

GALILEO GALILEI (GG)

PRELIMINARY PRODUCT TREE

DRL/DRD: DEL-30

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1. SCOPE AND PURPOSE

This document is submitted in partial fulfilment of Work Package 1A-ADA of the GG Phase A2 Study (DRL item DEL-30).

According to ECSS-M-ST-10, "The product tree is the breakdown of the project into successive levels of hardware and software products or elements, articulated to perform the functions identified in the function tree. ... The product tree includes the development models, the GSE, the integration tools and test equipment, and external items necessary to validate the end product and Integrated Logistic Support items. It includes items submitted to customer configuration control and items that are the subject of a technical requirements specification. The product tree forms the basis for the elaboration of the project work breakdown structure."

This document provides a preliminary product tree (PT) of the GG space system, according to the current level of definition of the project. The PT is drawn in accordance with ECSS-M-ST-10 Annex B. In this early issue, particular emphasis is given to the non standard and/or new development items.

2. REFERENCES

2.1 Applicable Documents

- [AD 1] ASI, "Progetto Galileo Galilei-GG Fase A-2, Capitolato Tecnico", DC-IPC-2007-082, Rev. B, 10-10-2007 and applicable documents defined therein

2.2 Standards

- [SD 1] ECSS-M-00-02A, Space Project Management – Tailoring of Space Standards, 25 April 2000
- [SD 2] ECSS-E-ST-10C, Space Engineering - System Engineering General Requirements, 6 March 2009
- [SD 3] ECSS-E-10-02A, Space Engineering – Verification
- [SD 4] ECSS-Q-00A, Space Product Assurance - Policy and Principles, and related Level 2 standards.

2.3 ASI Reference Documents

- [RD 1] GG Phase A Study Report, Nov. 1998, revised Jan. 2000, available at:
<http://eotvos.dm.unipi.it/nobili/ggweb/phaseA/index.html>
- [RD 2] Supplement to GG Phase A Study (GG in sun-synchronous Orbit) "Galileo Galilei-GG": design, requirements, error budget and significance of the ground prototype", A.M. Nobili et al., Physics Letters A 318 (2003) 172–183, available at:
http://eotvos.dm.unipi.it/nobili/documents/generalpapers/GG_PLA2003.pdf
- [RD 3] A. Nobili, DEL001: GG Science Requirements, Pisa, September 2008

2.4 GG Phase A2 Study Notes

- [RD 4] SD-RP-AI-0625, GG Final Report / Satellite Detailed Architecture Report, Issue 1
- [RD 5] SD-RP-AI-0626, GG Phase A2 Study Executive Summary, Issue 1
- [RD 6] SD-TN-AI-1163, GG Experiment Concept and Requirements Document, Issue 3
- [RD 7] SD-RP-AI-0620, GG System Performance Report, Issue 2
- [RD 8] SD-TN-AI-1167, GG Mission Requirements Document, Issue 2
- [RD 9] SD-RP-AI-0590, GG System Concept Report (Mission Description Document), Issue 3
- [RD 10] SD-SY-AI-0014, GG System Functional Specification and Preliminary System Technical Specification, Issue 1
- [RD 11] SD-RP-AI-0631, GG Consolidated Mission Description Document, Issue 1
- [RD 12] SD-TN-AI-1168, GG Mission Analysis Report, Issue 2
- [RD 13] DTM, GG Structure Design and Analysis Report, Issue 1

