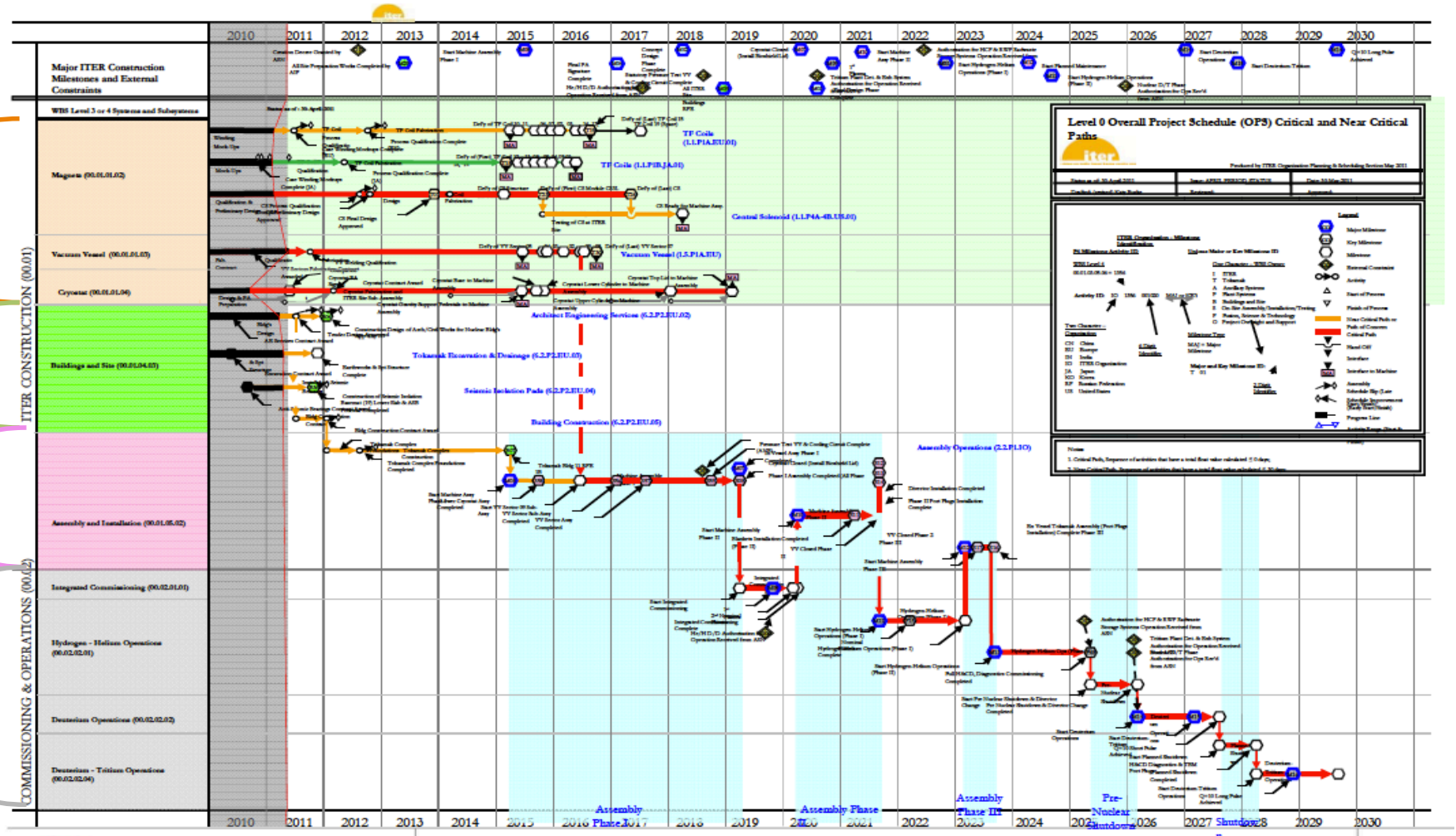
**Level 0 Overall Project Schedule (OPS) Critical and Near Critical Paths**

Magnets, Vacuum, Cryogenics

Buildings & Civil Engineering

Assembly Integration

Commissioning & Operation



# Project Management Plan

The Baseline Schedule is included in the Project Management Plan

## Project Management Plan

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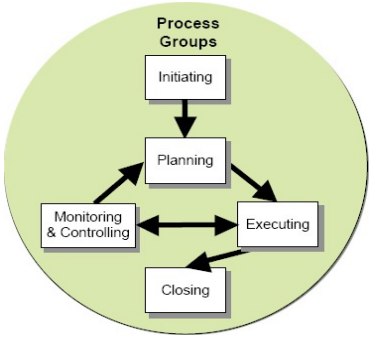
See Slide 44

# Basic project life-cycle

Scientific Projects like any other project can be summarize in the 5 process groups.

