training on

ECSS Space project management standards

Presented by

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ESA-ESTEC (retiree)

The presenter

- Four decades of experience in Academy, Industry and ESA
  - Took up duties in ESA on 28 September 1987
  - More than 10 years in Technology Management
  - More than 20 years in Human Spaceflight
  - Retired since 1 Dec 2018
  - ISU Adjunct Academy
  - IAASS Member

The object of this session

What this session is about…

This is a session on "Project management **standardization**"

What this session is NOT about

This session is NOT about "Project management techniques"

What is the difference?…

A clue: ECSS standards are for **use in contracts**…

The approach followed

After a brief introduction to project management:

- An "ECSS universal principle" will be introduced
  - In this presentation it is called the "**ODSI**" principle
- Then the M books "will be open", to confirm how much this principle is applied

Therefore, the objective of this presentation is

- To familiarize with the content of the ECSS-M standards
- To be able to quickly identify key requirements

Table of Content

1 - Introduction – PM activities

Project Management Functions

What is Project Management, and why is it needed?

Project Management
is
an integrated process
for
documenting, monitoring and controlling
complex projects
throughout the entire project's life cycle
from their conception, through design, development, manufacturing, operations and disposal phases

Project Management system objective's to
"keep in balance" 4 key parameters:

Risk	Scope	Schedule	Cost

PM is about documenting, monitoring & controlling… (everybody involved)

During all Project Phases (from A to F)

project involved personnel coordinated by project management team

1 - Introduction – PM activities

Project Management Overview

- **Risk, Scope, Schedule, Cost** are:
  - directly linked to each other
  - interact continuously throughout the project life cycle
- ✓ Any change in any of them impacts on at least one of the other three

- Example – the measures adopted to resolve an unforeseen problem can easily lead to one, several, or all the following:
  - need for additional resources to correct the problem
  - need to extend the project schedule
  - change in the perceived risk associated with the project
  - modifications to the scope

- ✓ Any, or all of the above will have an impact on cost

The 4 parameters **cannot** be improved all at the same time

1 - Introduction – PM activities

Project Management – Project Content & Schedule

Scope		
Products and Services to be delivered	**Facilities and Resources** needed to create products & services	**Breakdown of major tasks** to be performed

Schedule accumulated time needed to	
Phase A	➢ Establish the project objectives ➢ Define the Mission Statement ➢ Organise the project
Phase B, C & D	➢ Design, develop, manufacture, qualify and deliver the project's products ○ based on detailed planning and a logical flow of all tasks to be completed ○ within the available resources and facilities
Phase E	Utilise the project deliverables during their operational lifetime
Phase F	Safely dispose of project products at their end of life

1 - Introduction – PM activities

Project Management – Project Cost

Cost **total cost incurred during project life cycle**
Parts, Materials and Services
Labour
Facilities
Launch, Operations and Disposal
External Support
Any other unforeseen expenditures needed to complete the project within the allocated timescale

1 - Introduction – PM activities

Project Management – Project Risk

Risk

associated with project implementation to be determined very early

level of perceived risk is based on assessment of:

- project **complexity** (*including comparisons with similar projects*)
- the **technology** to be used → *TRL is an useful tool* ←
- any **known constraints** or limitations to be imposed
- any **other factors** that may apply

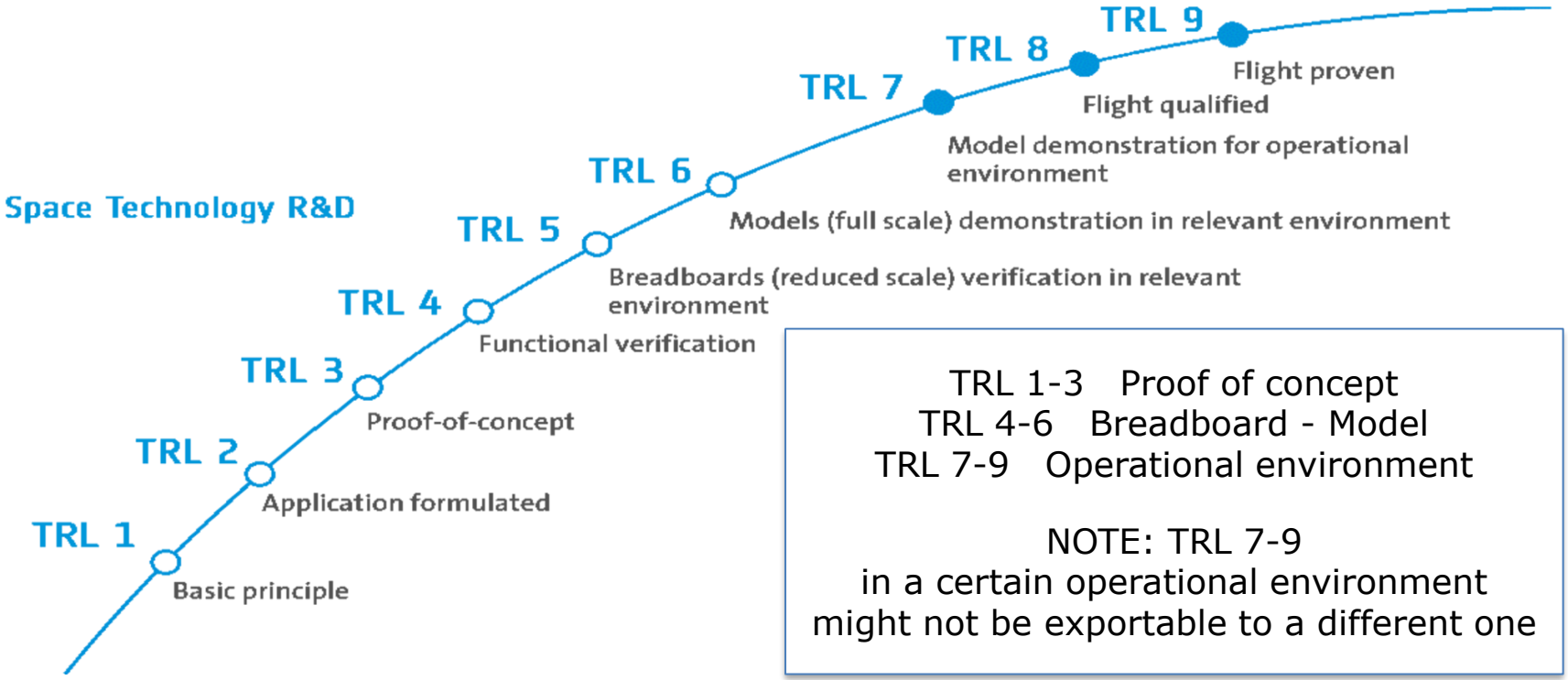
Technology Readiness Level
used by project managers
assessed by engineering team
covered in the E-10
"System Engineering"

Initial risk assessment is one key input for
finalising the project content, schedule, funding, including reserves

Errors in initial risk assessment are likely to lead to cost and schedule increase beyond the margin planned

acceptable level of risk
needs to be known
to do the tailoring
before selecting prime

Technology Readiness Level (TRL)

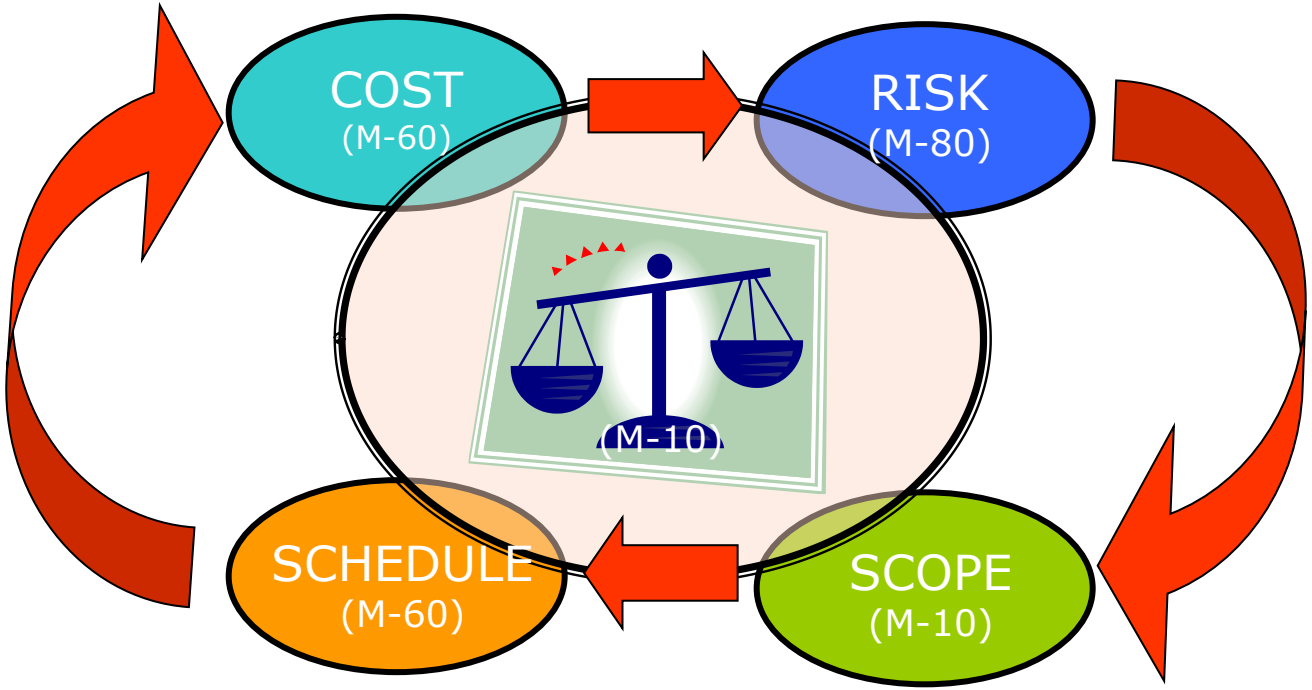


TRL 1-3 Proof of concept
TRL 4-6 Breadboard - Model
TRL 7-9 Operational environment

NOTE: TRL 7-9
in a certain operational environment
might not be exportable to a different one

