Galileo Ground Segment Integration Standard (GGSIS)

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CHANGE HISTORY

Issue History				
Issue	**Revision**	**Reason for Release**	**Date**	**Bookcaptain**
1	**0**	**First Issue**	**01/06/2005**	**Author**
1	**1**	**Implementation of DCN 1352, Issue 1.3**	**01/06/2005**	**Author**
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1	**2**	Implementation of DCN 1731, Issue 1.0	**03/04/2007**	**Author**
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	-		Glossary of Terms, GGSIS-389 (GGSIS 3.1.2-2), GGSIS-414 (GGSIS 3.1.2-5), GGSIS-883 (GGSIS 3.2.7-5)	
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	-	Tables 3, 4, 5, 5a, 6, 7, 8, 11 and 12	Updated Tables 3, 4, 5, 5a, 6, 7, 8, 11 and 12
	-	Paragraph 3.1.9	Added new Paragraph 3.1.9 Removal of the Strikethrough
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	-		List of Acronyms updated updated Sections 1, 3 updated paragraphs: 3.1.1, 3.1.3, 3.1.4, 3.4 added paragraph : 1.3 deleted paragraphs: 3.2.9, 3.2.10 (covered by GGSIS 3.2.2-11 and 3.2.7-2) Fig. 1 and 2 updated Fig. 3 renumbered to Fig. 5 Fig. 4 replaced by new Fig. 6 new Fig. 3 and 4 added
	-		**Requirements deleted:** GGSIS 3.1.2-9 (incorporated in new GGSIS 3.1.2-10), 3.1.4.2-2 (incorporated in new GGSIS 3.1.4.2-7), GGSIS 3.1.5-2 (incorporated in 3.1.5-2a) GGSIS 3.1.6-2 GGSIS 3.1.2-3 (partially included in new 3.2.1.-9) GGSIS 3.2.2-1 (partially included in new 3.2.2-10) GGSIS 3.2.5-3 GGSIS 3.2.8-4 (incorporated in GGSIS 3.2.8-9) GGSIS 3.2.8-6 (covered by 3.2.8-1) GGSIS 3.4.2-3 (obsolete)
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			3.1.8-10, 3.2.2-2, 3.2.2-4, 3.2.2-7, 3.2.2-8, 3.2.4-1, 3.2.4-2, 3.2.4-3, 3.2.4-4, 3.2.5-1,3.2.5-2, 3.2.5-4, 3.2.5-6, 3.2.6-1, 3.2.6-2, 3.2.6-3, 3.2.6-5, 3.2.6-8, 3.2.6-9, 3.2.7-2, 3.2.7-4, 3.2.7-6, 3.2.7-7, 3.2.7-9, 3.3.1-1, 3.3.2-2, 3.4.1-3, 3.5.1.2-2, 3.5.1.2-4
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			GGSIS 3.5.1.3.4 GGSIS 3.2.1-2 edited and integrated ino paragraph 3.2.2 GGSIS 3.2.1-4 moved to paragraph 3.2.2 GGSIS 3.2.9-1 moved to paragraph 3.2.7 GGSIS 5.1.5-2a added, GGSIS 3.1.6-2 deleted		
3	**0**	**Implementation of DCN GAL-DCN-ESA-SITE-X0038 v1.3**		**01/12/2012**	**Author**
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	-	3.5.1.4	Update of Table 10 (3.5.1.4. - Location Table)		
3	**1**	**STRB1.5.1.01 delivery**		**15/01/2016**	**A. Poletti**
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	-	2.3	The "List of acronyms" has been moved from the beginning of the document (before chapter 1) to paragraph 2.3		
	-	2.4	The table 1 Glossary of Terms has been moved from the beginning of the document (before chapter 1) to paragraph 2.4		
	-	Table 9	Implementation of GAL-DCN-ASTG-SYST-X-13983 v1.0 ID001: Update of Table 9 (GCCs, TTC, ULS and GSS sites)		
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	-	3.1.1 3.1.2 3.1.3 3.1.4 3.1.5 3.1.6 3.1.7 3.1.8 3.3.4 3.5.1 3.2.4	Implementation of GAL-DCN-ASTG-SYST-X-14196: GGSIS 3.1.1-1a rewording including GGSIS 3.1.1-1b GGSIS 3.1.2-3 rewording GGSIS 3.1.3-6 rewording GGSIS 3.1.4.2-6 rewording GGSIS 3.1.4.2-7 rewording GGSIS 3.1.5-3 rewording including GGSIS 3.1.5-4 GGSIS 3.1.5-7 example has been removed GGSIS 3.1.6-1 removal GGSIS 3.1.6-7 rewording GGSIS 3.1.7-2 rewording GGSIS 3.1.7-7 removal GGSIS 3.1.8-1 rewording GGSIS 3.1.8-8 removal GGSIS 3.1.8-9 rewording GGSIS 3.3.4-2 rewording GGSIS 3.5.1.1-2 rewording GGSIS 3.5.1.3-1 rewording including GGSIS 3.5.1.3-2 GCC electrical system requirements moved to GCC IRD GGSIS 3.2.4-7 and GGSIS 3.3.1-5 removal		
	-	3.2.2	Implementation of GAL-DCN-ASTG-SYST-X-14197:		