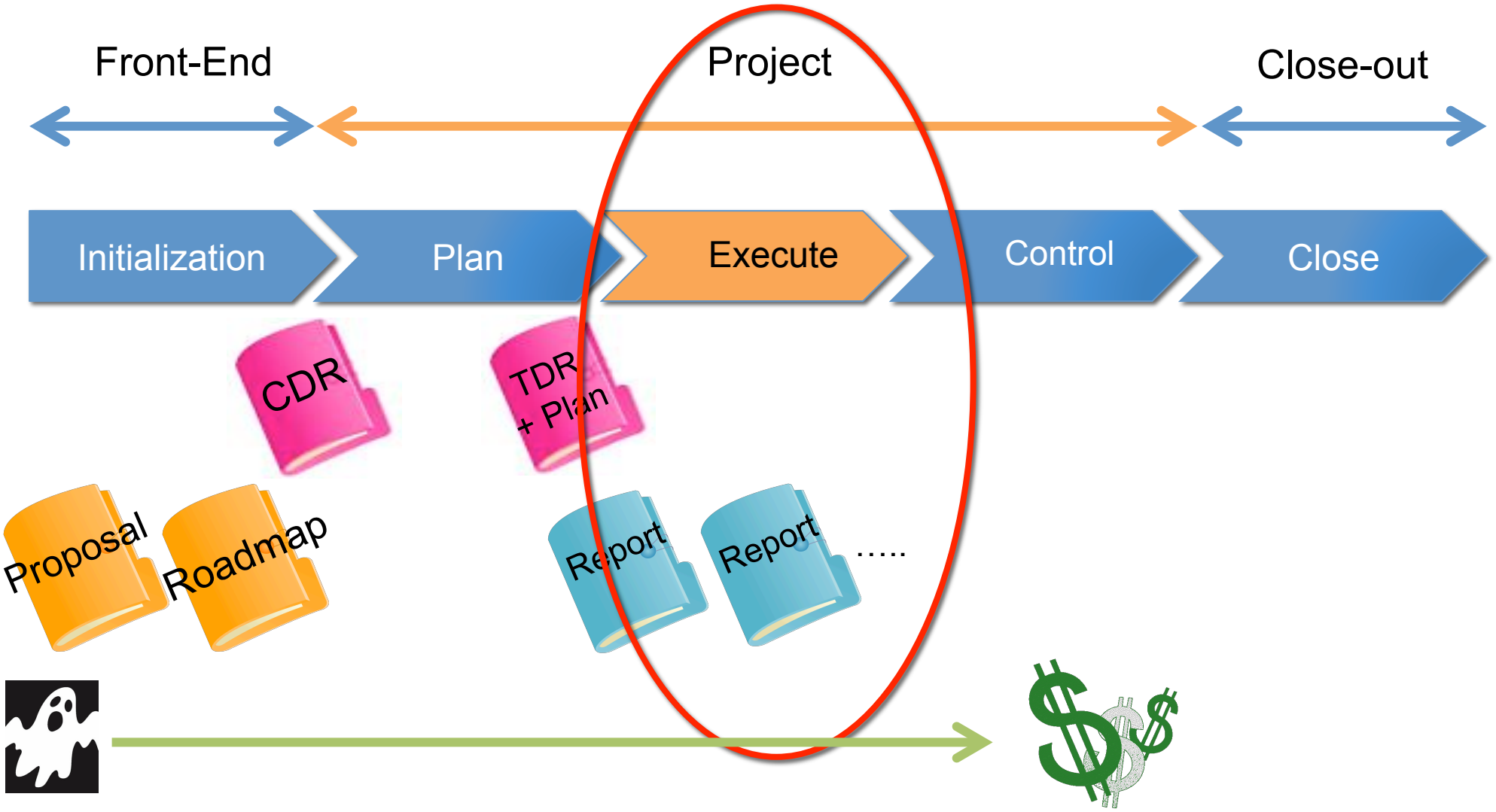



Creative phase

Rigorous phase

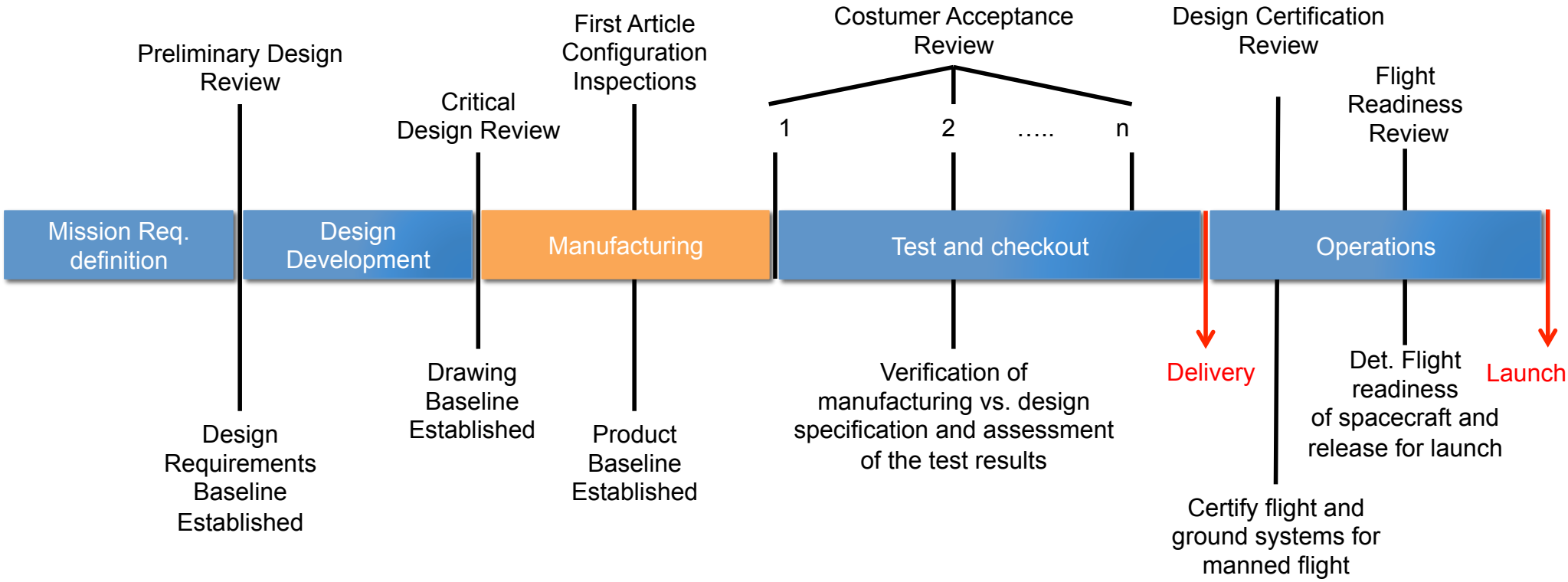
Initialization → Plan → Execute → Control → Close

# Basic Project Documentation (1/2)



# Basic Project Documentation (2/2)

## The NASA **Program**/Project Life-Cycle



# *Finalizing the Schedule (1/2)*

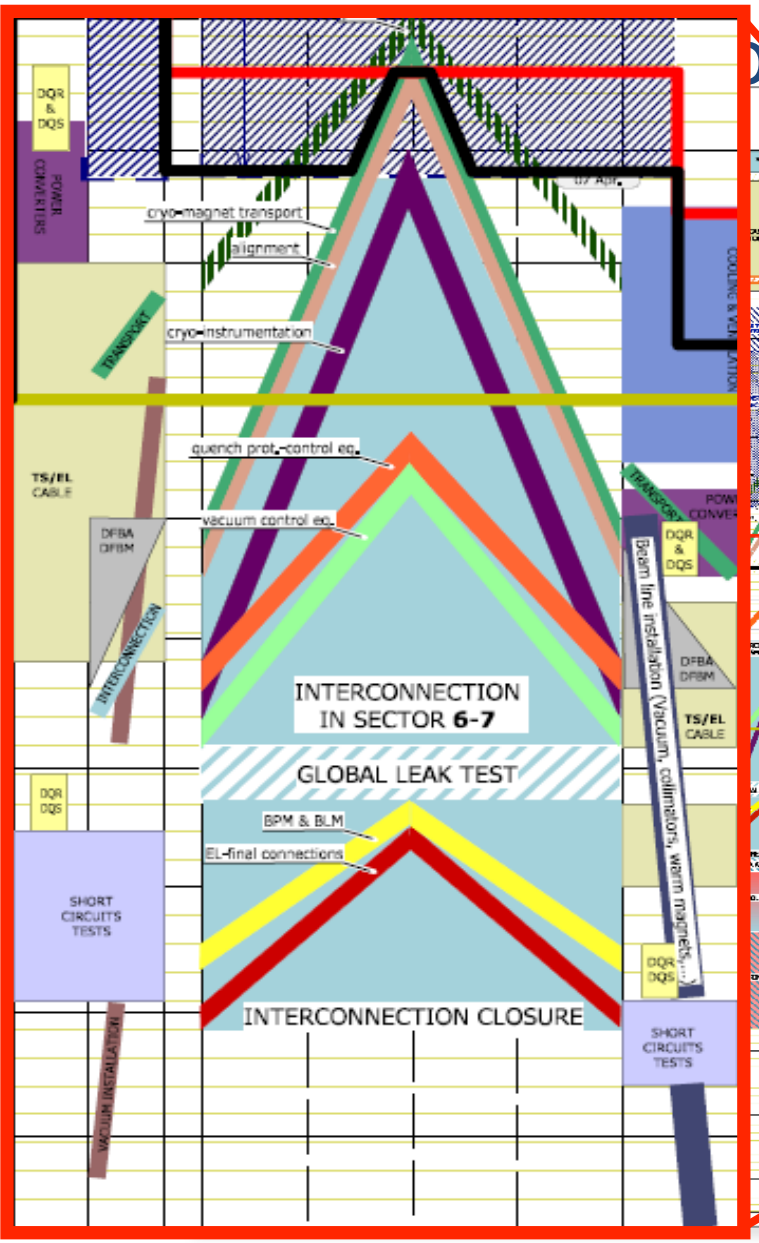
## Up to now

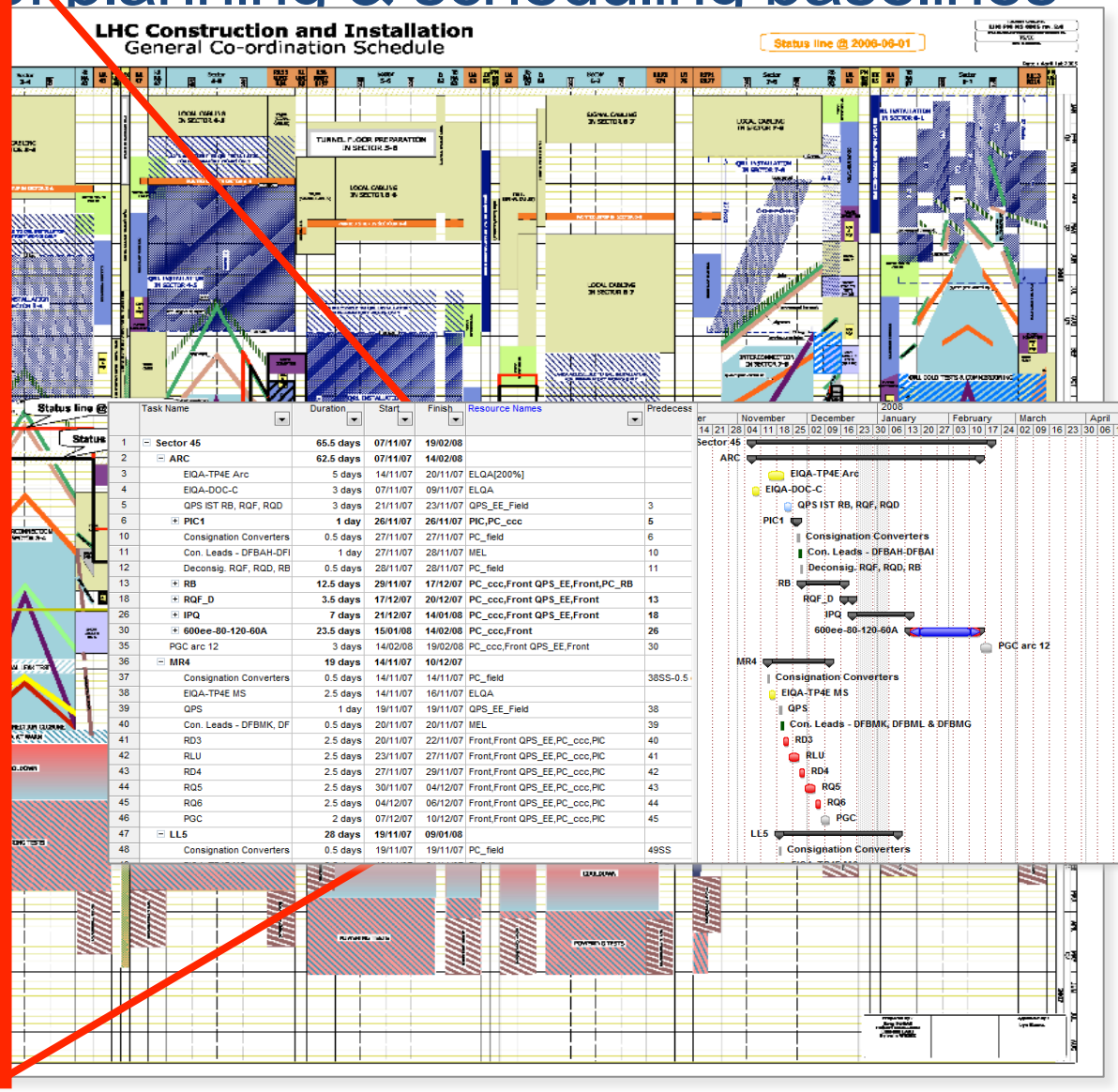
Activity of the projects defined and developed a schedule that meets the expected end date of the project and on-budget.