1 - Introduction – PM activities

Project Management – Interaction & Balance



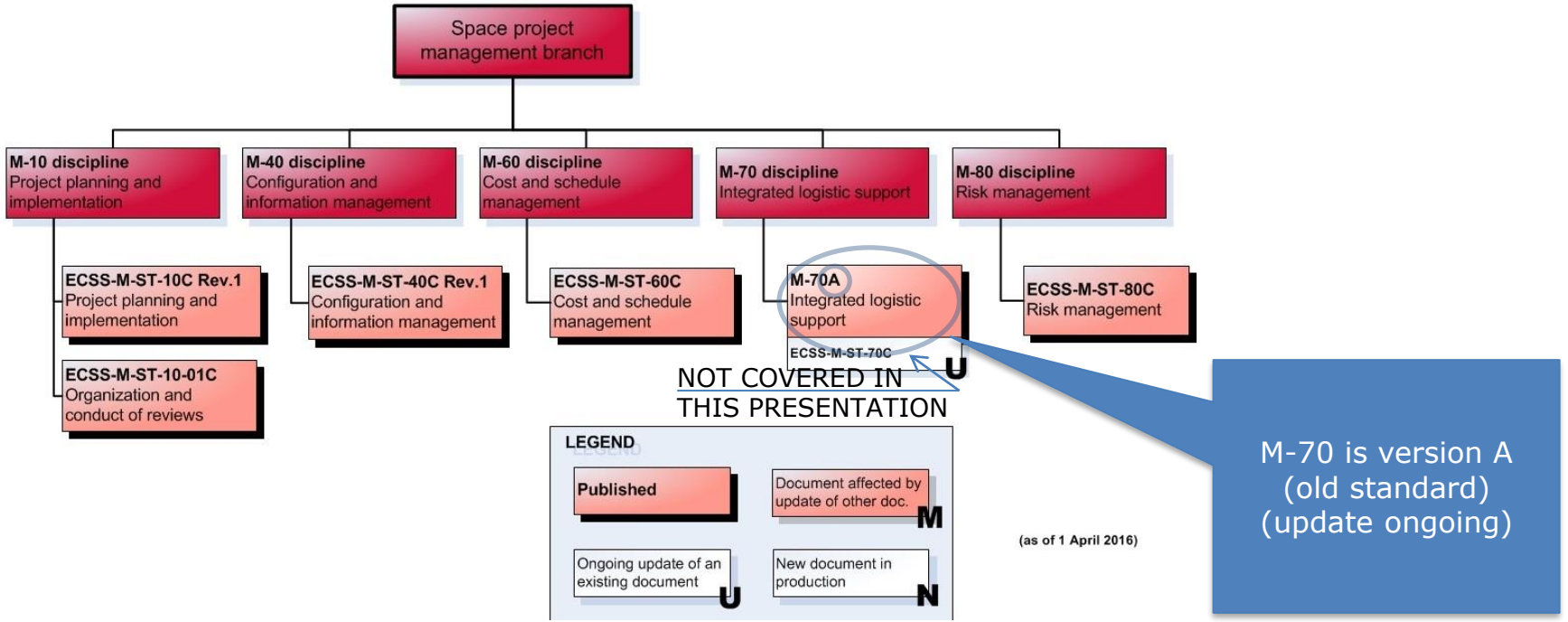
PM

cannot improve the 4 parameters at the same time

but it can keep them in balance

2 – ECSS-M structure & approach

ECSS Management Tree



2 – ECSS-M structure & approach

ECSS Management disciplines description (1/3)

Discipline	Title & (Document)	Scope / Objective
M-10	Project Planning and Implementation (ECSS-M-ST-10 and ECSS-M-ST-10-01)	Set of processes/requirements for *minimizing* technical, scheduling and economic *risks* of the project In particular this is done by: • introducing **phases and formal milestones** • defining **project breakdown structures**, used as unique reference system for the project to: ○ identify the **tasks and responsibilities** of each actor ○ ensure the **coherence between all activities** (technical, documentary, administrative and financial) of the whole project ○ perform **scheduling and costing** activities • setting up a **project organization** to implement a structured and complete approach to perform all necessary activities on the project

2 – ECSS-M structure & approach

ECSS Management disciplines description (2/3)

Discipline	Title & (Document)	Scope / Objective
M-40	Configuration and Information Management (ECSS-M-ST-40)	Set of processes for: • identifying, describing and controlling the **technical description of a system** in a logical and consistent manner throughout the system's life cycle • ensuring that the **information** necessary for execution of all management processes is recorded, retrieved, distributed, modified and used in a traceable manner
M-60	Cost and Schedule Management (ECSS-M-ST-60)	Set of processes for verifying the compliance of project planning and organization ➔ to ensure the **consistent use of resources** (human, facilities, materials and funds) ➔ to complete the space project within its established goals: costs, schedule and performance Provides alerts to trigger necessary adaptations (e.g. re-planning, resource reallocation, …)

2 – ECSS-M structure & approach

ECSS Management disciplines description (3/3)

Discipline	Document & Title	Scope / Objective
M-70	Integrated Logistic Support (ILS)	NOT COVERED IN THIS PRESENTATION
M-80	Risk Management (ECSS-M-ST-80)	Risk management discipline • identifies all risks (including new opportunities) • **keeps these risks within defined and accepted boundaries** that are defined in the risk policy of the project Risk management encompasses **all aspects of the programme** including: • Technical and Quality performance • Programmatic (e.g. funding, political environment) • Cost (e.g. contract type, project cost) • Schedule and Operation (e.g. logistic support, security)

2 – ECSS-M structure & approach

A map of the contents of ECSS-M standards

	Clauses									Annexes		Bib
	1	2	3	4	5	6	7	8	9	Normative (DRDs)	Informative	
M-ST-10C	SCOPE		Terms and definitions	#	@					@ 5 DRDs	3	BIBLIOGRAPHY
M-ST-10-01C		Normative References		#	@					@ 4DRDs	2	
M-ST-40C				#	@					@ 10 DRDs	3	
M-ST-60C				#	#	#	@	@	@	@ 15 DRDs	3	
M-ST-70C				#	@	@	@	@				
M-ST-80C				#	#	#	@			@ 3 DRDs	2	

Informative Normative

Principles @ Requirements

Note that Clauses 4
(and for M-ST-60 and M-ST-80, also Clauses 5 and 6)
describe the principles, i.e.
how the activities are performed in a typical project

2 – ECSS-M structure & approach

General approach followed in ECSS-M standards (1/2)

- Many high level requirements (mainly in the 5 Level-2 standards) are drafted following the "**ODSI**" principle:

  a. – **O**rganize yourself in your own way
  b. – **D**ocument how you have organized yourself
  c. – **S**ubmit this document to your customer for approval
  d. – **I**mplement this organization (once approved)

- This philosophy is very convenient for already established suppliers, but newcomers may have difficulties in understanding what it is required from them. To help them, some information is available. Therefore, the ODSI principle can be extended to:

  e. – If you don't know how to comply with a. above [**O**rganise], informative material may be available in Chapter 4, informative annexes or handbooks.

2 – ECSS-M structure & approach

General approach followed in ECSS-M standards (2/2)

- This "To document" normally implies that a **DRD** is required
- Approval by the customer is important for 2 reasons:
  - To ensure correctness
  - To ensure consistency through the whole project
- Example: M-ST-10C "Project planning and implementation, # 5.1.3:

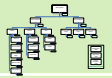
h. "The supplier shall establish the Work Breakdown Structure (WBS) for his work share incorporating the WBS of his lower tier suppliers in conformance with Annex C DRD (Work breakdown structures)

k. The WBS shall be subject to customer approval"

In the next slides, anything with the background in green is following this ODSI principle

3 - ECSS M-standards content

M-ST-10: Project Planning & Implementation

Clause & Req	Content of the requirements	DRD (Annex)	Supporting information
5.1 Project planning			
5.1.1	Tailoring by the customer	-	Will be described in S-ST-00-02
5.1.2	Project management Plan (PMP)	A	General guidelines in 4.1
5.2 Project organization			
5.2.1	Organization structure	Part of PMP	General guidelines in 4.2.1 & 4.2.2
5.2.2	Communication & reporting		General guidelines in 4.2.3
5.2.3	Audits		*Basic* guidelines in 4.2.4
5.3 Project breakdown structures			
5.3 a to g	Product tree	B	4.3.4 
5.3 h to l	Work Breakdown Structures (WBS)	C	4.3.5, Annex H NOTE: WBS refers to Functional responsibilities 
5.3 m to o	Work Packages (WP) Descriptions	D	4.3.6 NOTE: A WP is any WBS element(s) that can be measured and managed for planning, monitoring and control
5.3 p to r	Organization Breakdown Structure (OBS)	Part of WBS	4.3.7 NOTE: OBS refers to responsible parties for each work package in the WBS.
5.4 Project phasing			
5.4 a to d	Project phases & reviews (including criteria to next phase)	-	4.4 

3 - ECSS M-standards content

M-ST-10 "Project Planning & Implementation" – Supporting material (1/4)

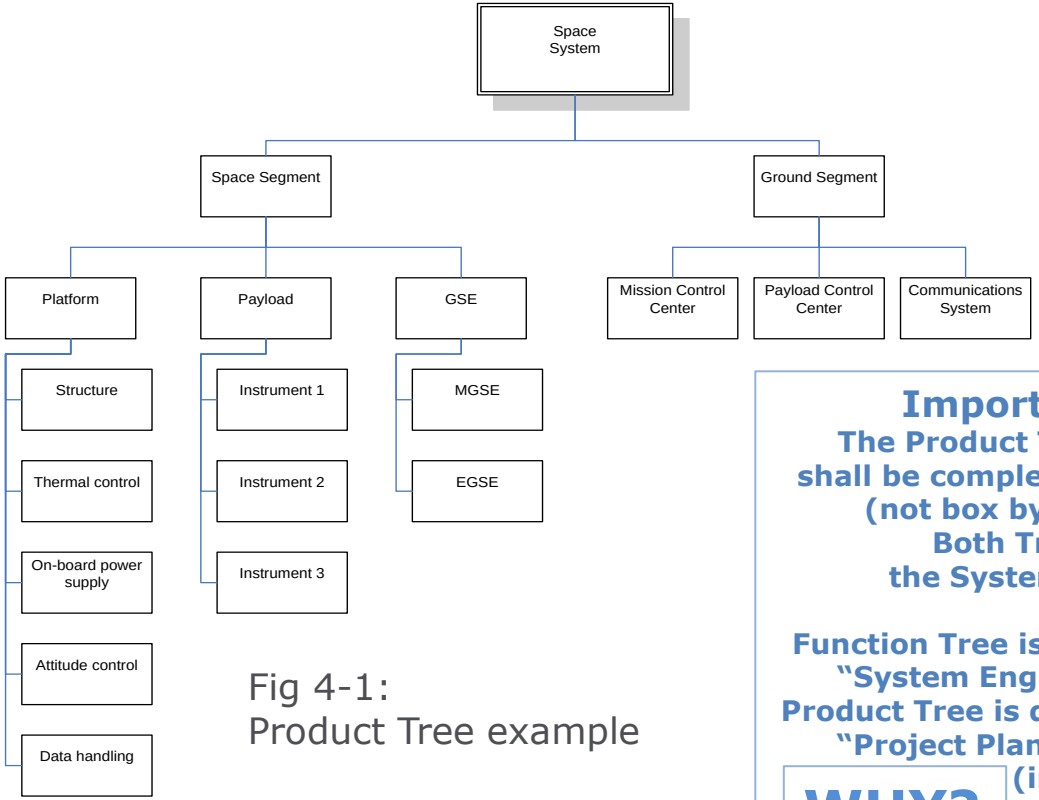


Fig 4-1:
Product Tree example

Important consideration

The Product Tree and the Function Tree shall be completely mapped one to the other (not box by box, but many to many)
Both Trees are produced by the System Engineering Function

Function Tree is described by DRD in E-ST-10 "System Engineering" (in the E branch)
Product Tree is described by a DRD in M-ST-10 "Project Planning and Implementation" (in the M branch)

WHY?

