GALILEO GALILEI (GG)

Preliminary System and Satellite Design Definition File (DDF) and Design Justification File (DJF)

DRL/DRD: DEL-23/24/33/35

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ISSUE	DATE	§ CHANGE RECORDS	AUTHOR
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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 items DEL-23, DEL-24, DEL-33, DEL-35).

The purpose of the document is to provide a list of the documents, produced as part of the study, belonging to the satellite/system Design Definition file (DDF) and the satellite/system Design Justification File (DJF).

In a small project such as GG, the system reduces to the satellite and its ground control and data collection/distribution services. Therefore the “system” files and the “satellite” files are coincident and they are treated in this document as one.

According to ECSS-E-ST-10C [SD 2], Annex G, the DDF is a collection of all documentation that establishes the system or product characteristics such as lower level technical specifications, design and interface description, drawings, electrical schematics, specified constraints (e.g. on materials, manufacturing, processes, and logistic). The list of the documents that form part of the GG DDF is in Chapter 3.

According to [SD 2], Annex K, the DJF is a collection of all documentation that traces the evolution of the design during the development and maintenance of the product. The DJF is updated according to the evolution of the DDF, in accordance with its access and monitoring objectives. The list of the documents that form part of the GG DJF is in Chapter 4.

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

[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] TAS-I, Cold-Gas Thruster Design and Accommodation Report, Issue 1

[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. DESIGN DEFINITION FILE

The following table lists the documents and parts thereof that constitute the GG DDF.

[RD n]	Doc n	Title	Issue	DDF Applicable Parts
8	SD-TN-AI-1167	GG Mission Requirements Document	2	All – highest level mission requirements specification
6	SD-TN-AI-1163	GG Experiment Concept and Requirements Document	3	All – experiment requirements specification
10	SD-SY-AI-0014	GG System Functional Specification and Preliminary System Technical Specification	1	All – highest level satellite system technical specification
25	SD-PL-AI-0227	GG System Engineering Plan	2	All – satellite engineering plan
27	SD-PL-AI-0228	GG System Verification and Validation Plan	1	All – satellite system verification plan
26	TASI (Mi)	Payload Development and Verification Plan	1	All – payload verification plan
11	SD-RP-AI-0631	GG Consolidated Mission Description Document	1	Definition of orbital mission
4	SD-RP-AI-0625	GG Final Report / Satellite Detailed Architecture Report	1	Definition of satellite system §5 Payload §6 Satellite Platform §7 Drag Free Control System
15	SD-RP-AI-0268	GG System Budgets Report	1	Definition of satellite system (complementary information)
24	SD-TN-AI-1218	GG Preliminary Product Tree	1	Hierarchical definition of satellite components
23	ALTEC-AD-001	GG Ground Segment Architecture and Design Report	1	Definition of ground segment architecture

4. DESIGN JUSTIFICATION FILE

The following table lists the documents and parts thereof that constitute the GG DJF.

[RD n]	Doc n	Title	Issue	DJF Applicable Parts
7	SD-RP-AI-0620	GG System Performance Report	2	All – summary of demonstration by analysis that proposed design meets mission requirements
18	SD-RP-AI-0629	Technical Report on Simulators	1	Complementary data to the above
12	SD-TN-AI-1168	GG Mission Analysis Report	2	All – justification of orbital mission design
9	SD-RP-AI-0590	GG System Concept Report	3	All – justification of satellite system conceptual design
4	SD-RP-AI-0625	GG Final Report / Satellite Detailed Architecture Report	1	Justification of satellite system
29	SD-RP-AI-0632	GG Mission Risk Assessment and Mitigation Strategies Report	1	Complementary data to justification of satellite system
17	TL25033	Payload Architectures and Trade-Off Report	3	Justification of payload architecture and design
13	(DTM)	GG Structure Design and Analysis Report	1	Justification of satellite structure design
14	SD-RP-AI-0627	GG Thermal Design and Analysis Report	1	Justification of satellite thermal design
16	SD-RP-AI-0621	Technical Report on Drag and Attitude Control	2	Justification of satellite attitude and drag-free control design
19	ALTA	FEEP Thruster Design and Accommodation Report	1	Justification of FEEP drag-free control actuator design
20	TASI	Cold-Gas Thruster Design and Accommodation Report	1	Justification of CGPS drag-free control actuator design
21	SD-RP-AI-0630	Spin Sensor Design, Development and Test Report	1	Justification of spin sensor design
28	SD-TN-AI-1219	Report on Frequency Management Issues	1	Justification of communications interface
22	SD-TN-AI-1169	GG Launcher Identification and Compatibility Analysis Report	1	Justification of launch vehicle selection

END OF DOCUMENT