

MBSE Best Practices

Book for Space Projects

César Coelho, Liana Lica, Katharina Schneider
Stephan Jahnke, Riccardo Benvenuto, Lauri Panitzsch
Alberto Gonzalez Fernandez

September 2021



Agenda

01



**Project
Overview**

02



**Project
Tasks**

03



**Main Topics
of the Book**

Project Overview

MBSE Best Practices for Space Projects

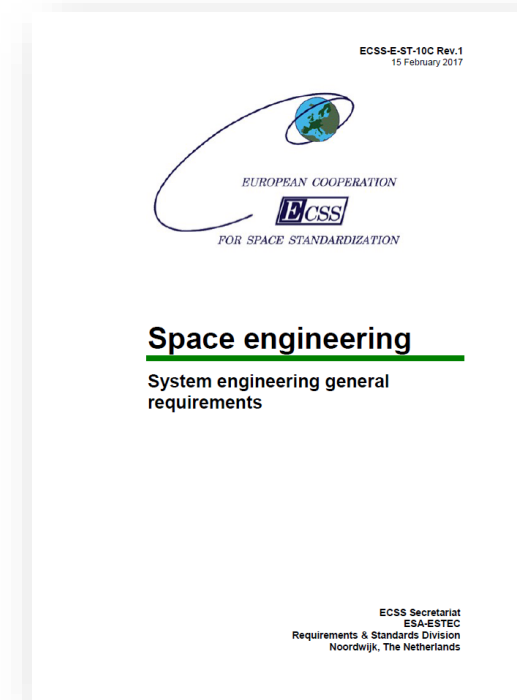
Objective: Create a MBSE Best Practices document for Space Projects

- Phases A & B considered
- Based on interviews with ESA and the Large Space Integrators
- Compliant with ECSS- E-ST-10 and ECSS-E-ST-70