3 - ECSS M-standards content

M-ST-10 "Project Planning & Implementation" – Supporting material (2/4)

Important consideration

The WBS is fully based on the product tree

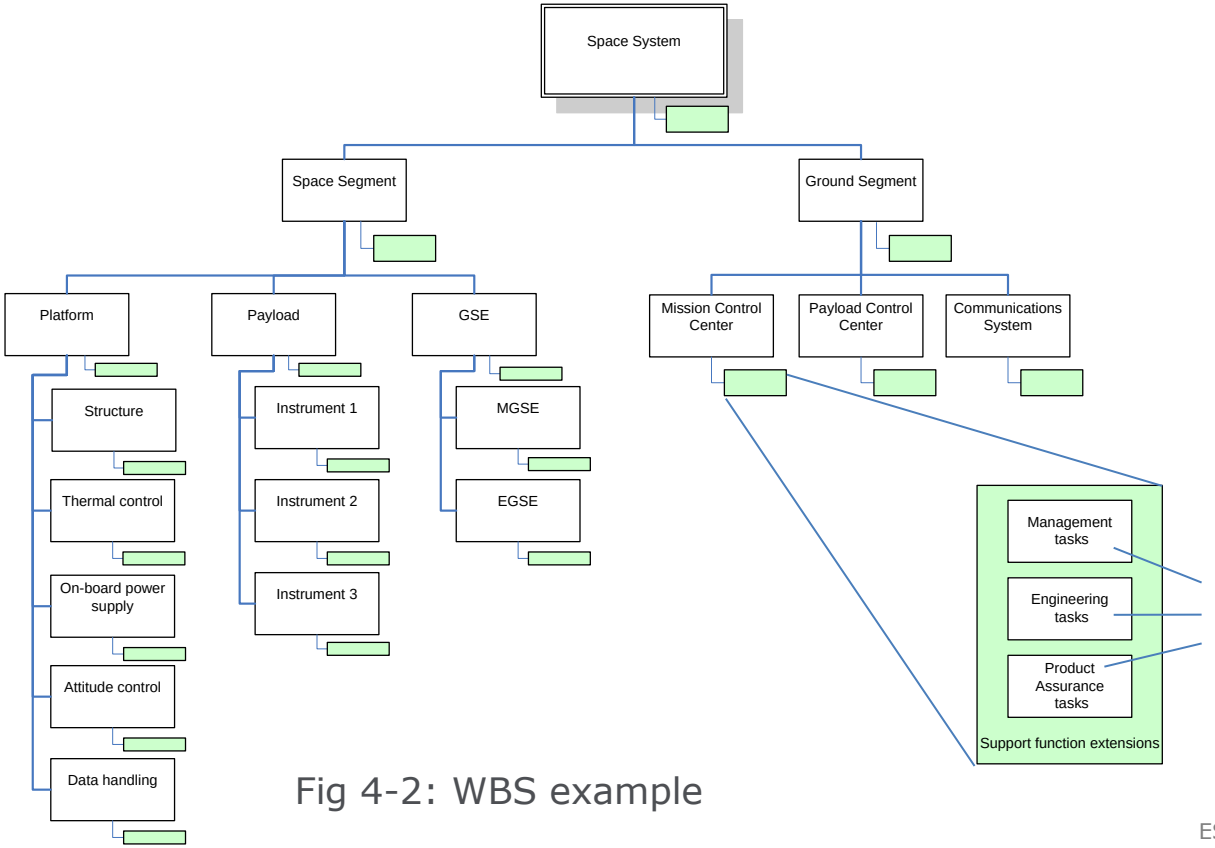


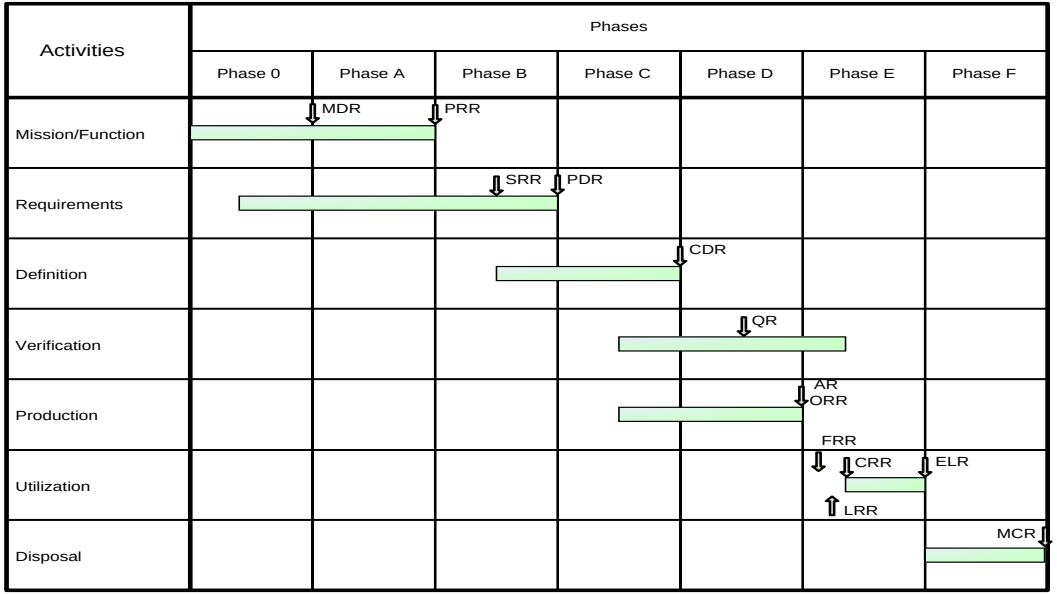
Fig 4-2: WBS example

3 - ECSS M-standards content

M-ST-10 "Project Planning & Implementation" – Supporting material (3/4)

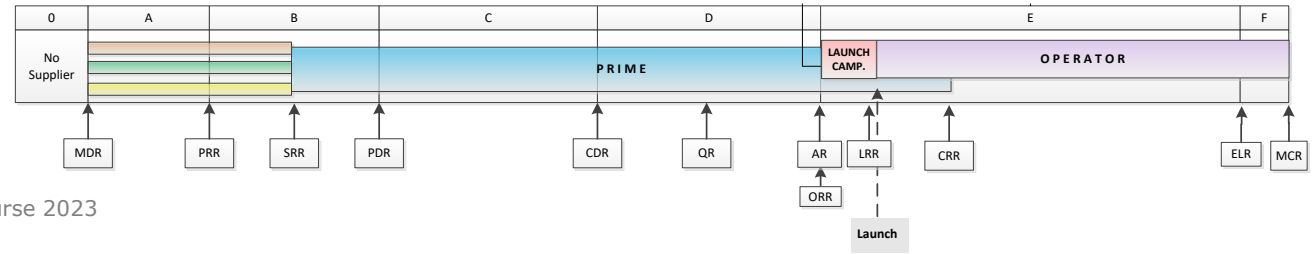
REVIEWS

MDR=Mission Definition
PRR=Preliminary req.
SRR=System req.
PDR=Preliminary design
CDR=Critical design
QR=Qualification
AR=Acceptance
ORR=Operational readiness
FRR=Flight readiness
LRR=Launch readiness
CRR=Commissioning result
ELR=End-of-life
MCR=Mission close-out



PHASES

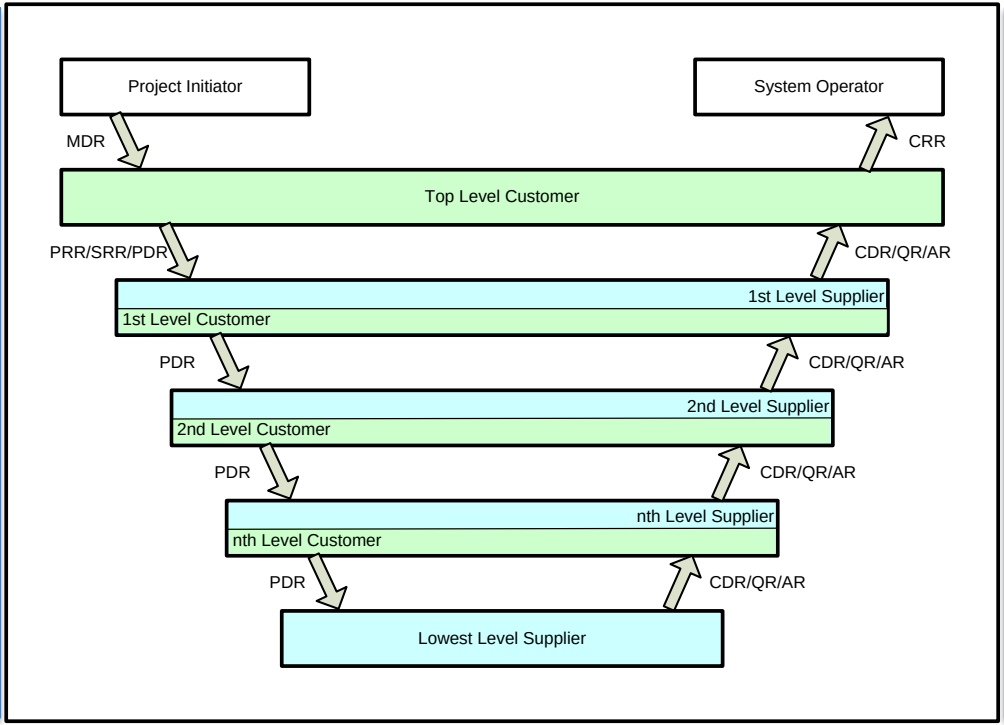
0 – Mission analysis / needs identification
A – Feasibility
B – Preliminary definition
C – Detailed definition
D – Qualification & production
E – Utilization
F – Disposal



3 - ECSS M-standards content

M-ST-10 "Project Planning & Implementation" – Supporting material (4/4)

From the PRR to the PDR the sequence of the reviews is "top down" starting with the top level customer and his top level supplier and continuing down the customer-supplier chain to the lowest level supplier



From the CDR to the AR the sequence of reviews is reversed to "bottom up" starting with the lowest level supplier and its customer and continuing up through the customer-supplier chain to the 1st level supplier and the top level customer

This is the so called "V model"

Figure 4-4: Review life cycle

3 - ECSS M-standards content

M-ST-10-01 "Organization & conduct of reviews"

Clause & Req	Content of the requirements	DRD (Annex)
5.1 General – customer responsibilities, objective & coverage documentation		
5.2 Review bodies – Review authority (consumer), review team, project team (customer & supplier)		
5.3 Roles & tasks		
5.3.1	**Review authority (RA)**: Approve procedure, endorse team recommendation, make recommendations to customer report findings	D (Review Authority Report)
5.3.2	**Customer**: Propose procedure, event organization, data management system	A (Review Procedure)
5.3.3	**Supplier:** Support the customer for: logistics, documentation, and RID responses/action schedule	
5.3.5	**Review team (RT):** Review doc, produce RIDs, assess RIDs responses, help with the report	B (RID content)
5.3.4	**Review team leader (RTL):** Confirm prerequisite, approve RIDs & dispositions, produce the report	C (Review team report)
5.4 Prerequisite conditions – defined in the procedure by the customer, and agreed by supplier		
5.5 Review meetings		
5.5.1	**Prerequisite key point** - See above	
5.5.2	**K.O. meeting** – All bodies, for present the docs and authorize review	
5.5.3	**Coordination meeting** – As defined by RTL, for review inputs, release RIDs	
5.5.4	**Collocation meeting:** As defined by the RTL, for review RIDs, agree dispositions, identify actions/dates	
5.5.5	**RT close-out meeting**: As defined by the RTL, for results, inputs to report, and major issues	
5.5.6	**RA meeting**: RA & RT, for "blessing" the review, endorse team recommendations, make decisions, issue RA report	
5.6 RID processing and A.I. follow-up – Major & Minor RIDs, originators informed, RID closed = disposed/action agreed, open RIDs to be dispositioned by RA INFO IN ANNEX E (Logic diagram for RID processing)		

Important consideration

Why this standard is not necessarily following the ODSI principle?