			GGSIS 3.2.2-10 reworded GGSIS 3.2.7-2 reworded Added new requirement GGSIS 3.2.7-12		
4	**0**	**STRB delivery**		**10/12/2018**	**A. Poletti**

Change Records

		Paragraph(s) / Pages	**Details of change/DCN**
	-	Table 11	Image of table has been replaced with table
		Table 12	ISC, REEF and SOIF have been added, IPF has been removed
		Section 2.3	List of acronyms as per GAL-CN-ADSO-SYST-X-1000473268: ISC, REEF and SOIF have been added, IPF has been removed

Table of contents:

1 INTRODUCTION

1.1 Purpose

The purpose of the Galileo Ground Segment Integration Standards (GGSIS) is to harmonize the design of GALILEO, GDDN and other equipment to be deployed to and used at Galileo sites, and to facilitate its installation at such sites. It is in this context that this standard defines requirements applicable to the Segment Primes and the GDDN provider, who are expected to break these down to their subcontractors as applicable.
The GGSIS is also relevant to the Hosting Entities (HE) for Galileo remote sites, and the Hosting Services Providers (HSP) for the Galileo Control Centres. It provides information to these entities, that they are expected to process in order to plan and maintain the infrastructural environment, which the Galileo Primes and the GDDN provider alike expect to find when they start with the deployment of their equipment.
The GGSIS shall for the above reasons be looked at as a document essential for the definition of the infrastructural interfaces, which site providers and equipment providers will design and implement by and large independently of each other, and which must match at the time of Galileo equipment/GDDN deployment (and thereafter).
All parties concerned are expected to adhere to the requirements of the GGSIS. They should address ESA with questions for clarification in case they feel there is a need to.

1.2 SCOPE AND APPLICABILITY

This GGSIS is applicable to all Galileo equipment which has already been or will be installed at Galileo sites, irrespective as to where these will be located. It represents, therefore, an applicable document [AD] to the HEs, HSPs, GDDN Provider, Ground Segment Primes, and Ground Segment Element Providers.
The scope of the GGSIS shall encompass also classified areas/rooms and the equipment to be hosted by these. However, there will be additional applicable requirements which are applicable to these. Only in case of conflicts, the latter shall take precedence over the GGSIS.
It is possible that aspects of cost, schedule and risk mitigation suggest the use of COTS equipment or the reuse of existing design. In case such use/re-use would raise issues of compliance with the GGSIS Requests for Deviation (RfD) may be considered. ESA reserve the right to accept and approve or to reject such RfDs.

1.3 HISTORY OF THIS DOCUMENT

This document was initially prepared by ESA. It was later compiled and edited under the responsibility of Galileo Industries (GaIn), who eventually changed their name to European Satellite Navigations Industries (ESNIS). Revisions 3 and 4 of the document were prepared and submitted by AST-D in the framework of the Galileo IOV System Support contract. As of this Issue 2.0, an issue produced specifically for FOC and the related ITT, the responsibility for preparing and issuing the GGSIS has been re- assumed by ESA, who trust in AST-D's continued contributions to maintaining/updating this document.
In order to maintain continuity in the history (and contents) of this document, the list of Change Records at the beginning of the document keeps all GGSIS issues included.