## Considering availability

Do you can accomplished this schedule with the resource available?

# of planning & scheduling baselines

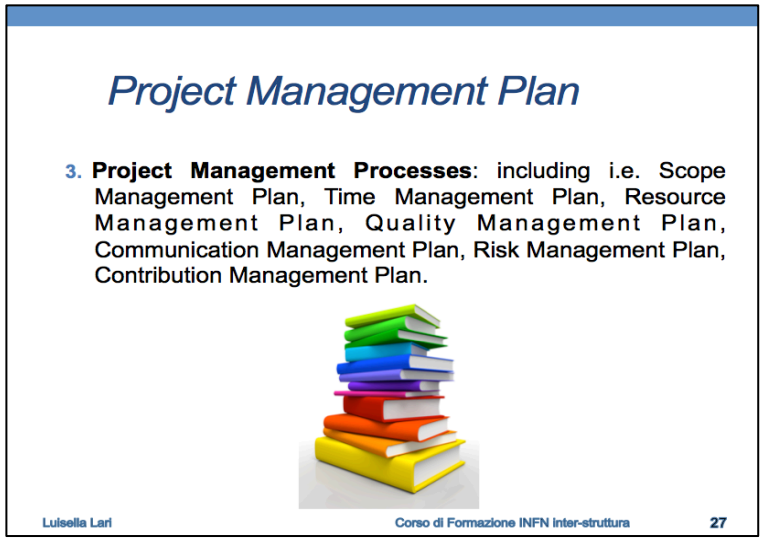



| | Task Name | Duration | Start | Finish | Resource Names | Predecess |
|---|---|---|---|---|---|---|
| 1 | Sector 45 | 65.5 days | 07/11/07 | 19/02/08 | | |
| 2 | ARC | 62.5 days | 07/11/07 | 14/02/08 | | |
| 3 | EIQA-TP4E Arc | 5 days | 14/11/07 | 20/11/07 | ELQA[200%] | |
| 4 | EIQA-DOC-C | 3 days | 07/11/07 | 09/11/07 | ELQA | |
| 5 | QPS IST RB, RQF, RQD | 3 days | 21/11/07 | 23/11/07 | QPS_EE_Field | 3 |
| 6 | PIC1 | 1 day | 26/11/07 | 26/11/07 | PIC,PC_ccc | 5 |
| 10 | Consignation Converters | 0.5 days | 27/11/07 | 27/11/07 | PC_field | 6 |
| 11 | Con. Leads - DFBAH-DFI | 1 day | 27/11/07 | 28/11/07 | MEL | 10 |
| 12 | Deconsig. RQF, RQD, RB | 0.5 days | 28/11/07 | 28/11/07 | PC_field | 11 |
| 13 | RB | 12.5 days | 29/11/07 | 17/12/07 | PC_ccc,Front QPS_EE,Front,PC_RB | |
| 18 | RQF_D | 3.5 days | 17/12/07 | 20/12/07 | PC_ccc,Front QPS_EE,Front | 13 |
| 26 | IPQ | 7 days | 21/12/07 | 14/01/08 | PC_ccc,Front QPS_EE,Front | 18 |
| 30 | 600ee-80-120-60A | 23.5 days | 15/01/08 | 14/02/08 | PC_ccc,Front | 26 |
| 35 | PGC arc 12 | 3 days | 14/02/08 | 19/02/08 | PC_ccc,Front QPS_EE,Front | 30 |
| 36 | MR4 | 19 days | 14/11/07 | 10/12/07 | | |
| 37 | Consignation Converters | 0.5 days | 14/11/07 | 14/11/07 | PC_field | 38SS-0.5 |
| 38 | EIQA-TP4E MS | 2.5 days | 14/11/07 | 16/11/07 | ELQA | |
| 39 | QPS | 1 day | 19/11/07 | 19/11/07 | QPS_EE_Field | 38 |
| 40 | Con. Leads - DFBMK, DF | 0.5 days | 20/11/07 | 20/11/07 | MEL | 39 |
| 41 | RD3 | 2.5 days | 20/11/07 | 22/11/07 | Front,Front QPS_EE,PC_ccc,PIC | 40 |
| 42 | RLU | 2.5 days | 23/11/07 | 27/11/07 | Front,Front QPS_EE,PC_ccc,PIC | 41 |
| 43 | RD4 | 2.5 days | 27/11/07 | 29/11/07 | Front,Front QPS_EE,PC_ccc,PIC | 42 |
| 44 | RQ5 | 2.5 days | 30/11/07 | 04/12/07 | Front,Front QPS_EE,PC_ccc,PIC | 43 |
| 45 | RQ6 | 2.5 days | 04/12/07 | 06/12/07 | Front,Front QPS_EE,PC_ccc,PIC | 44 |
| 46 | PGC | 2 days | 07/12/07 | 10/12/07 | Front,Front QPS_EE,PC_ccc,PIC | 45 |
| 47 | LL5 | 28 days | 19/11/07 | 09/01/08 | | |
| 48 | Consignation Converters | 0.5 days | 19/11/07 | 19/11/07 | PC_field | 49SS |

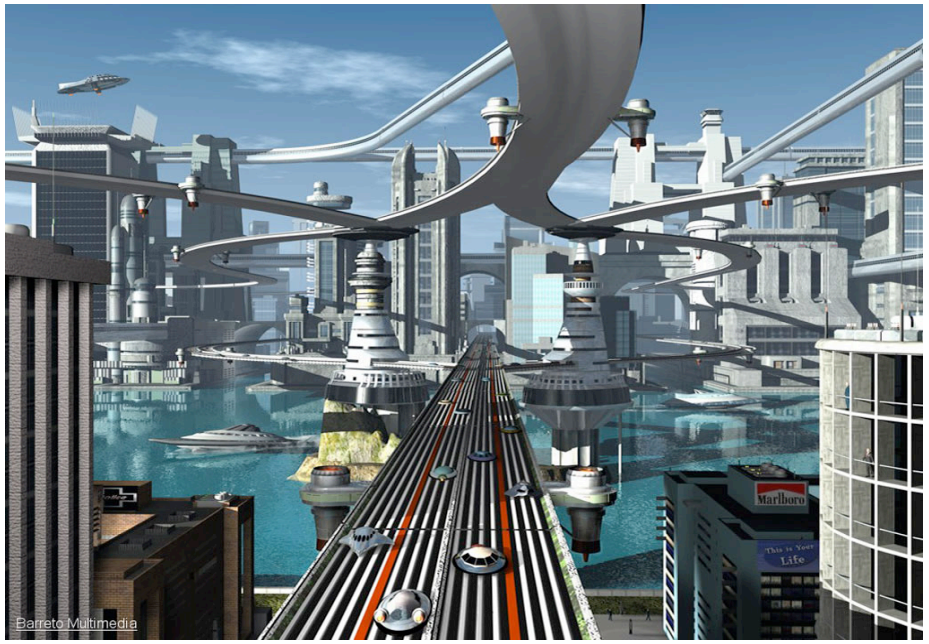
# Procurement plan

Procurement plan include all the process necessary to purchase or acquire products, services, or results from outside the project team.




The Procurement Plan is included in the Project Management Plan.

# *Risk analysis (1/3)*




Project Risk is always

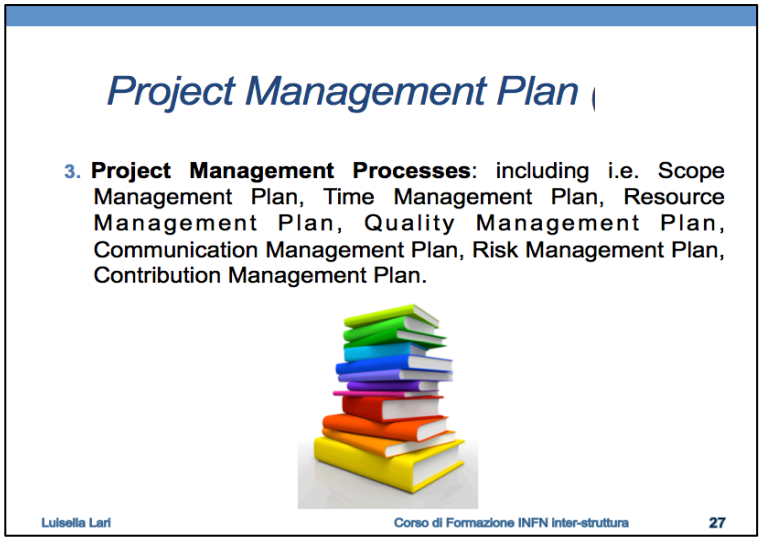
in the future.