RA = Review Authority

RID = Review Item Discrepancy

RTL = Review Team Leader

3 - ECSS M-standards content

M-ST-40 "Configuration and information management"

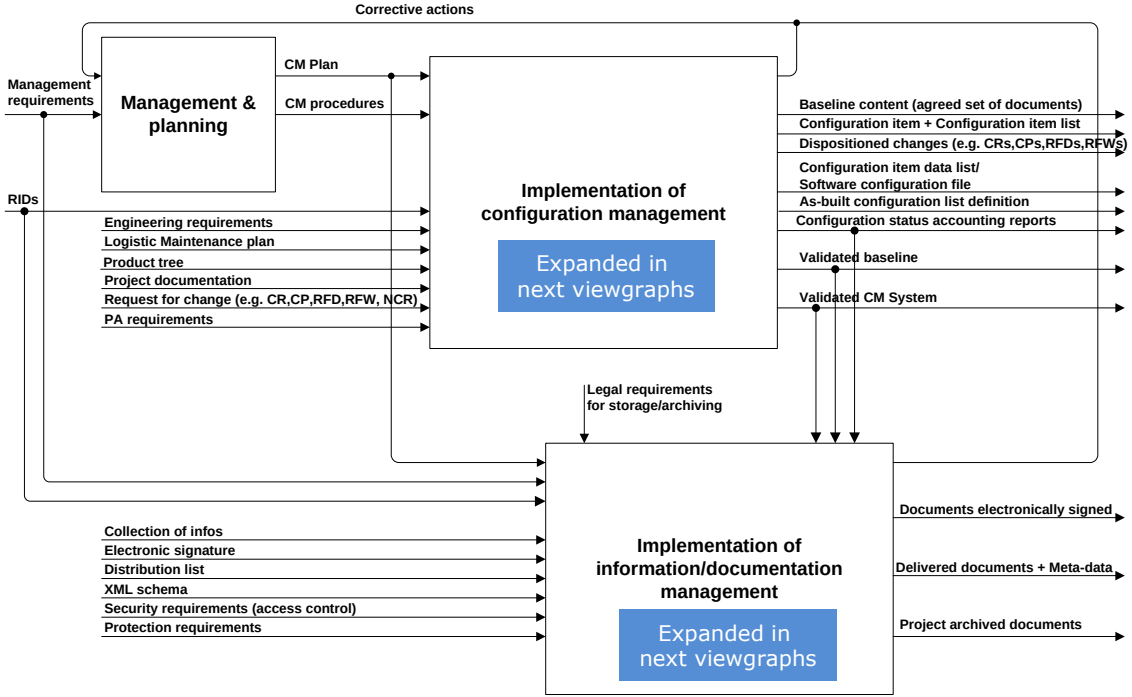
NOTE 1: For general process descriptions see Figures 4-1, 4-4, 4-5, 4-7, and 4-8

Clause & Req	Content of the requirements	DRD (Annex)	Supporting information
5.2 Configuration Management (CM) planning			
5.2.1	**CM plan (CMP)** - (including information security & classification)	A	General guidelines in 4.1.2
5.2.2	**CM interfaces** - (with Project management, Engineering, PA, Inf/Doc Management, …)	-	4.2.2 
5.3 Configuration Management (CM) implementation			
5.3.1	**Configuration identification** - (C.I. definition, selection, baseline, marking, …)	**Part of CMP**	4.3.2 & Annex K (C.I. Selection) 
	Configuration Item List (CIL)	B	
5.3.2	**Configuration control** - (Change process, classification, disposition, …)	**Part of CMP**	4.3.3 (change process, classification, CCB…)
	Change request	G	
	Change proposal	H	
	RFD & RFW	I & J	
5.3.3	**Configuration status accounting (record, store & retrieve data)**	**Part of CMP**	General guidelines in 4.3.4 (including as-designed and as-build data lists)
	Conf. Status accounting report (incl. Documents, Drawings, RFW, RFD, CRs, …)	F	
	As designed: Configuration Item Data List (CIDL)	C	
	As designed: SW Configuration File (SCF)	E	
	As-build Configuration List	D	
5.3.4	**Configuration verification** - (AsBuilt<->AsDesign @ various reviews)	**Part of CMP**	
5.3.5	**Audits of the CM system**		
5.3.6	**CM for operational phases** – (Activities during phases E & F)		
5.3.7	**Implementation of info/doc management** (including creation, review, delivery, archiving, retrieval)		4.3.8 (including TDP) & Annex L (Technical data) Annex M (Digital Signature) 

IDM = Info & Doc Management CCB = Configuration Control Board TDP = Technical Data Package

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material



NOTE to Fig 4-1: Corrective actions are improvements on the process itself as a consequence of lessons learned and any feedback provided on the project