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- [RD 14] SD-RP-AI-0627, GG Thermal Design and Analysis Report, Issue 1
 - [RD 15] SD-RP-AI-0268, GG System Budgets Report, Issue 1
 - [RD 16] SD-RP-AI-0621, Technical Report on Drag and Attitude Control, Issue 2
 - [RD 17] TL25033, Payload Architectures and Trade-Off Report, Issue 3
 - [RD 18] SD-RP-AI-0629, Technical Report on Simulators, Issue 1
 - [RD 19] ALTA, FEEP Thruster Design and Accommodation Report, Issue 1
 - [RD 20] TASI-FI-44/09, Cold Gas Micro Thruster System for Galileo Galilei (GG) Spacecraft - Technical Report, Issue 1, May 2009
 - [RD 21] SD-RP-AI-0630, Spin Sensor Design, Development and Test Report, Issue 1
 - [RD 22] SD-TN-AI-1169, GG Launcher Identification and Compatibility Analysis Report, Issue 1
 - [RD 23] ALTEC-AD-001, GG Ground Segment Architecture and Design Report, Issue 1
 - [RD 24] SD-TN-AI-1218, GG Preliminary Product Tree, Issue 1
 - [RD 25] SD-PL-AI-0227, GG System Engineering Plan (SEP), Issue 2
 - [RD 26] TAS-I, Payload Development and Verification Plan, Issue 1
 - [RD 27] SD-PL-AI-0228, GG System Verification and Validation Plan, Issue 1
 - [RD 28] SD-TN-AI-1219, Report on Frequency Management Issues, Issue 1
 - [RD 29] SD-RP-AI-0632, GG Mission Risk Assessment And Mitigation Strategies Report, Issue 1
 - [RD 30] SD-RP-AI-0633, Report on Mission Costs Estimates, Issue 1