Space Industry



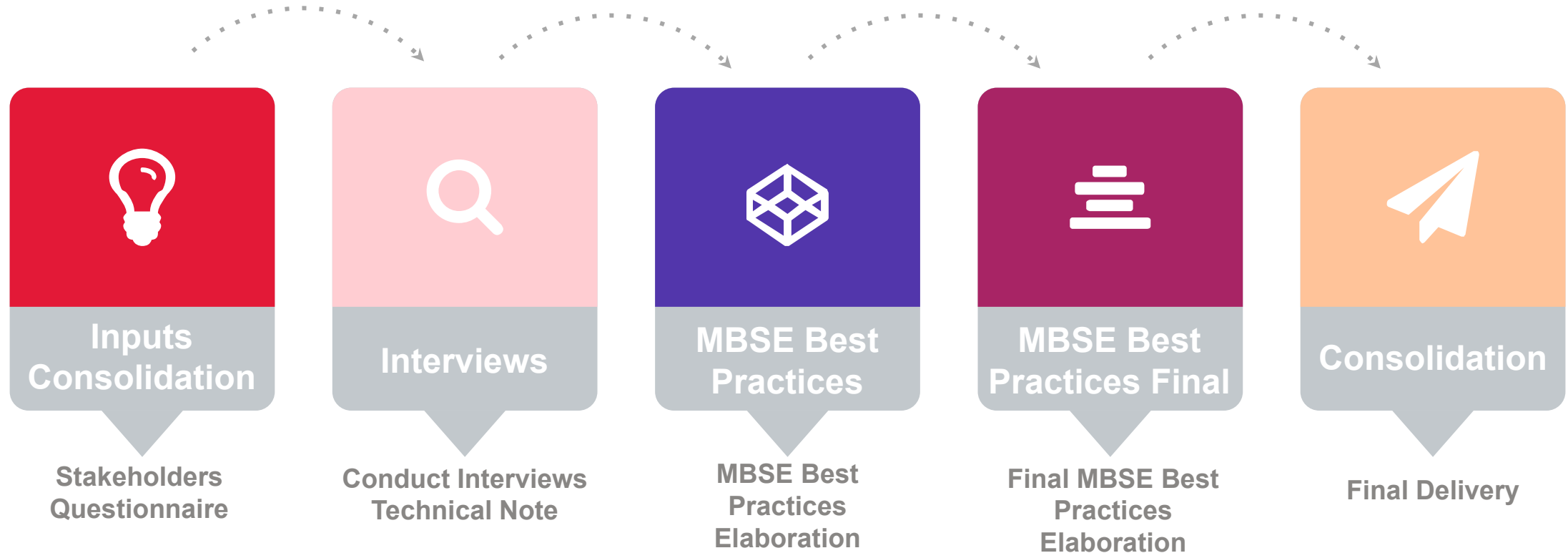
ECSS-E-ST-10C



MBSE Best Practices for Space Projects

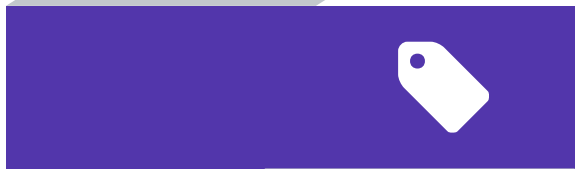
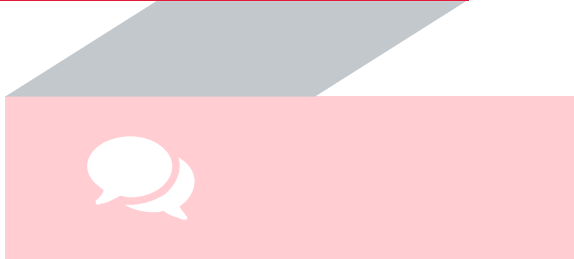
Project Tasks

MBSE Best Practices for Space Projects



Project Objectives

MBSE Best Practices for Space Projects



MBSE for Space Projects

Describe how a set of the Systems Engineering tasks (as per ECSS – E-ST-10-C) can be best achieved with MBSE support.

Focus

Capitalize on experience and focus on methods and processes, while respecting already existing assets such as tooling and specific in-house methodologies.