Fig 4-1: Configuration Management

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

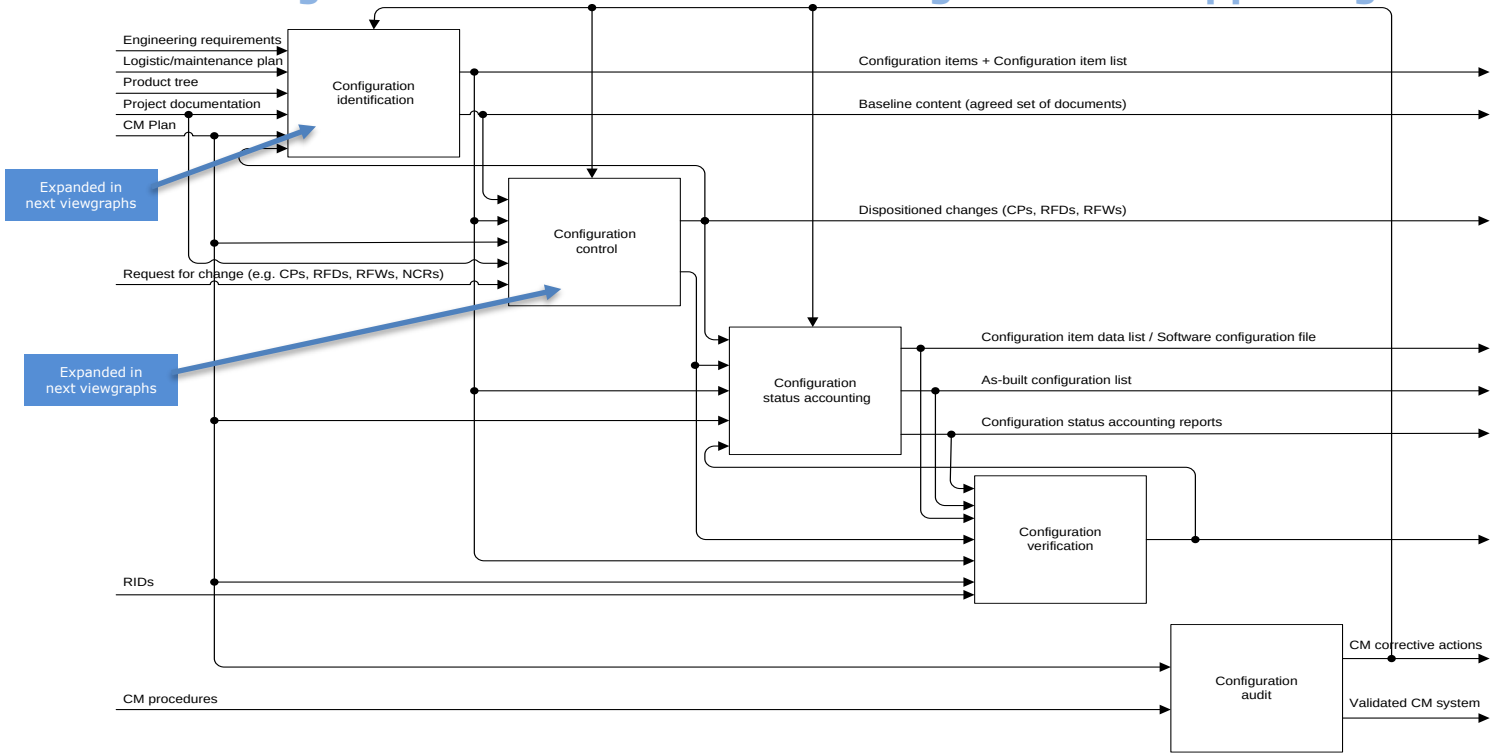


Fig 4-4: Implementation of Configuration Management

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

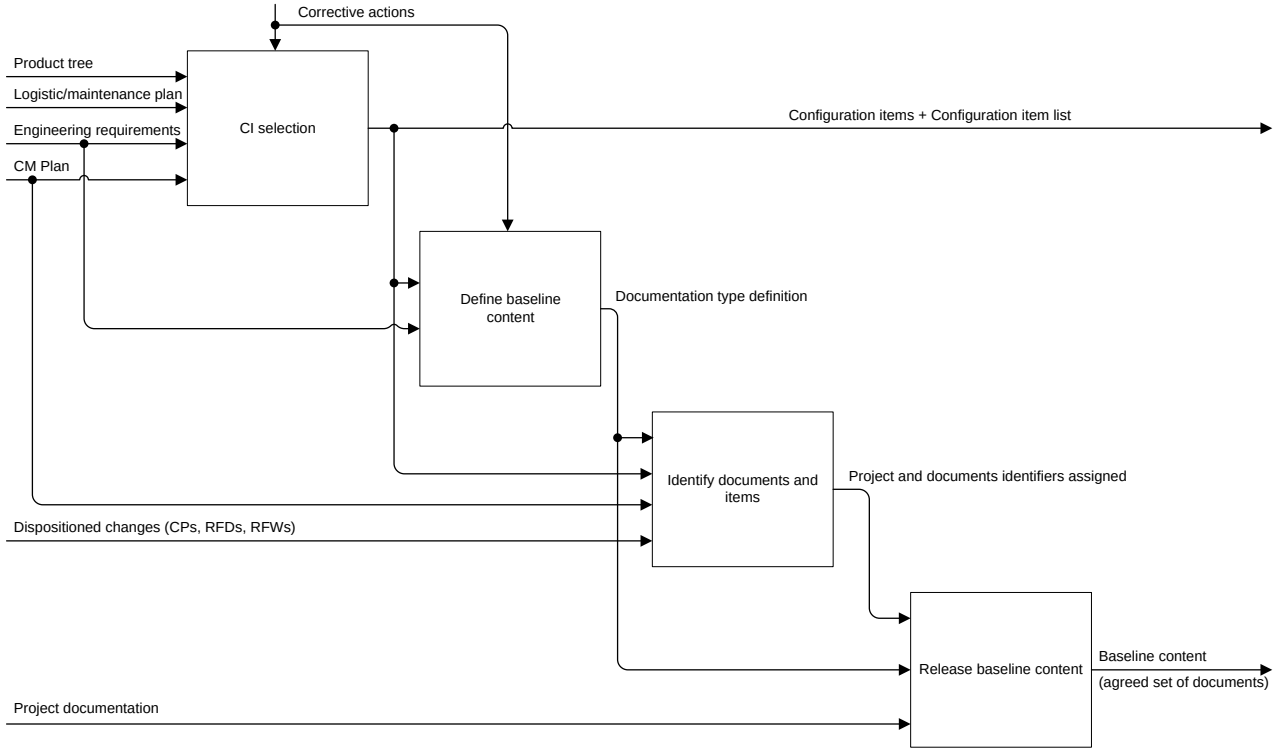


Fig 4-5: Configuration Identification

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

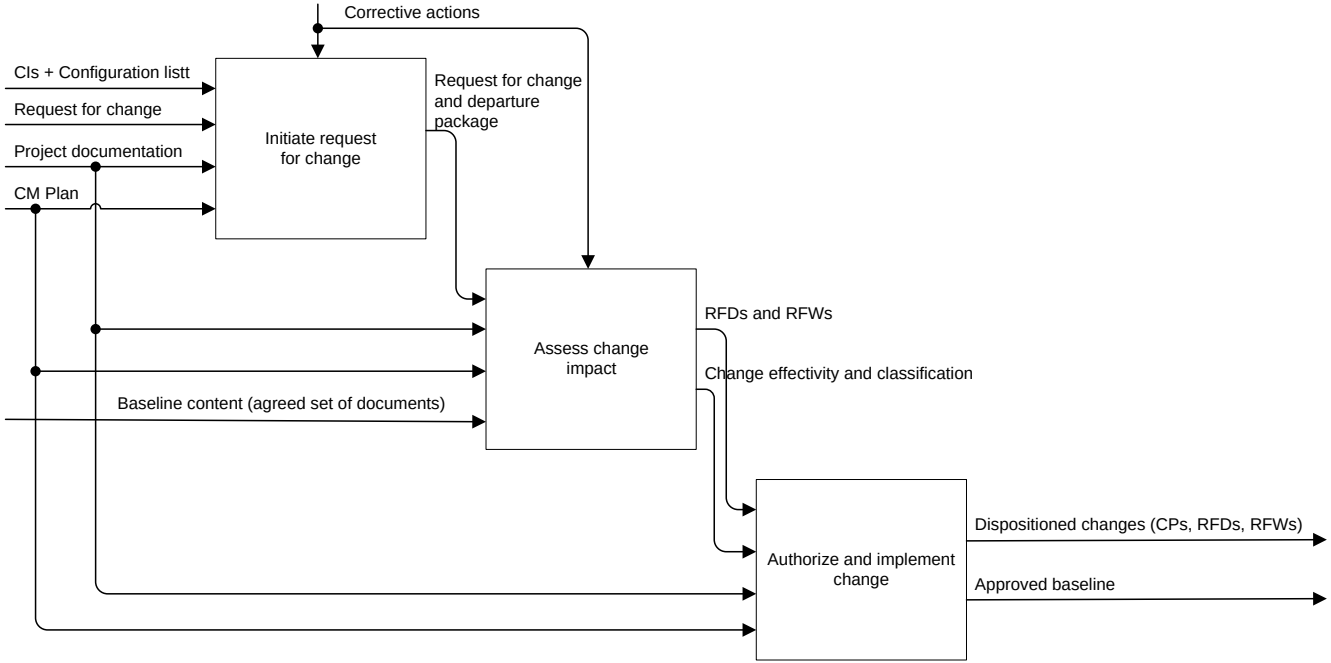


Fig 4-7: Configuration Control

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

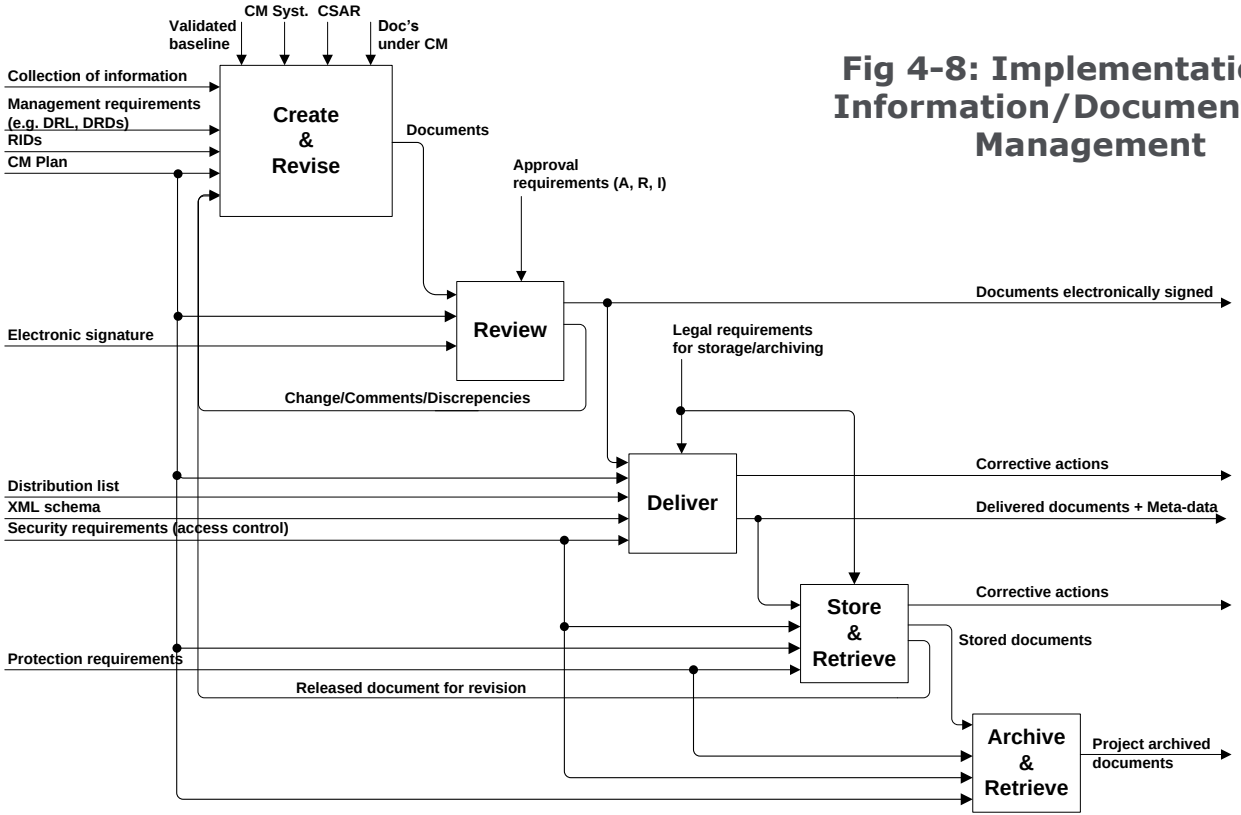


Fig 4-8: Implementation of Information/Documentation Management

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

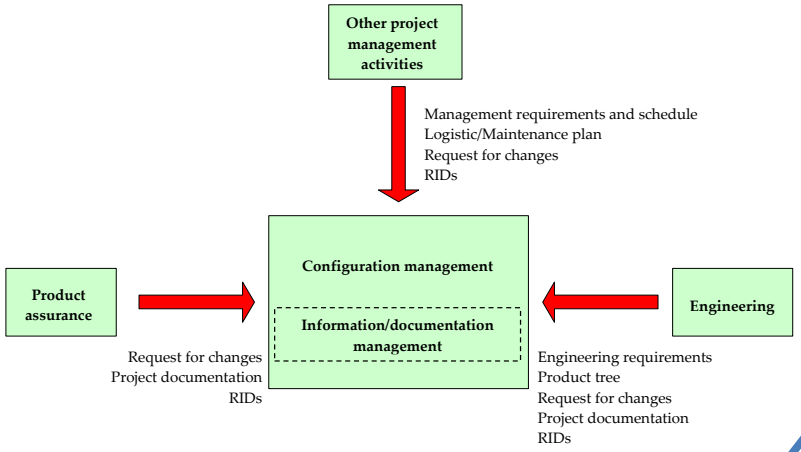


Fig 4-2:
C.M. interfaces (inputs)

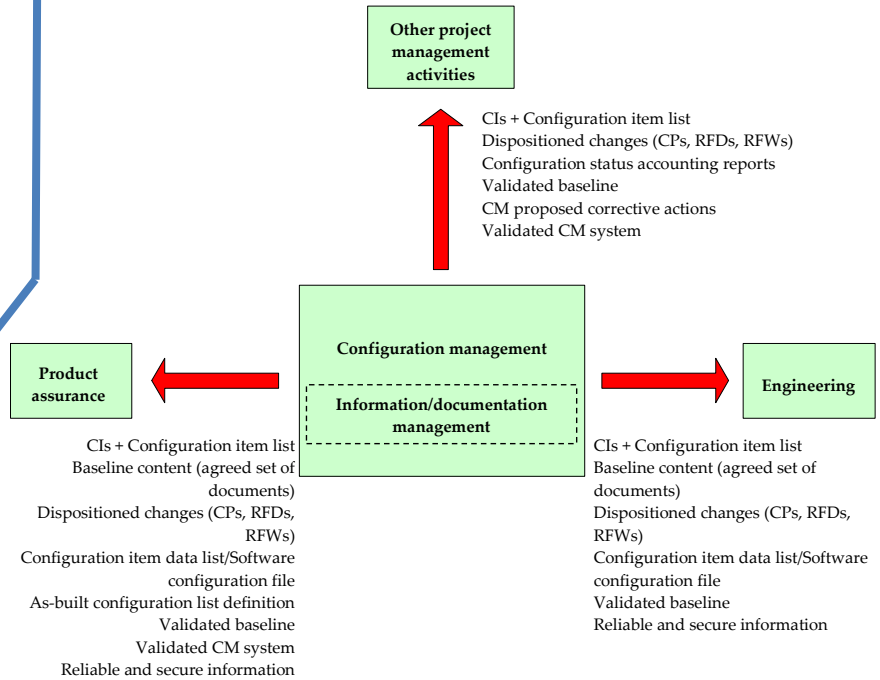


Fig 4-3:
C.M. interfaces (outputs)

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

Derived from Product Tree
Configuration item (CI) identification, performed by the customer
Trade-off C.M. ←→ cost
Annex K contains guidelines