Technical, Programmatic or External Risks are uncertain events or conditions that, if they occur, have effects on at least one project objective

(i.e. scope, schedule, cost, quality, ..)

# *Risk analysis/plan (3/3)*

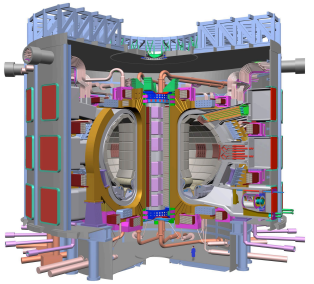
Risk analysis allows to Plan intervention/mitigation action




How project risk management will be structured and performed on the project is a part of the Project Management Plan.

[See also: H. Thamhain, *Managing Risks in Complex Projects,* Project Management Journal (2013)]

# Example



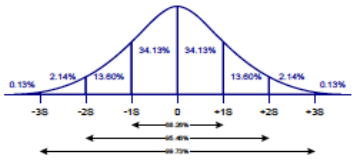
## What is the Annual Work Plan?

**Executive Summary**
- **Scope**
- **Schedule**
- **Cost/Credit**

***Based on current progress***

A one-year piece of the lifecycle baseline plan which provides ITER Members a more detailed view of the work for the upcoming year

**Detailed Information Summarised**

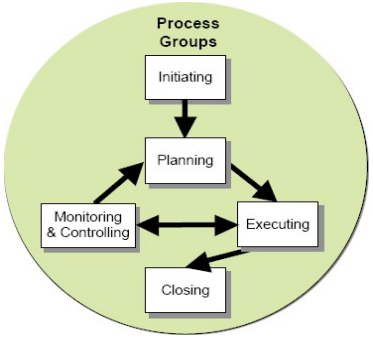



| Item | Project Scope | Detailed WBS Schedule | Cost/Credit Estimate | Risk Analysis |
|---|---|---|---|---|

***This plan allows ITER Members to base their near term technical and financial planning on the current status of the project as opposed to the baseline***

# Basic project life-cycle

Scientific Projects like any other project can be summarize in the 5 process groups.

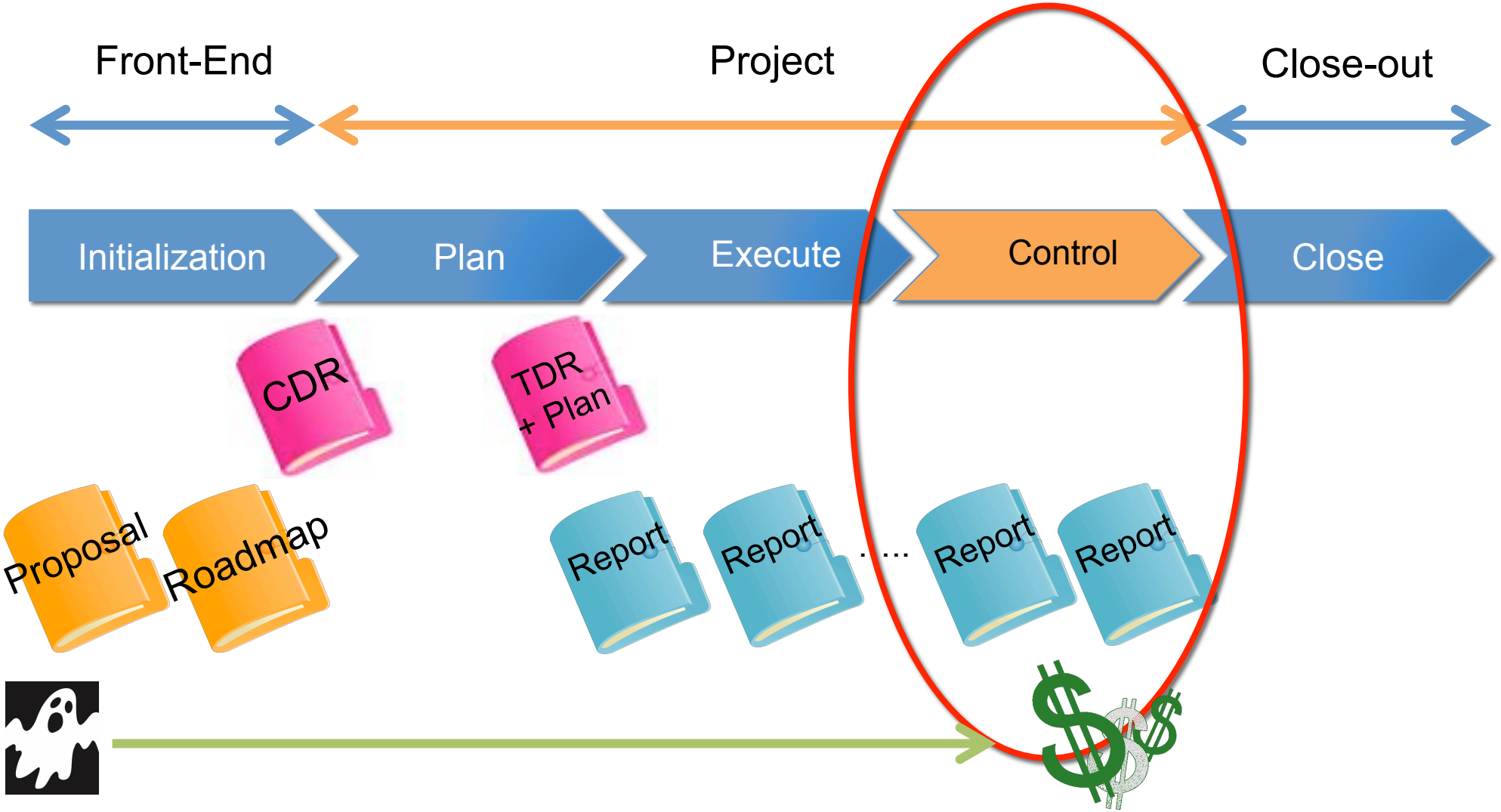



Creative phase

Rigorous phase

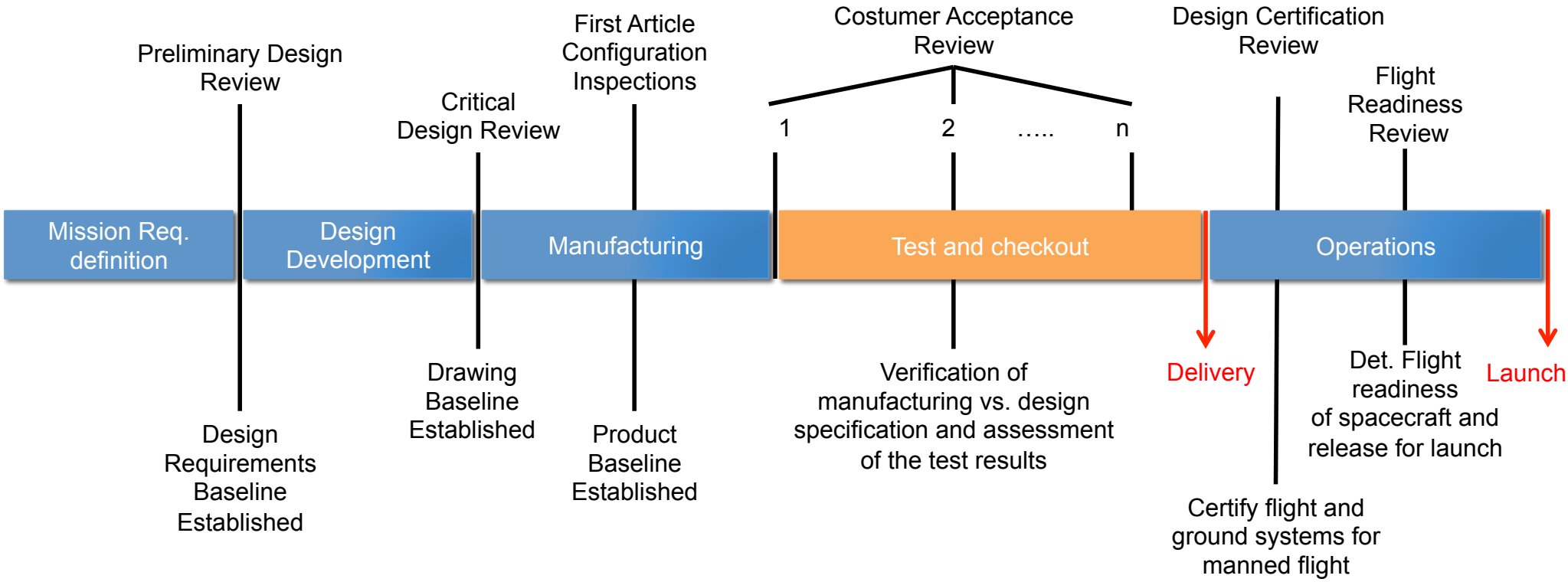
Initialization → Plan → Execute → Control → Close

# Basic Project Documentation (1/2)



# Basic Project Documentation (2/2)

## The NASA **Program**/Project Life-Cycle



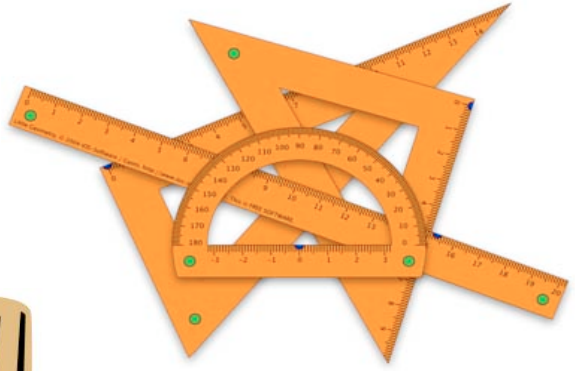
# *Monitoring the project (1/2)*

Monitoring the status of the project is necessary to update project progress and to manage changes.