Best Practices

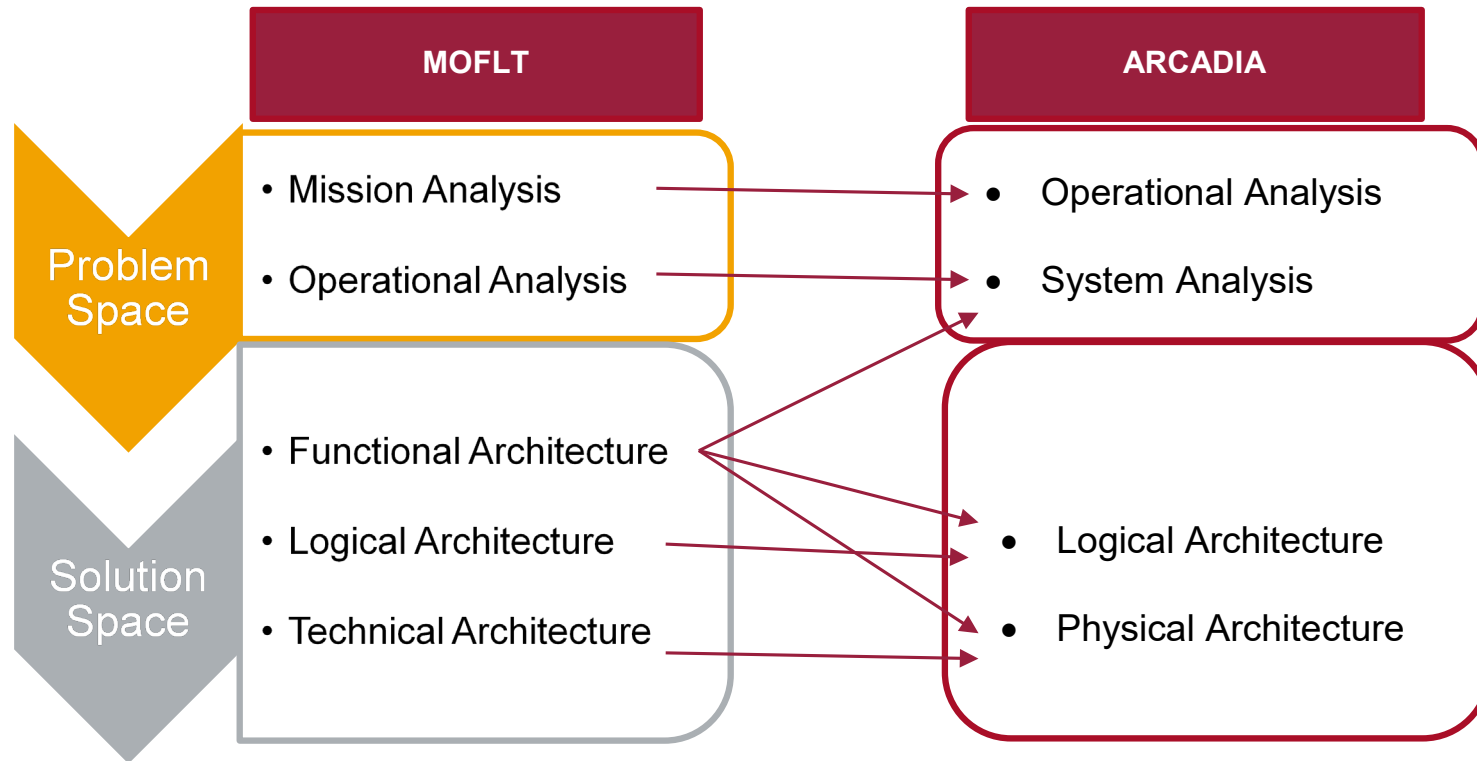
Harmonise best practices and share them among the MBSE practitioners

Industry

Compiled feedback to be agnostic from any particular MBSE tooling.

Mapping of MOFLT and ARCADIA

MBSE Best Practices for Space Projects



Topics

MBSE Best Practices for Space Projects

MBSE Context and General Overview

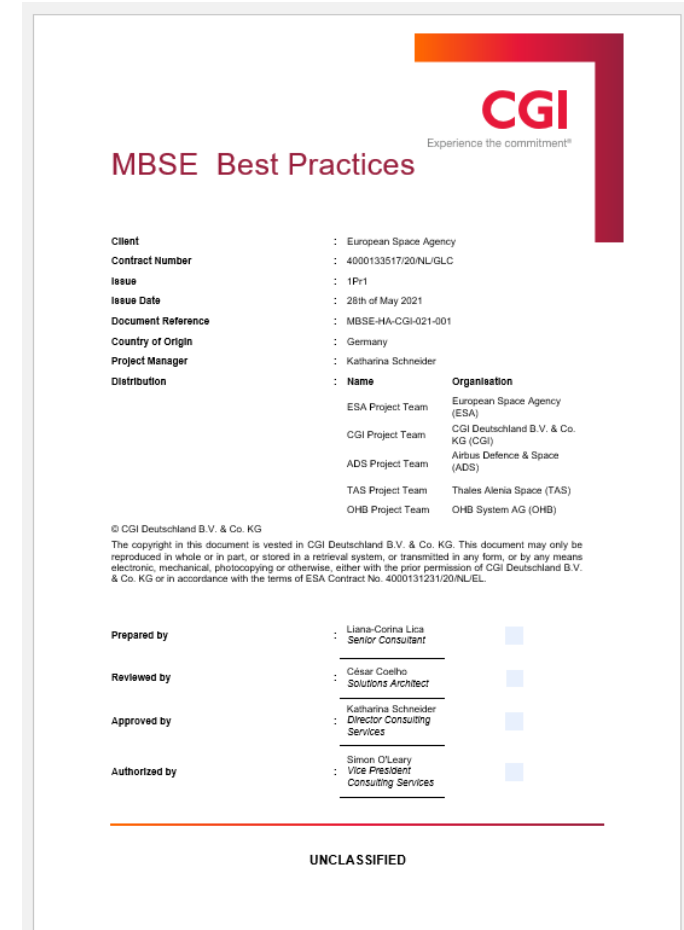
- Overview of analysed MBSE Methods
- MBSE Environment Overview