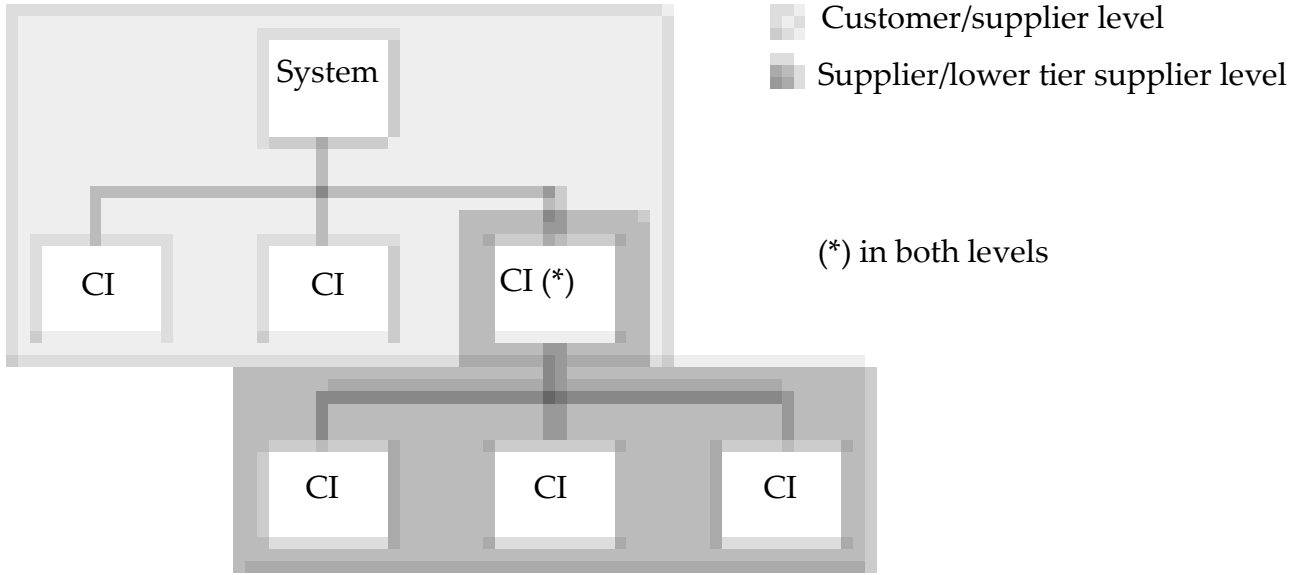


Fig 4-6: Configuration Item (CI) product tree structure

3 - ECSS M-standards content

M-ST-40 "Configuration and information management" – Supporting material

TDP format defines the way to exchange content files and their related metadata and the way to structure them within folders

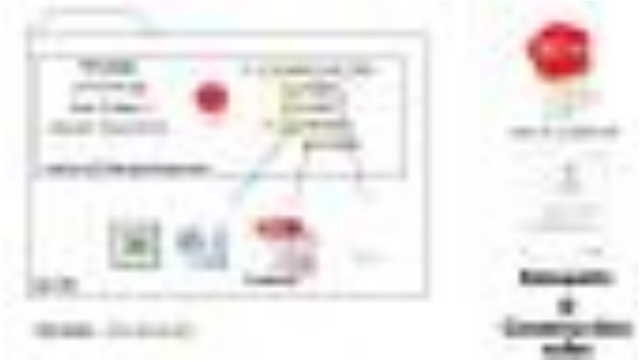


Fig 4-9: Technical Data Package (TDP) contents

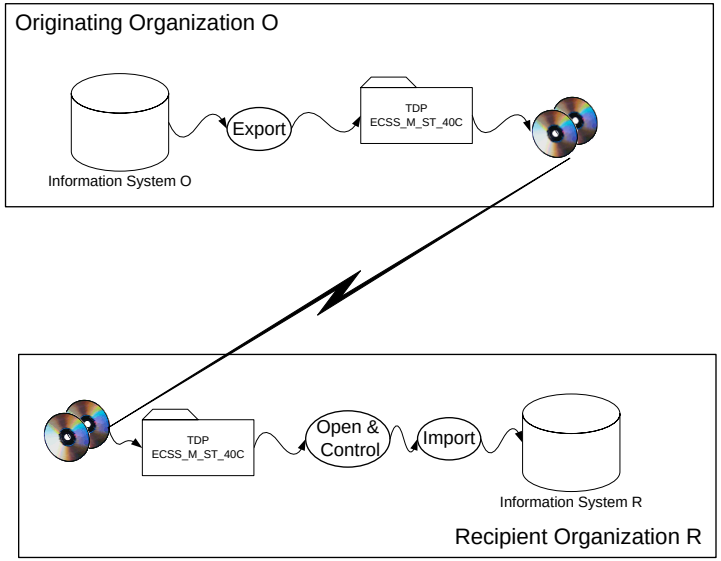


Fig 4-10: Delivery process for TDP

3 - ECSS M-standards content

M-ST-80 "Risk management"

Clause & Req	Content of the requirements	DRD (Annex)	Supporting information
7 – Risk management requirements			
7.2	**Risk management process**		
	7.2.1 Risk policy	A	
	- Resources, goals & constraints		Info in 5.1 
	- Strategy, approach and goal ranking		Info in 5.1 and 5.2.1
	- Risk scoring and index scheme, and action criteria		Info in 5.2.1 and 5.2.2 
	- Decision		Info in 5.2.3
	- Communication and monitorization		Info in 5.2.4 
	7.2.2 Risk management plan (RMP)	B	
	- Organization and responsibilities		Info and guidelines in 6.2 and 6.3
	- Decision, criteria and tools		Info in 6.4
	- Documentation and processes		Info in 6.5
	7.2.3 to 7.2.5 Risk scenarios – To be identified, assessed & analyzed for acceptability		Risk register example in Annex D 
	7.2.6 Risk reduction – i.a.w. the risk policy in Annex A		
	7.2.7 Determination of reduced risk – To understand the impact of mitigation actions		
	7.2.8 Resolved, acceptable & overall risk assessment – i.a.w. RMP (Annex B)		
	7.2.9 Unresolved risk – Disposed as in the RMP (Annex B)		
	7.2.10 Residual risk – Accepted/disposed as in the RMP (Annex B)		
	7.2.11 Risk report	C	
7.3	**Risk management implementation**		
	7.3.1 Risk implementation (at any level customer-supplier) and integration		Summary: Implement your RMP (Risk management plan)
	7.3.2 Cost effective, at project level		
	9.3.3 Risk management process - to be monitored		
	9.3.5 Lessons Learnt on Risk management - to be performed		

3 - ECSS M-standards content

M-ST-80 "Risk management" – Supporting material

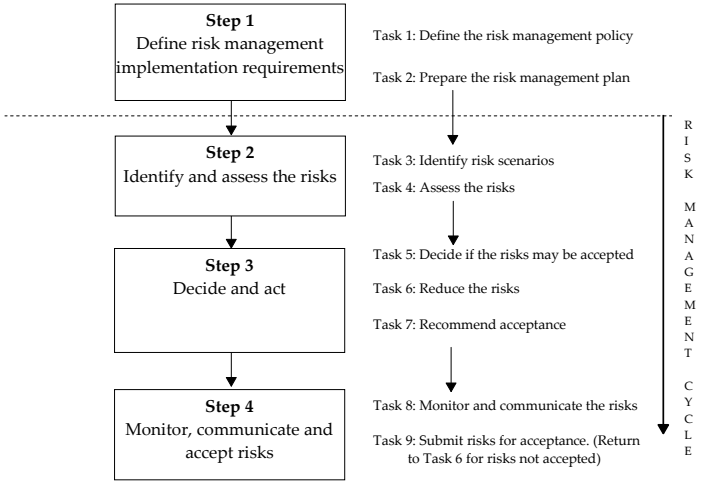


Fig 5-2: Task associated to the steps

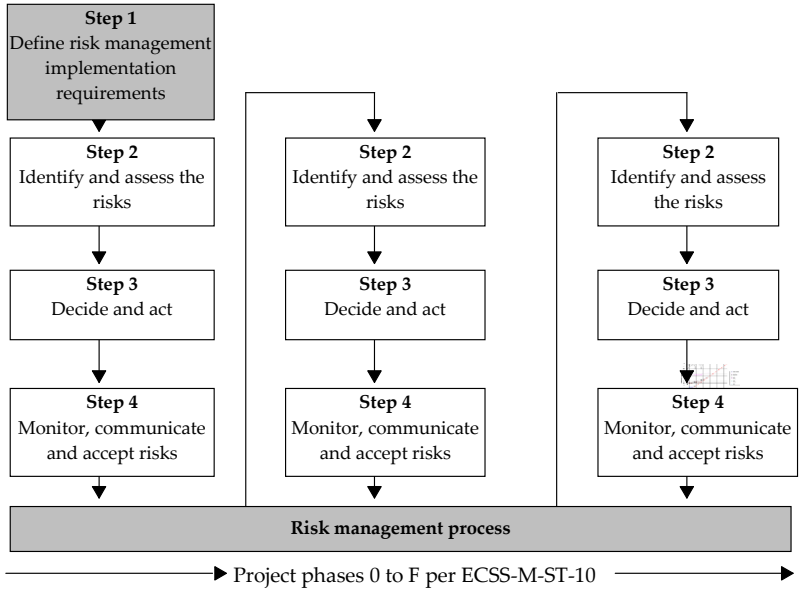


Fig 5-1: Steps & cycles in the risk management process

3 - ECSS M-standards content

M-ST-80 "Risk management" – Supporting material

Score	Severity	Severity of consequence: impact on (for example) cost
5	Catastrophic	Leads to termination of the project
4	Critical	Project cost increase > tbd %
3	Major	Project cost increase > tbd %
2	Significant	Project cost increase < tbd %
1	Negligible	Minimal or no impact

Fig 5-3: Example of a severity-of-consequence scoring scheme

Score	Likelihood	Likelihood of occurrence
E	Maximum	Certain to occur, will occur one or more times per project
D	High	Will occur frequently, about 1 in 10 projects
C	Medium	Will occur sometimes, about 1 in 100 projects
B	Low	Will seldom occur, about 1 in 1000 projects
A	Minimum	Will almost never occur, 1 of 10 000 or more projects

Fig 5-4: Example of likelihood scoring scheme

Likelihood	Risk Index: Combination of Severity and Likelihood				
E	Low	Medium	High	Very High	Very High
D	Low	Low	Medium	High	Very High
C	Very Low	Low	Low	Medium	High
B	Very Low	Very Low	Low	Low	Medium
A	Very Low	Very Low	Very Low	Very Low	Low
	1	2	3	4	5 Severity

"Red" "Yellow" "Green"

Fig 5-5: Example of risk index & magnitude scheme

Risk index	Risk magnitude	Proposed actions
E4, E5, D5	Very High risk	Unacceptable risk: implement new team process or change baseline – seek project management attention at appropriate high management level as defined in the risk management plan.
E3, D4, C5	High risk	Unacceptable risk: see above.
E2, D3, C4, B5	Medium risk	Unacceptable risk: aggressively manage, consider alternative team process or baseline – seek attention at appropriate management level as defined in the risk management plan.
E1, D1, D2, C2, C3, B3, B4, A5	Low risk	Acceptable risk: control, monitor – seek responsible work package management attention.
C1, B1, A1, B2, A2, A3, A4	Very Low risk	Acceptable risk: see above.