# *Monitoring the project (2/2)*

Monitoring includes:


1. Status Reporting



2. Progress Measurement

3. Forecasting

# Quality Control

How?

Quality Management → includes the Quality Plan,

Perform Quality Control and Perform Quality Assurance

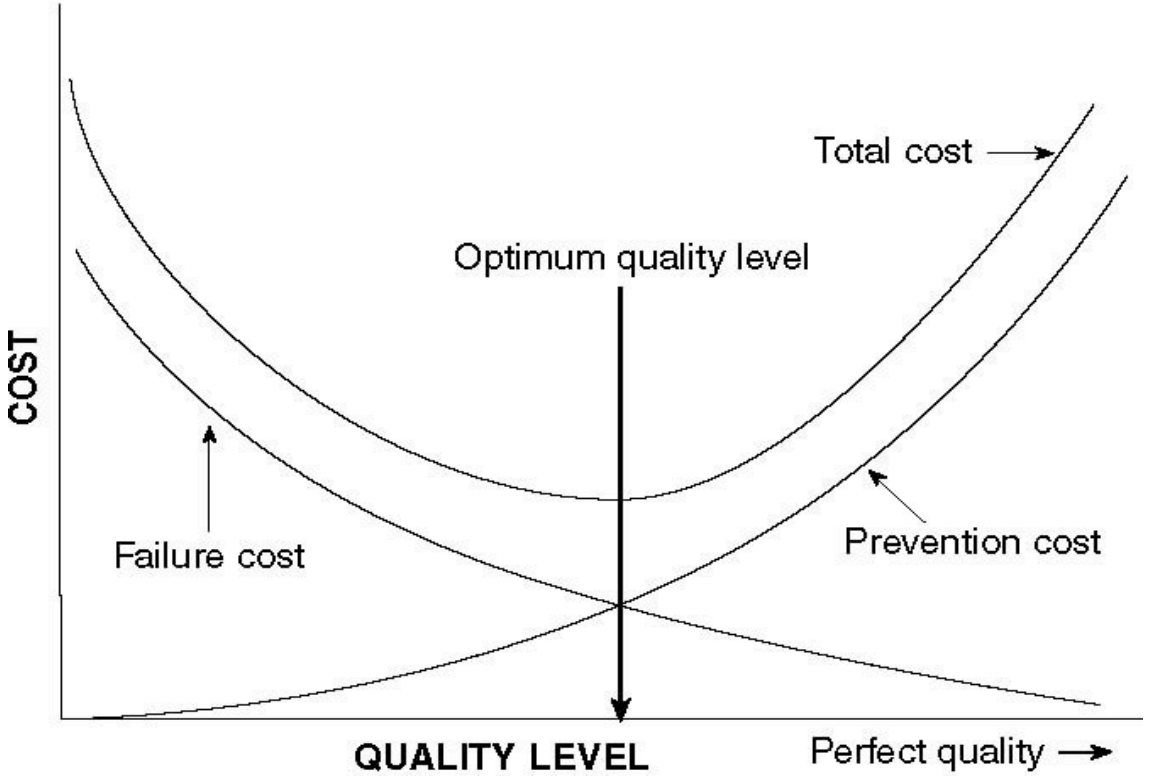
Collect results of executing Quality activities

Audit the results of Quality Control

[See also: J. E. Diekmann, *Quality Control – The key Element in Project Control,* Project Management Quarterly (1981)]

# *Quality control…more*

There are a lot of Quality Control analysis methods…..the idea is to collect data to evaluate the Cost of Quality



# *How to measure project performance?*

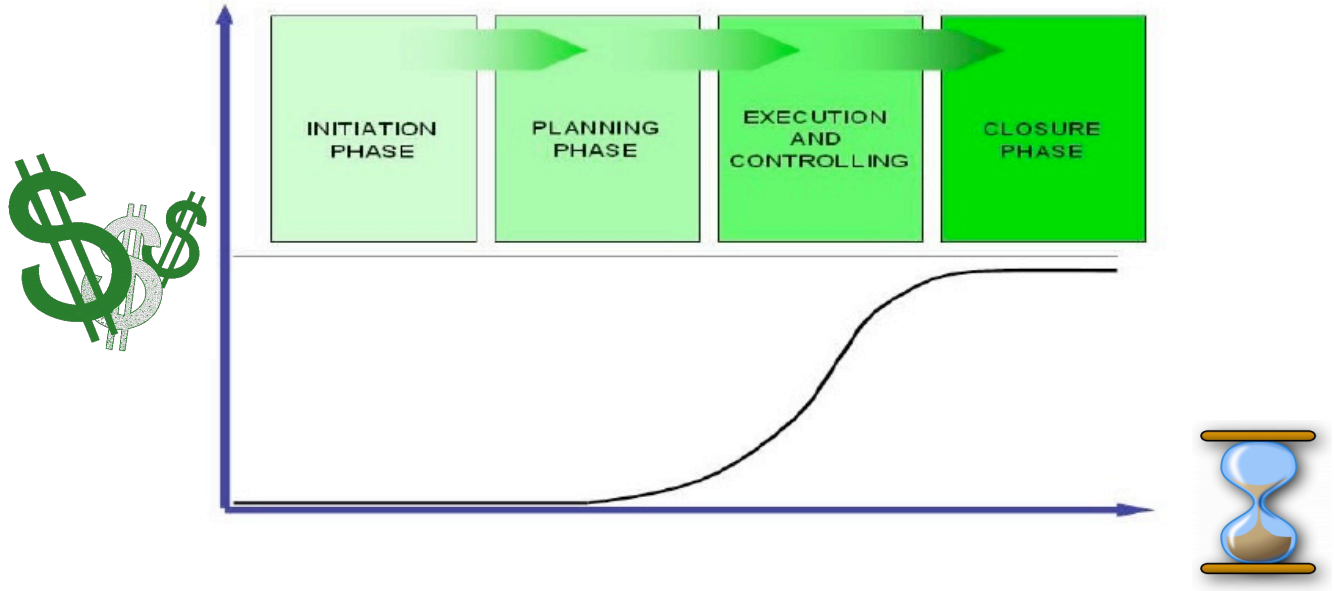
Earned Value Management (EVM) is the a commonly used method of performance measurement.

EVM integrates project scope, cost and schedule measures.

# EVM Method (1/5)

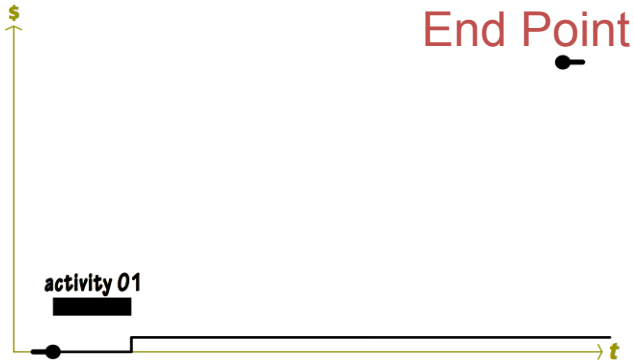
## S-curve

S-curves are an important project management tool. They allow the progress of a project to be tracked visually over time, and form a historical record of what has happened to date.