Model Governance

- Model Organisation, Configuration and Version Control
- Engineering Change Order (ECO) & Review Process
- Model Checks and KPIs
- Permissions and Collaboration on the Model
- Reuse Strategy
- General MBSE Best Practices

Requirements Management

- Requirements Management Process
- Requirements Traceability
- Requirements Management Best Practices



Topics

MBSE Best Practices for Space Projects

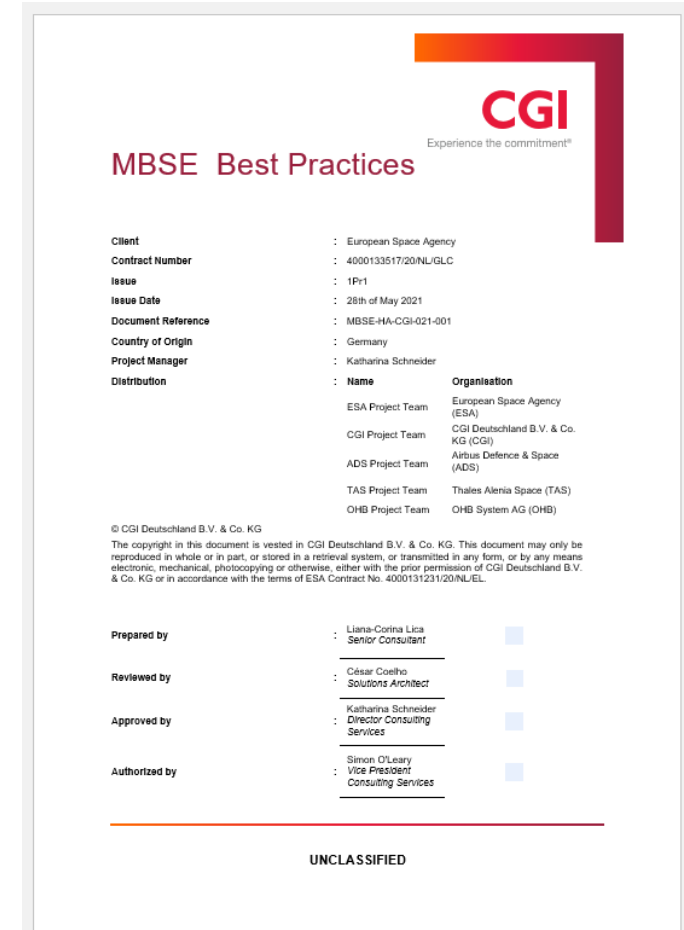
Problem Space/Specification

- Mission Analysis
- Operational/System Analysis
 - Modelling layer objectives
 - Main Inputs
- Modelling Artefacts Creation Process
- Requirements Engineering
- Best Practices

Solution Space/Design

- Functional Architecture
- Logical Architecture
 - Modelling layer objectives
 - Main Inputs
- Modelling Artefacts Creation Process
- Requirements Engineering
- Best Practices

Modelling Artefacts vs. ECSS Deliverables



Conclusions

MBSE Best Practices for Space Projects

A set of 35 best practices were identified, covering the following domains:

- General MBSE Best Practices
- Requirements Management
- Mission Analysis
- Operational Analysis
- Functional Architecture
- Logical Architecture

The interviewed stakeholders mentioned some common inputs when defining their specific MBSE methodology:

- Space Standards (ECSS E-10, ECSS E-70)
- existing methodologies (ARCADIA, INCOSE OOSEM)
- Architecture Frameworks (TOGAF, DoDAF etc.)

Thank you!



CGI