3. GG SPACE SEGMENT PRODUCT TREE

3.1 Product Tree Structure

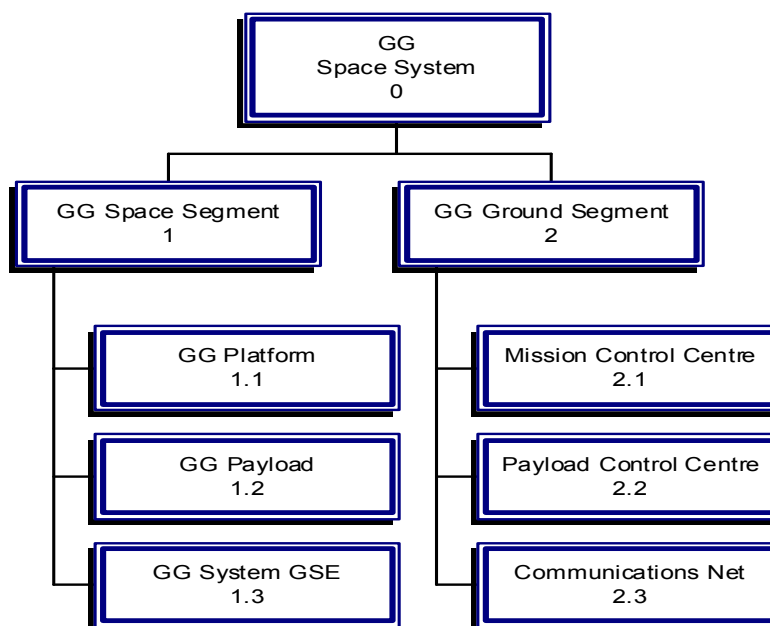


Figure 3.1-1: GG Product Tree Structure

3.2 Space Segment

3.2.1 Platform

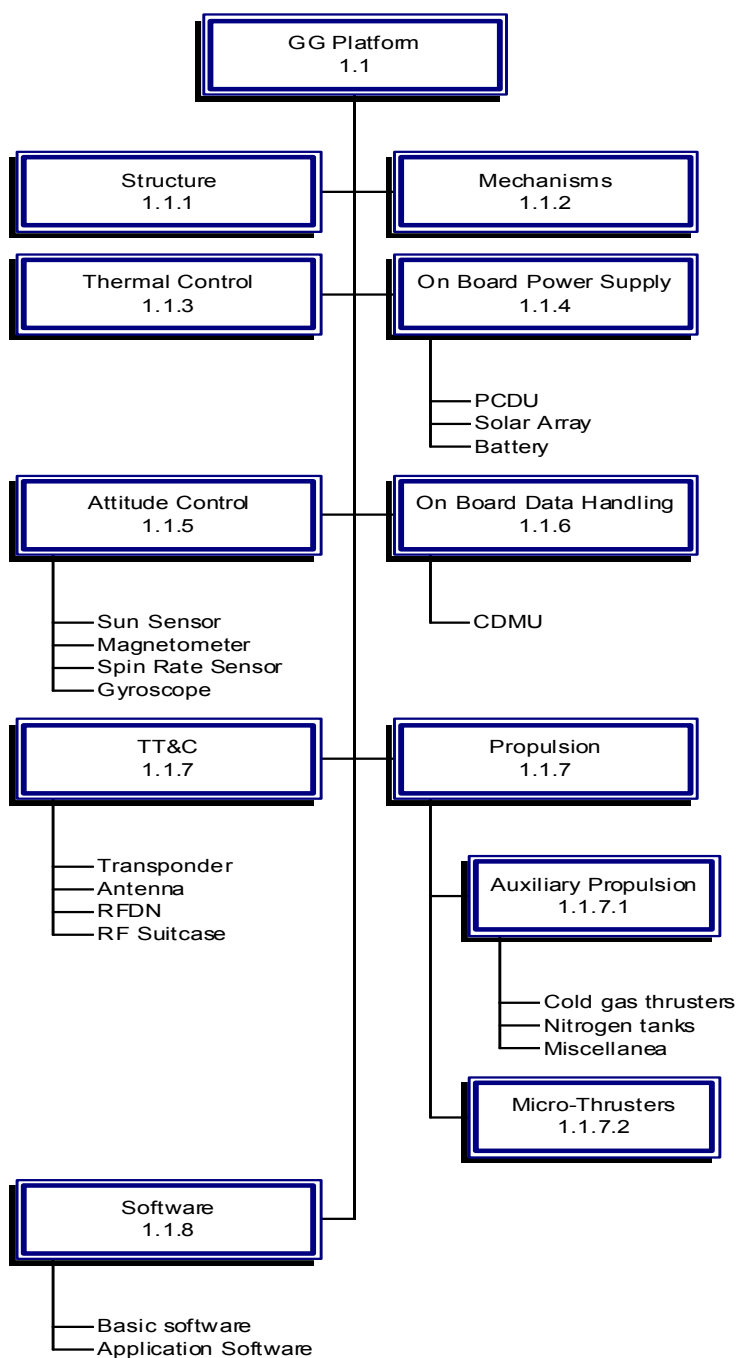