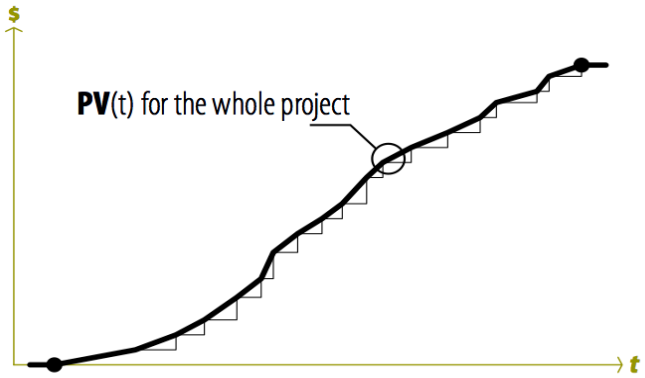
# EVM Method (2/5)

## Steps to create the Baseline S-curve…





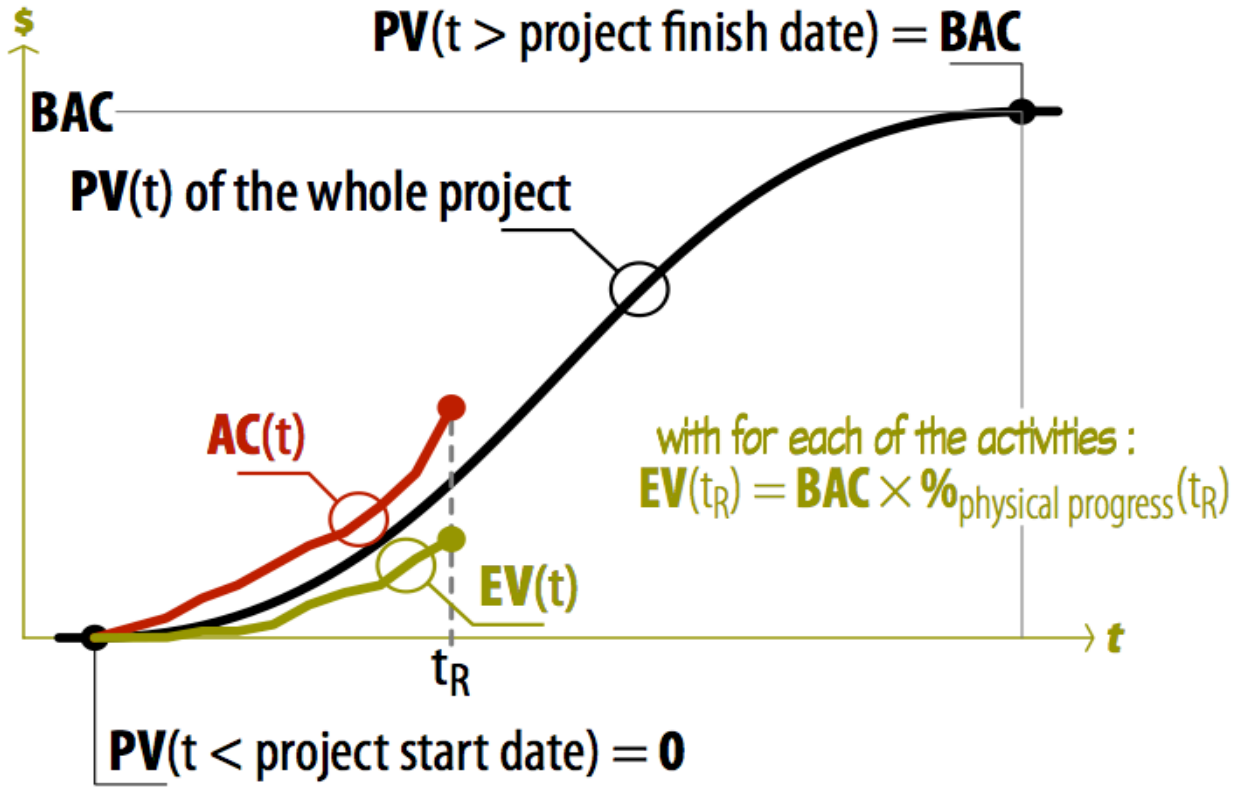
Start Point

# EVM Method (3/5)

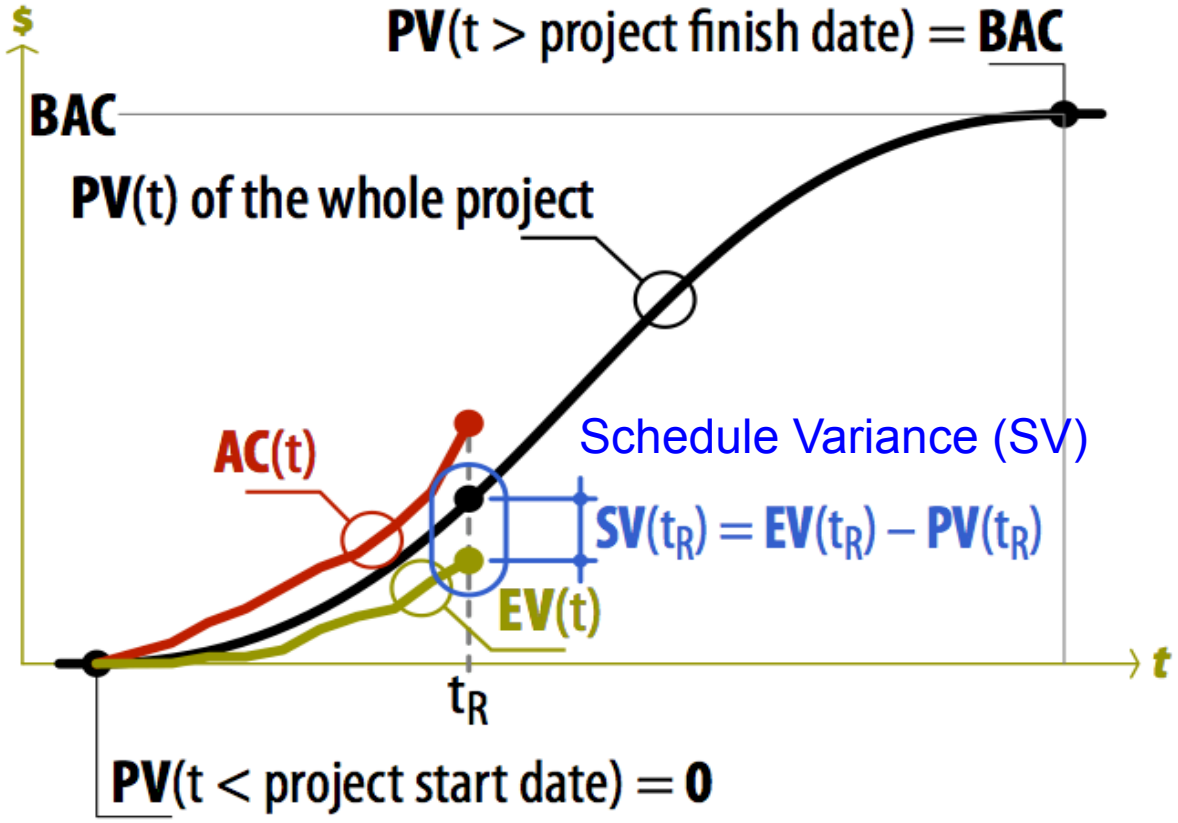
## Earned Value (EV) of work performed

*"costo delle attivita' realizzate alla data corrente $t_R$"*



# EVM Method (4/5)

## Why EVM is an integrated method?



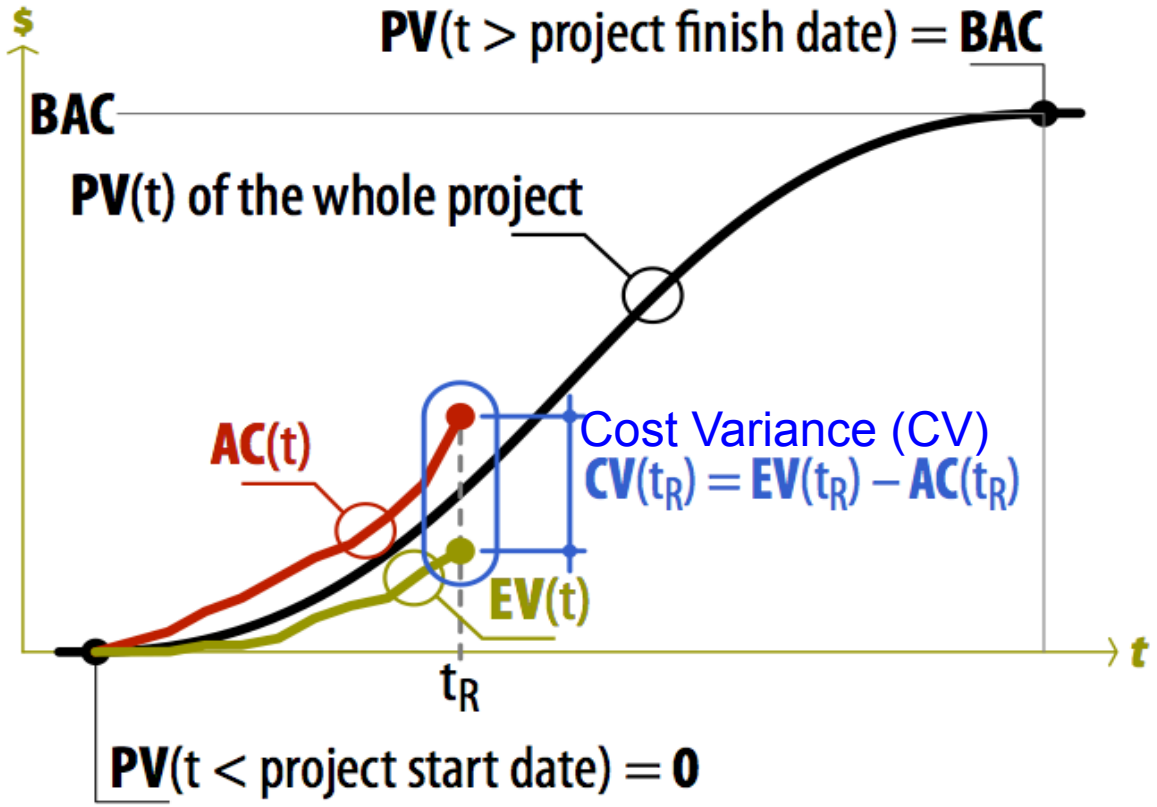

Variance Index

SV < 0

SV > 0

# EVM Method (5/5)

## Why EVM is an integrated method?

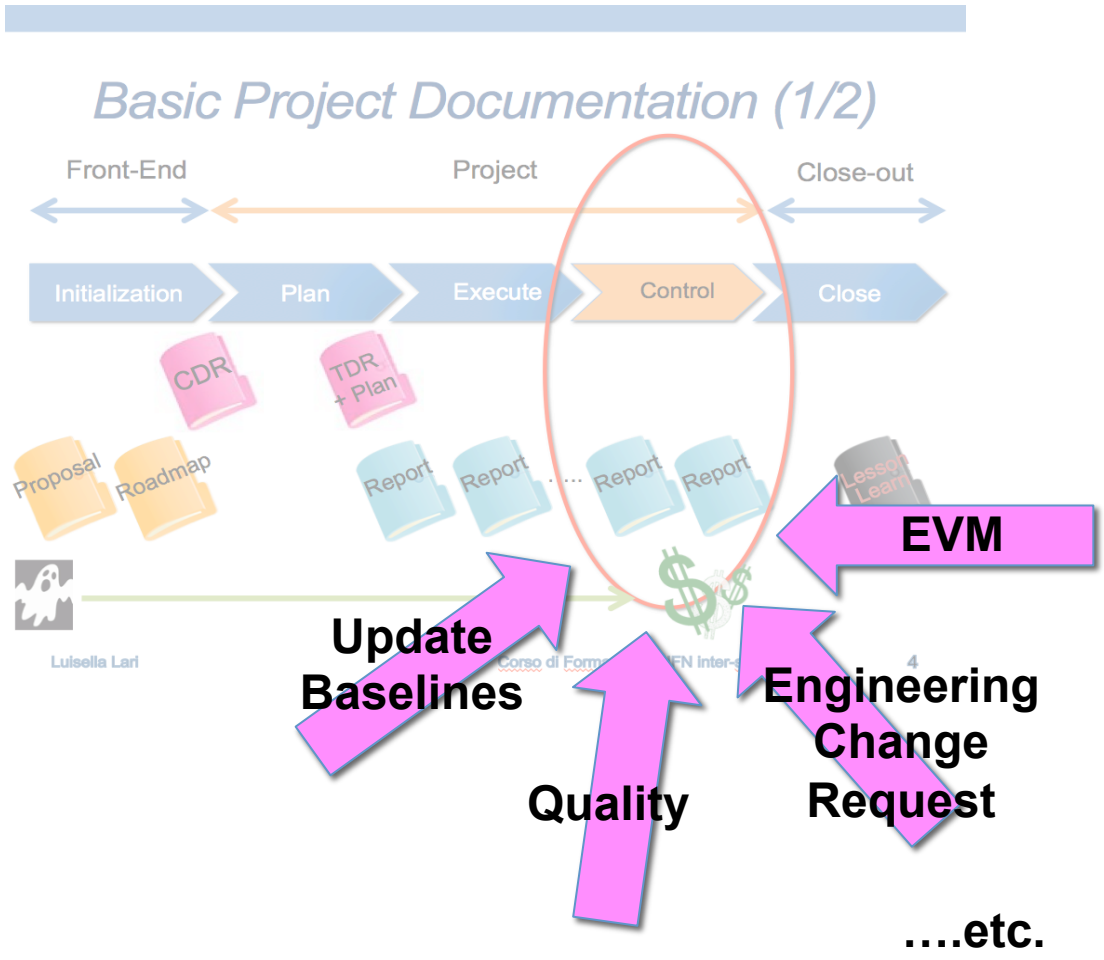



Variance Index

CV < 0

CV > 0

# Status Reports (1/2)




At the right person → the right information

# Status Reports (2/2)

## Project Management Plan

3. **Project Management Processes**: including i.e. Scope Management Plan, Time Management Plan, Resource Management Plan, Quality Management Plan, Communication Management Plan, Risk Management Plan, Contribution Management Plan.