Fig 5-6: Example of risk magnitude designation & proposed actions for individual risks

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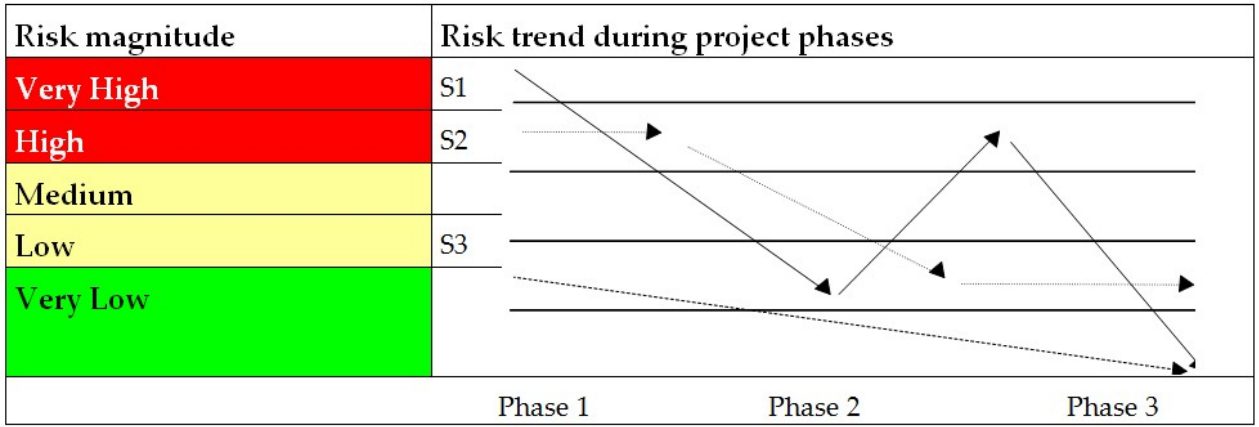

Fig 5-7: Example of a risk trend

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M-ST-80 "Risk management" – Supporting material

Annex D: Example of risk register

RISK REGISTER (Example)

Project: WBS Ref.:	Organization:	Source: Controlled by: Supported by:	Date: Issue:

RISK SCENARIO and MAGNITUDE

No.	Risk scenario title:
Cause and consequence:	

Severity (S)					Likelihood (L)					Risk index	RED	YELLOW	GREEN	Risk domain
Negligible 1	Significant 2	Major 3	Critical 4	Catastrophic 5	Minimum A	Low B	Medium C	High D	Maximum E		(*)	(*)	(*)	(**)

RISK DECISION and ACTION

Accept risk ❑		Reduce risk ❑
Risk reduction measures:	Verification means:	Expected risk reduction (severity, likelihood, risk index):
Action:		Status:
Agreed by project management: Name: Signature: Date:		Risk rank:

Project:	Organization:	Date: Issue:

Rank	No.	Risk scenario title	Red	Yellow	Green	Risk domain	Actions and status
			(*)	(*)	(*)	(**)	

4 – The DRDs in the ECSS-M standards

Annex F of M-ST-10 is a very interesting INFORMATIVE annex

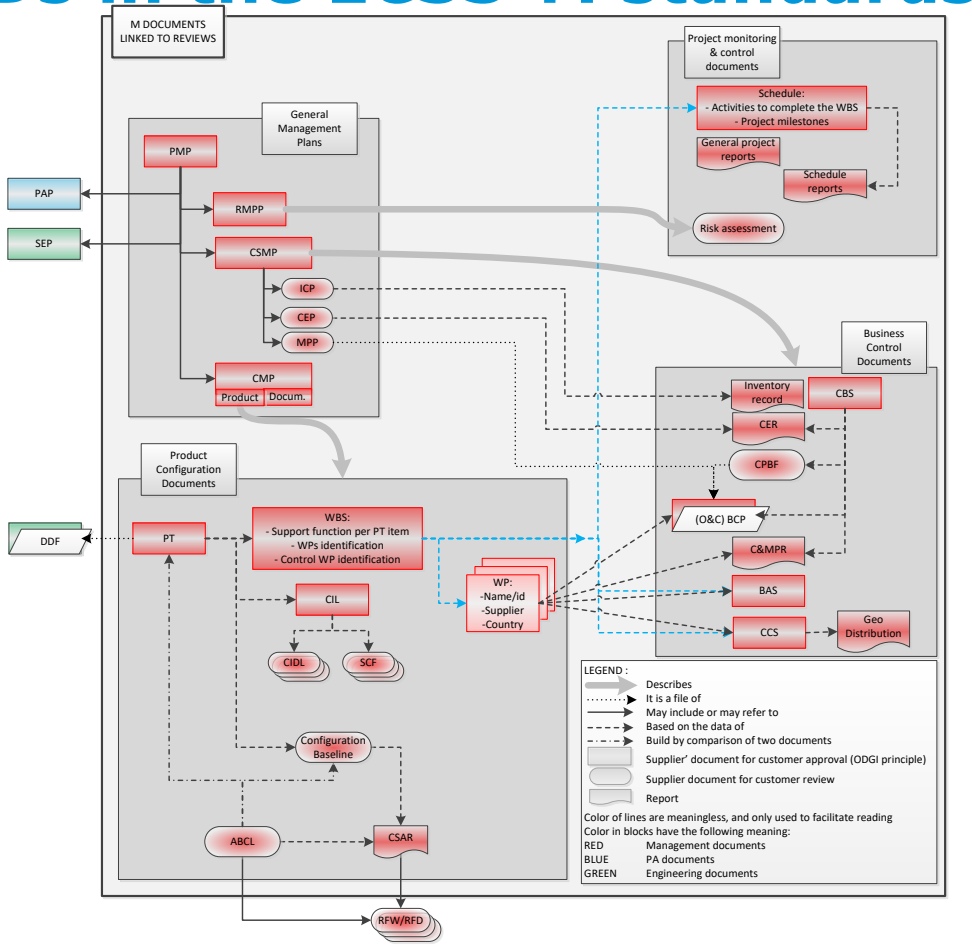
It covers the MAIN DRDs in the M branch

Table F-1: Management documents delivery per review

Document Title	Phase													DRD ref.
	0	A	B		C	D		E					F	
	MDR	PRR	SRR	PDR	CDR	QR	AR	ORR	FRR	LRR	CRR	ELR	MCR	
Project management plan		X	X	X										ECSS-M-ST-10, Annex A
Product tree		X	X	X	X	X	X							ECSS-M-ST-10, Annex B
Work breakdown structure		X	X	X										ECSS-M-ST-10, Annex C
Work package description		X	X	X										ECSS-M-ST-10, Annex D
Schedule	X	X	X	X	X	X	X	X	X					ECSS-M-ST-60, Annex B
Cost estimate report		X	X	X										ECSS-M-ST-60, Annex G
Configuration management plan		X	X	X										ECSS-M-ST-40, Annex A
Configuration item list				X	X									ECSS-M-ST-40, Annex B
Configuration item data list				X	X	X	X							ECSS-M-ST-40, Annex C
As-built configuration list						X	X							ECSS-M-ST-40, Annex D
Software configuration file				X	X	X	X							ECSS-M-ST-40, Annex E
Configuration status accounting reports				X	X	X	X							ECSS-M-ST-40, Annex F
Risk management policy document	X	X	X	X										ECSS-M-ST-80, Annex A
Risk management plan	X	X	X	X										ECSS-M-ST-80, Annex B
Risk assessment report		X	X	X	X	X	X	X	X					ECSS-M-ST-80, Annex C

4 – The DRDs in the ECSS-M standards

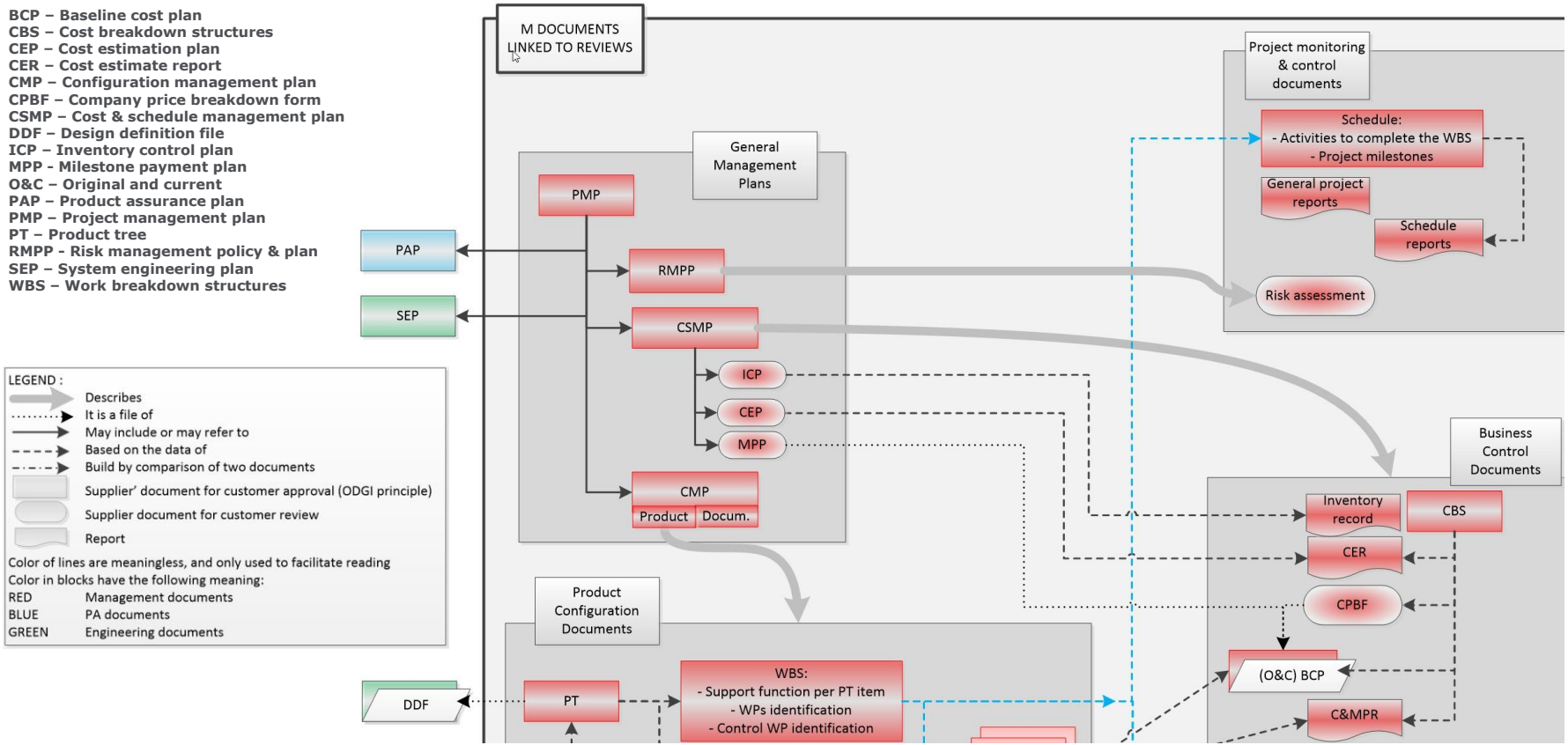
ABCL – As-built configuration list
BAS – Business agreement structure
BCP – Baseline cost plan
C&MPR – Cost & manpower report
CBS – Cost breakdown structures
CCS – Company/country structure
CEP – Cost estimation plan
CER – Cost estimate report
CIDL – Configuration item data list
CIL – Configuration item list
CMP – Configuration management plan
CPBF – Company price breakdown form
CSAR – Configuration status accounting report
CSMP – Cost & schedule management plan
DDF – Design definition file
ICP – Inventory control plan
MPP – Milestone payment plan
O&C – Original and current
PAP – Product assurance plan
PMP – Project management plan
PT – Product tree
RFD – Request for deviation
RFW – Request for waiver
RMPP - Risk management policy & plan
SCF – SW configuration file
SEP – System engineering plan
WBS – Work breakdown structures
WP – Work package