Figure 3.2-1: Platform Product Tree

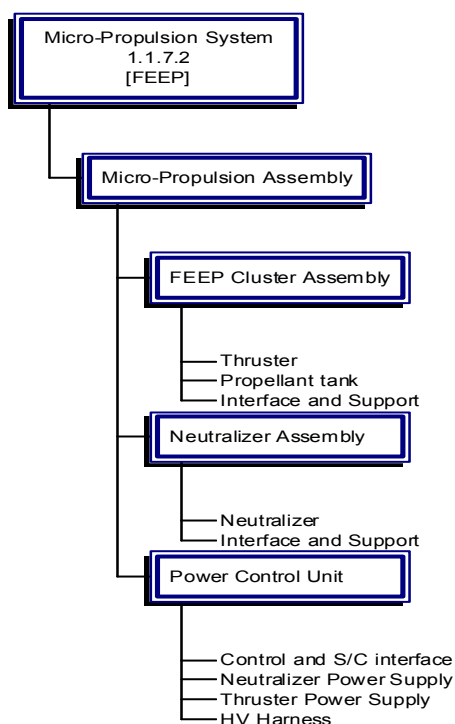


Figure 3.2-2: FEEP Micro-Newton Thrusters Product Tree

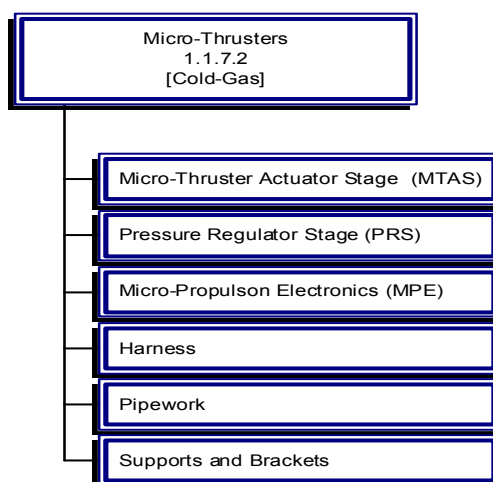


Figure 3.2-3: Cold-Gas Micro-Newton Thrusters Product Tree (Option)