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At the right person → the right information

Where I can find this information?

Communication Plan

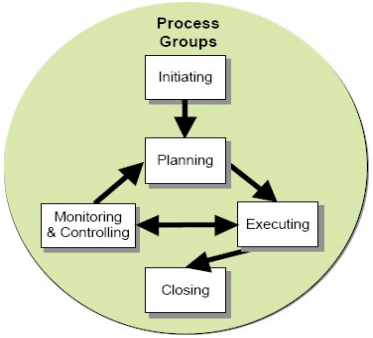
Communication Matrix

| Project | John (Client) | Sally (Proj Mgr.) | Robert (Technical Mgr.) | Jose (Executive Sponsor) | Isaiah (Client Consultant) | Jorge (Procurement Mgr.) |
|---|---|---|---|---|---|---|
| Project Scope | A | R | R | A | R | R |
| Changes | A | A | A | A | I | R |
| Meeting notes | I | A | A | I | I | A |
| RFIs | R | R | A | I | R | A |
| RFQs | R | R | A | I | R | A |
| Schedule updates | R | A | A | I | I | R |
| Technical reviews | I | R | A | I | R | A |

A = Approval required
R = Review and comment
I = For information only

# *Basic project life-cycle*

Scientific Projects like any other project can be summarize in the 5 process groups.