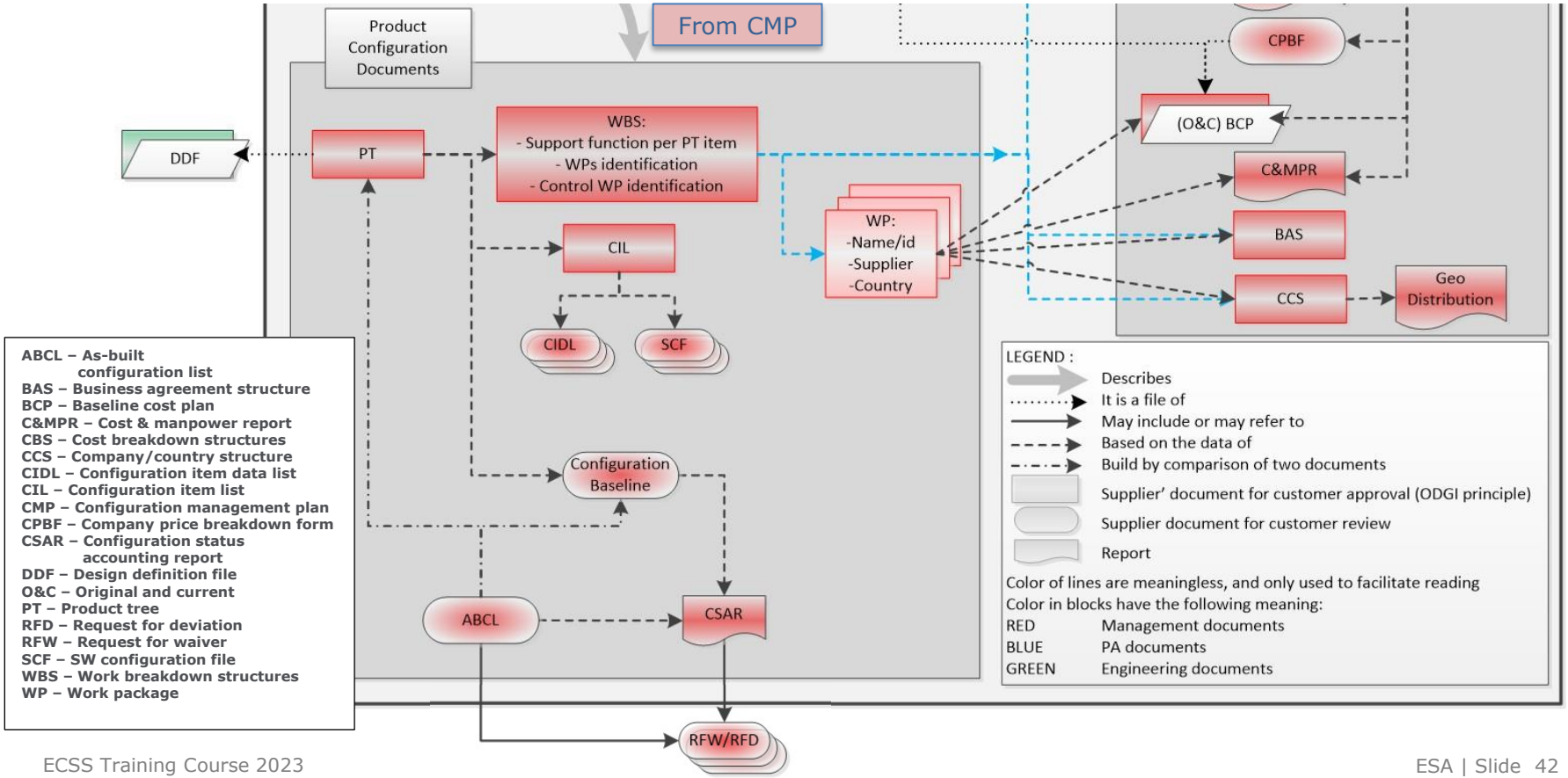
NOTE:
Full explanation in the last 4 viewgraphs

4 – The DRDs in the ECSS-M standards

BCP – Baseline cost plan
CBS – Cost breakdown structures
CEP – Cost estimation plan
CER – Cost estimate report
CMP – Configuration management plan
CPBF – Company price breakdown form
CSMP – Cost & schedule management plan
DDF – Design definition file
ICP – Inventory control plan
MPP - Milestone payment plan
O&C – Original and current
PAP – Product assurance plan
PMP – Project management plan
PT – Product tree
RMPP - Risk management policy & plan
SEP – System engineering plan
WBS – Work breakdown structures



4 – The DRDs in the ECSS-M standards



4 – a The DRDs in the ECSS-M standards

PMP
Project Management Plan

General management issues
Project Objectives and Constrains
Project Organization
project manager, key personnel, specialists
authority and hierarchy
roles and responsibilities
interface with suppliers and other projects

Project breakdown structures
approach to define the project WBS
WBS description

Description of ILS approach
[not covered here]

IFs with other management areas
Configuration management Plan (CMP)
Cost Schedule Management Plan (CSMP)
ILS approach
Risk Management and Plan (RMPP)

IFs with other project areas
Product Assurance Plan (PAP)
System Engineering Plan (SEP)

CMP
Configuration Management Plan

approach to perform all configuration management activities

for
product

for
documentation and information

CSMP
Cost & Schedule Management Plan

approach to ensure cost and schedule management

CEP
Cost Estimating Plan
organization and processes for cost estimation

MPP
Milestone Payment Plan
plan for payment events

ILS
Integrated Logistic Support

approach used for ILS

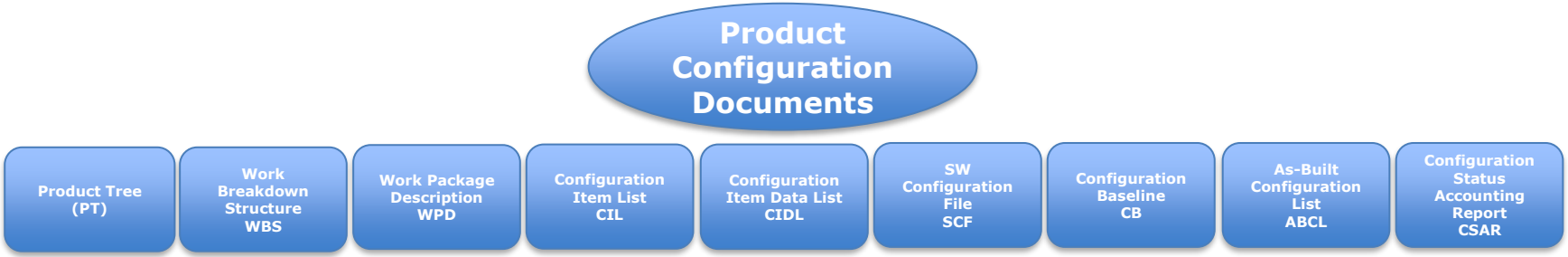
RMPP
Risk Management Policy and Plan

two documents released together or independently

Risk Management Policy
resources, goals, strategy, margins
ranking/scoring/index schemes
action/acceptance criteria
communication approach

The Risk Management Plan
processes and metrics to apply risk management policy

4 – b The DRDs in the ECSS-M standards



hierarchical partitioning of each deliverable product down to the agreed level

For each item in the PT

sub-tree with

customer defined support functions

necessary services and tasks to produce the deliverables e.g. management, PA, engineering …

Work Packages (WP) identification by referring the items in the WBS and ensuring that the WPs cover the total work scope

name of the package

manager in charge

supplier and its country

description of included (excluded) tasks

deliverables location

start/end date

PT's items list (HW or SW) identified as under configuration control [name, code, quantity, supplier and applicable specification]

all relevant data

of each CIL item

under configuration control

Description of each SW item in the CIL

set of customer/supplier agreed documents reflecting the actual product configuration

initial CB refers to "as-design" product

CB needs update during project evolution to refer to "as-built" product

actual status of the product

"as-built"

listing the differences with the product

"as design"

justifying differences by reference to applicable RFW/RFD

collecting and summarizing the necessary information to support a meaningful configuration management

4 – c The DRDs in the ECSS-M standards

Cost Breakdown Structure (CBS)

Breakdown of all cost concepts

Categories to be used for cost management

Clear differentiation between direct and indirect costs

Company Price Breakdown Forms(CPBF)

Manpower and cost data

broken down

according to categories defined in CBS

Business Agreement Structure (BAS)

Breakdown structure of the suppliers indicating

their reporting lines

WPs assigned to each supplier

Country/ Company Structure (CCS)

Shows relationship

between

suppliers in the BAS

and

country where the work is performed

Cost Estimate Report

Reports

for each of the cost items identified in the CBS:

Estimation method

Quality of the estimate

Hypothesis

Sensitivity analysis

Cost risk analysis

Recommendations

Cost and Manpower Report

Necessary for cost reimbursement contracts

Gives a detailed status on the expenses incurred by the supplier

Baseline Cost Plans (BCP)

Document

the contractually agreed

cost and manpower

4 – d The DRDs in the ECSS-M standards

Project Schedule

timed network of activities
(showing their interdependencies)
against
defined milestones
preferably in a Gant-Chart
identifying the critical path

the network of activities are derived from the **WBS**

the milestones depend on the project
typically include each phase's start/end date
project reviews (see **PMP**)
production/test/delivery reviews (see **PMP**)
payment milestones (see **PP**)
CFE delivery dates

Progress Report

General Project **Progress Reports**

Schedule Progress Report, work actually performed

against

original Project Schedule
trend analysis for the milestones
justification of deviations
remedy actions
status of deliverable items

Risk Assessment Report

explanation of how

Risk Policy and Plan

has been applied and followed

for

the identification and mitigation

of risks

listing all the registered risks
with their rank, rating and trend

Thanks for your attention

List of acronyms

AR	Acceptance Review
CCB	Configuration Control Board
CDR	Critical Design Review
CI	Configuration Item
CIL	CI list
CM	Configuration Management
CMP	CM Plan
CP	Change Process
CR	Change Request
CRR	Commissioning Result Review
Doc	Document, documentation
DRL	Document Requirement List
DRD	Document Requirement Definition
ECSS	European Cooperation for Space Standardization
e.g.	Exempli gratia (for example [Lat])
ELR	End-of-life Review
ESA	European Space Agency
FRR	Flight Readiness Review
i.a.w.	in accordance with
IDM	Info & Doc Management
i.e.	id est (that is [Lat])
Incl.	Including
Inf, info	Information
LRR	Launch Readiness Review
M	Management
MCR	Mission Close-out Review
MDR	Mission Definition Review
N	Number
NCR	Non Conformance Report
ORR	Operational Readiness Review
PA	Product Assurance
PDR	Preliminary Design Review
PM	Project Management
PRR	Preliminary Requirements Review
QR	Qualification Review
RA	Review Authority
RID	Review Item Discrepancy
Ref	Reference
Req	Requirement
RFD	Request For Deviation
RFW	Request For Waiver
RMP	Risk Management Plan
RTL	Review Team Leader
SRR	System Requirements Review
SW	Software
Syst	System
Tbd	To Be Defined (Determined)
TDP	Technical Data Package
TRL	Technology Readiness Level
WBS	Work Breakdown Structures
XML	Extensible Markup Language

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