3.2.2 Payload

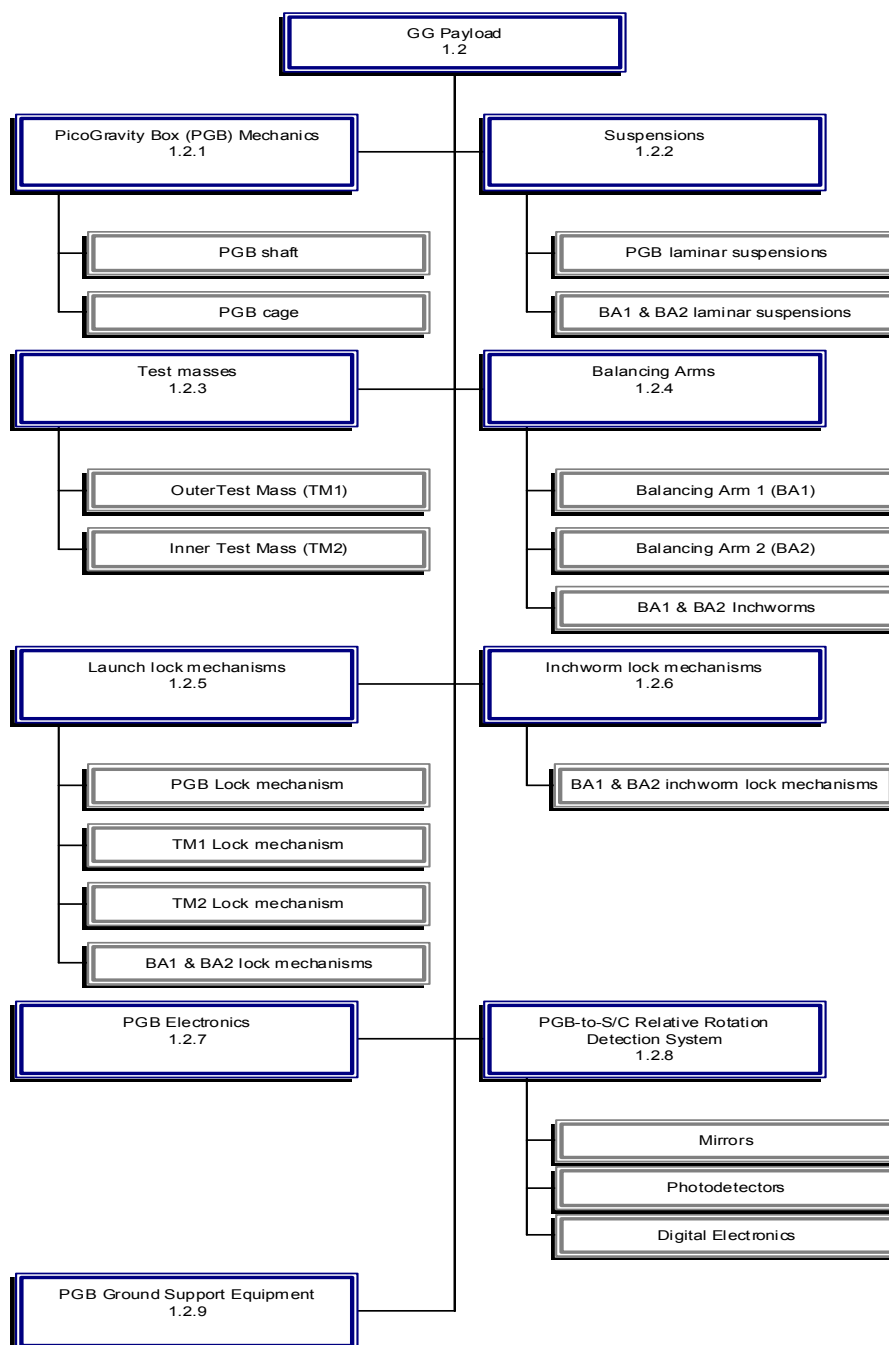


Figure 3.2-4: Payload Product Tree

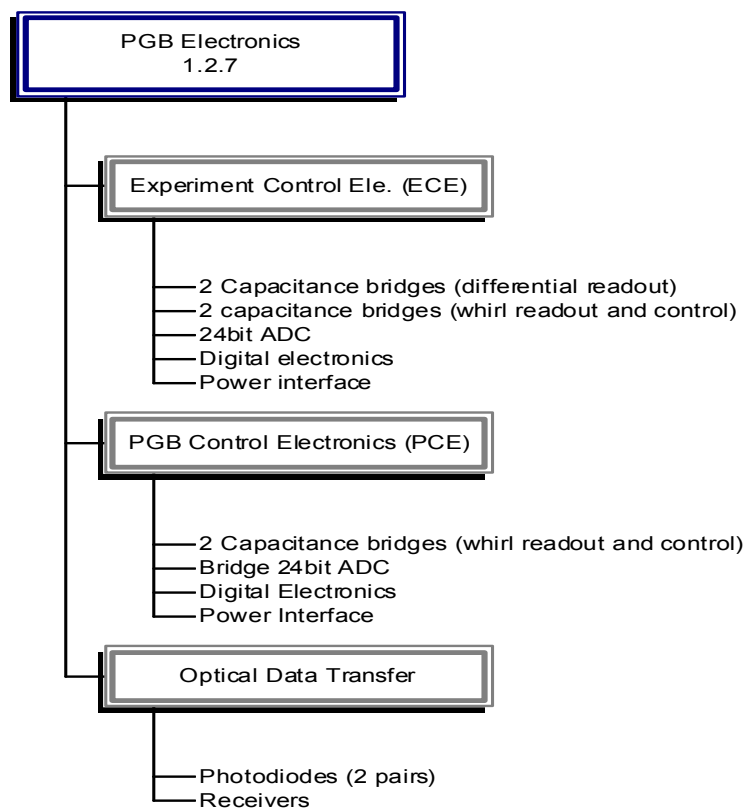


Figure 3.2-5: PGB Electronics Product Tree

3.2.3 Ground Support Equipment

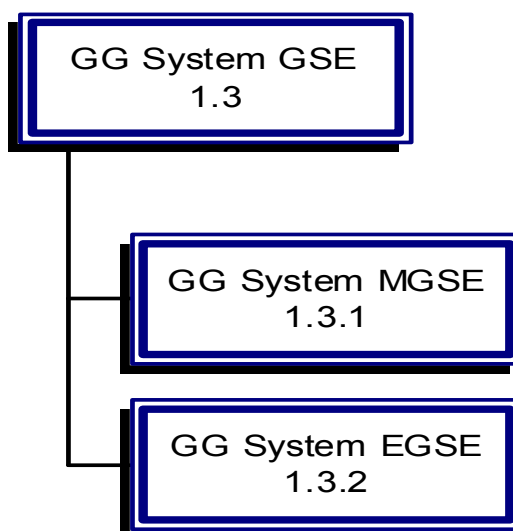


Figure 3.2-6: System GSE Product Tree

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