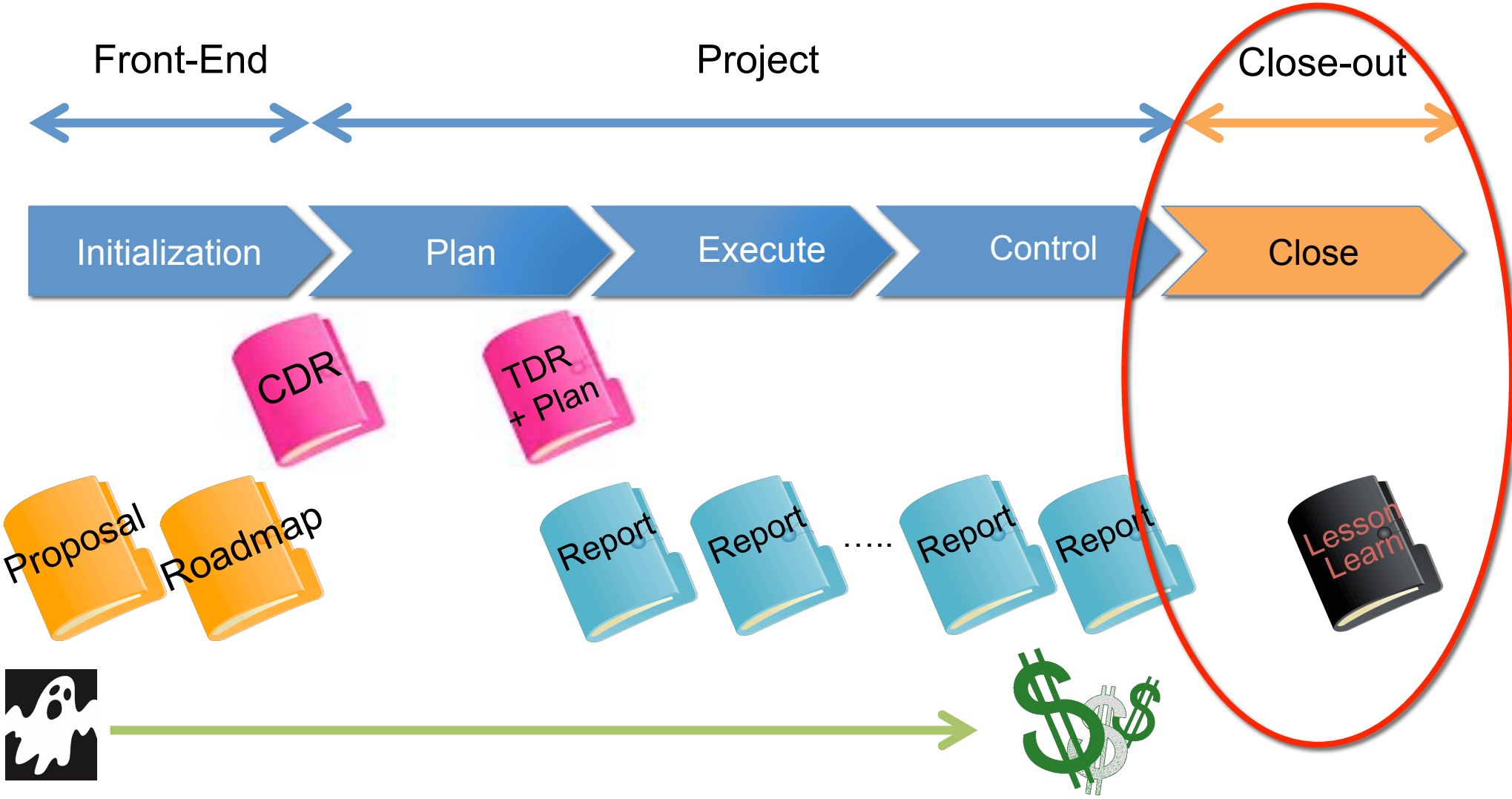



Creative phase

Rigorous phase

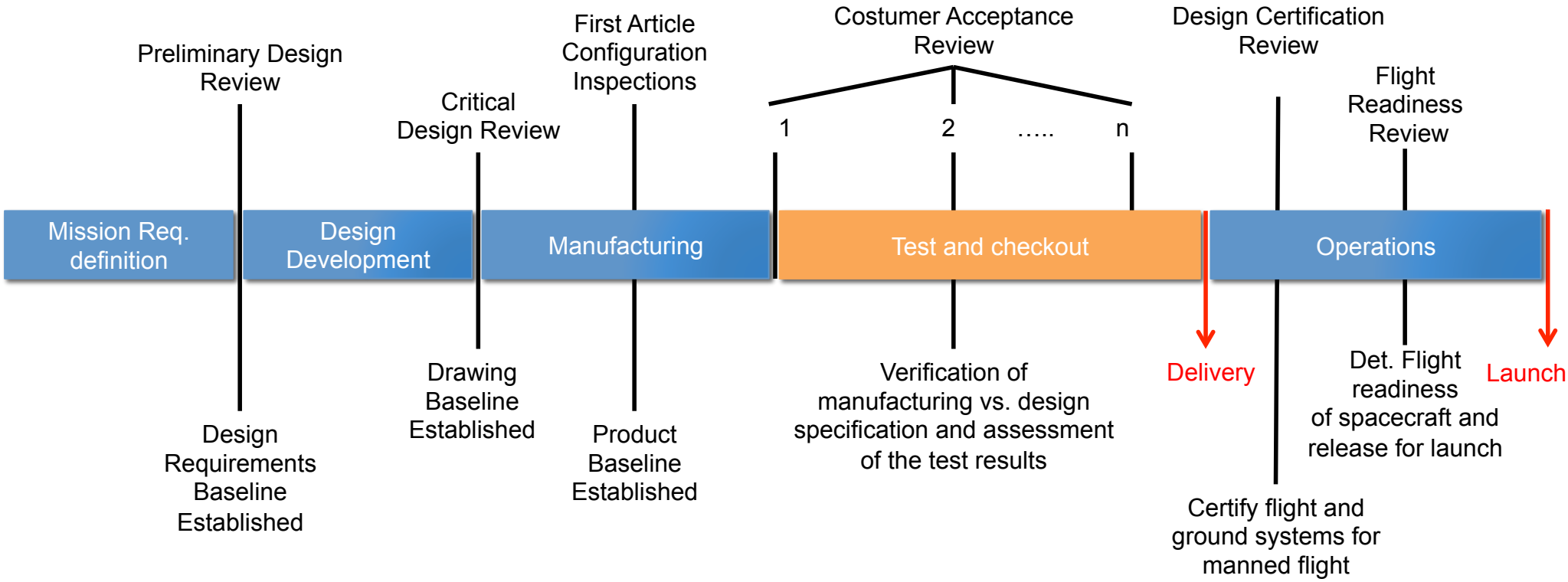
Initialization → Plan → Execute → Control → Close

# Basic Project Documentation (1/2)



# Basic Project Documentation (2/2)

## The NASA **Program**/Project Life-Cycle



# *Why is it important to properly close the project?*

2 Main reasons:

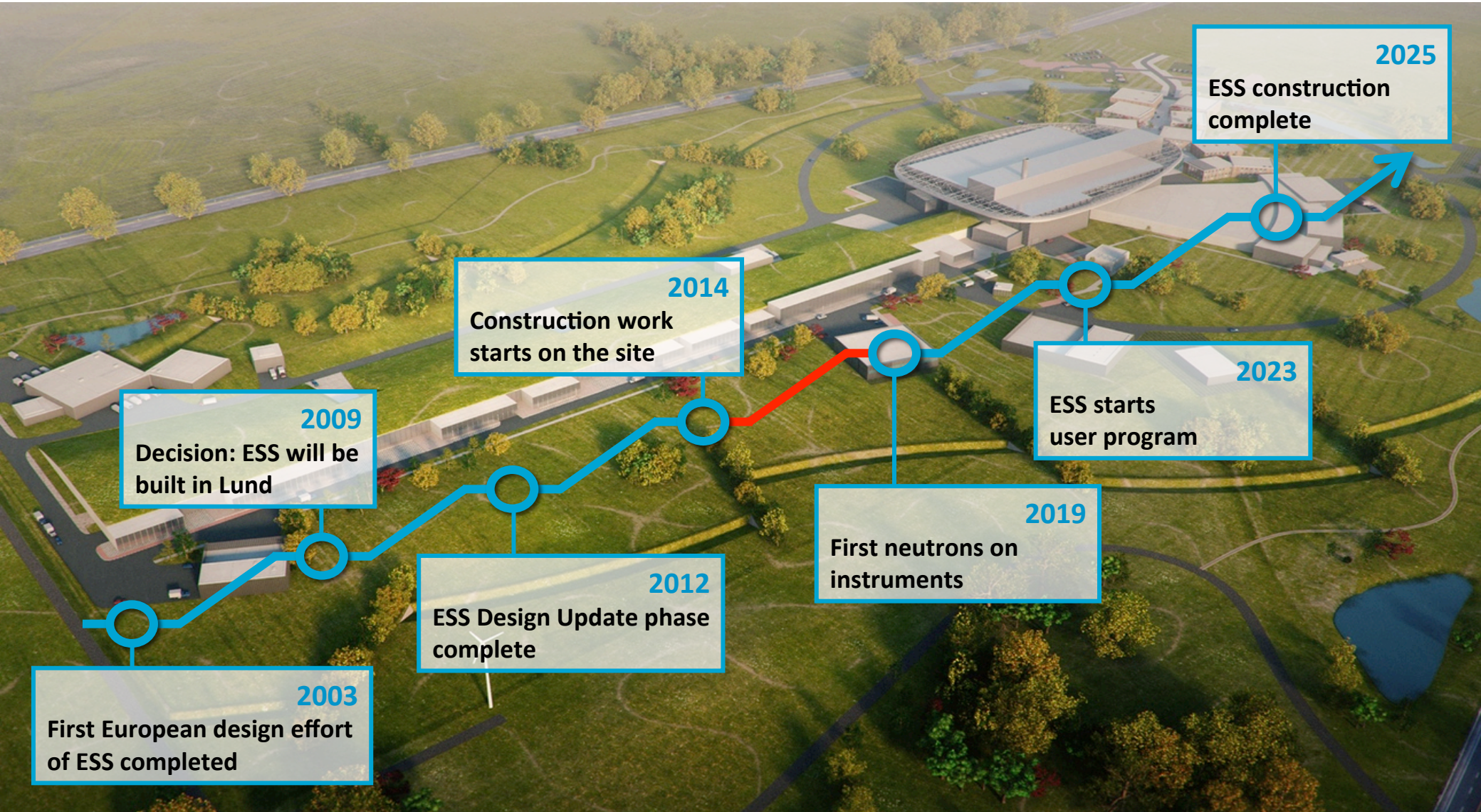
1. To avoid that the project drifts or that it becomes a new project;

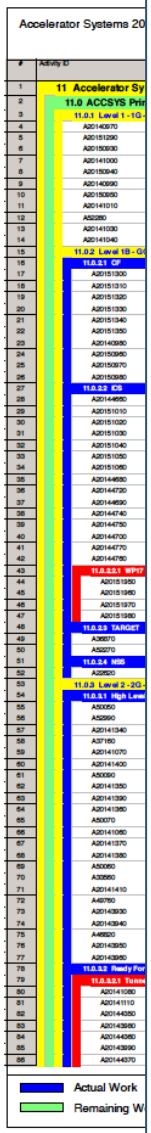
2. To assure that the lessons to be learned from the project are formally investigated and recorded for use them on the next project;

# *Lesson learned and knowledge transfer*


Note that most of the estimations on activity cost/duration/resource allocation are stored in that files !!!!!!!

# *Where are we at ESS?*






EUROPEAN SPALLATION SOURCE

**Change Requ**

*Class D and E ch*

| CHANGE DATA |
|---|
| CR ID |
| Title of the CR |
| Name of Change Leader |
| Change class |
| Approving entity |

| CHANGE ANALYSIS |
|---|
| Item No |
| Reason for change |
| Change description |
| Change Analysis (effects, risks, time, costs etc.) |
| Change affects other projects |
| Comment |

| CHANGE IMPACT |
|---|
| Schedule impact for affected projects |
| Scope impact for projects |
| Cost impact for projects |
| Risks for projects |
| References |

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**ESS Project Activities regarding**
**Beta Linac, High Energy Beam Tr**

EUROPEAN SPALLATION SOURCE

| | |
|---|---|
| Document Template | |
| Document Number | ESS Monthly Project Status Report |
| Date | 2016-01-28 |
| Revision | 0 (2) |
| State | FINAL |

Monthly Project Status Report for ACCSYS
Reporting period 2015-12-01 to 2015-12-31

*Including EVM reporting*


*Thanks for your attention!*

Questions?