2 REFERENCE DOCUMENTS

2.1 APPLICABLE DOCUMENTS

[AD.1]	Ergonomic design of control centres Part 4 Layout and dimensions of workstations	ISO 16401-4 First edition 2004-07-01
[AD.2]	Ergonomic design of control centres Part 6 Environmental requirements for control centres	ISO 16401-6 First edition 2005-07-01

2.2 REFERENCE DOCUMENTS

[RD.1]	SCED/GSSIS Ground Station Systems Integration Standard	Issue 3.0, European Space Operations Centre, 17 January 1994
[RD.2]	Galileo Control Centre Infrastructure Requirement Document	GAL-REQ-GLI-SYST-A/1107, Issue 1.2, 19 June 2008
[RD.3]	TT&C Site Interface Requirement Document (TT&C SIRD)	ESA-APP-NG-REQ/01180- AC Issue 1.1, 25th June 2008
[RD.4]	ULS Site Interface Requirement Document (ULS SIRD)	ESA-APP-NG-REQ/01181- AC, Issue 1.1, 25th June 2008.
[RD.5]	GSS Site Interface Requirement Document (GSS SIRD)	ESA-APP-NG-REQ/01182- AC, Issue 1.1, 27th June 2008
[RD.6]	GMS Software and Hardware COTS List	GAL-LST-ASP-GMS-I/0351 Issue 3.0, 12 December 2005
[RD.7]	Ergonomic design of control centres Part 1 Principles for design of control centres	ISO 16401-1 First edition 2000-12-15
[RD.8]	Ergonomic design of control centres Part 2 Principles for the arrangement of control suites	ISO 16401-2 First edition 2000-12-15
[RD.9]	Ergonomic design of control centres Part 3 Control room layout	ISO 16401-3 First edition 1999-12-15

2.3 List of acronyms

AC	Alternating Current
AD	Applicable Document
AHUB	Antenna Hub Room
ANT	Antenna
BBU	Base Band Unit
BKR	Circuit Breaker
CDR	Critical Design Review
CKT	Circuit
CMCF	Central M&C Facility
COTS	Commercial Off The Shelf
D/C	Down Converter
DEM	Demodulator
DIN	(from German: German Institute for Normalization)
DVRK	Servo Drive Rack
EC	European Community
EIA	Electronic Industries Alliance
EQL	Line Equalizer
ERM	Equipment Room
ESA	European Space Agency
ESNIS	European Satellite Navigation Industries

FAR	Factory Acceptance Review
FDF	Flight Dynamics Facility
FQR	Factory Qualification Review
FTP	Foiled Twist Pair
GACF	Ground Asset Control Facility
GaIn	Galileo Industries
GCC	Galileo Control Centre
GCS	Ground Control Segment
GCS-KMF	GCS Key Management Facility
GGSIS	(Galileo Industries Ground Segment Integration Standard)
GMS	Ground Mission Segment
GS	Ground Segment
GS	Galileo Sensor Station
HPA	High Power Amplifier
HMI	Human Machine Interface
IEC	International Electrotechnical Commission
IF	Intermediate Frequency
IFL	Intermediate Frequency Link
ILS	Integrated Logistic Support
IRD	Interface Requirement Document
ISC	Infrastructure Service Capacity
KPA	Klystron Power Amplifier
L/A	Line Amplifier
LAN	Local Area Network
LNA	Low Noise Amplifier
LPA	Low Power Amplifier
LRU	Lowest Replaceable Unit
M&C	Monitor and Control
MCF	Mission Control Facility
MCR	Main Control Room
MEB	Main Equipment Building
MGF	Message Generation Facility
MKMF	Mission Key Management Facility
MIL	Military Specification Standard
MMI	Man Machine Interface
MOD	Modulator
MSF	Mission Support Facility
OFF	Office
OPF	Operations Preparation Facility
OSPF	Orbitography & Synchronization Processing Facility
PA	Power Amplifier
PC	Personal Computer
PDP	Power Distribution Panel
PIB	Power Interface Box
PP	Patch Panel
PRSKMF	PRS Key Management Facility

PSHT	Power Distribution and Generation Shelter
PTF	Precise Time Facility
RAL	(from German: Commission for Delivery Terms and Quality Assurance)
RD	Reference Document
REEF	RF Environment Estimation Facility
RF	Radio Frequency
RNGU	Ranging Unit
RTR	Router
RU	Rack Unit
SCCF	Spacecraft Constellation Control Facility
SCED	Stations and Communications Engineer Department
SCPF	Spacecraft and Constellation Planning Facilities
SECA	Secure Area
SHT	Shelter
SOIF	Security Operation and Intelligence Facility
SOR	Special Operations Room
SPF	Service Product Facility
SSPA	Solid State Power Amplifier
STP	Shielded Twisted Pair
SWT	Switch
TBC	To Be Confirmed
TBD	To Be Determined
TBP	To Be Provided
THPA	TTC High Power Amplifier
TLMRX	Telemetry Receiver
TLT	Test Loop Translator
TT&C	Tracking Telemetry & Command
TTC	Telemetry, Tracking and Control stations
U/C	Up Converter
UANT	ULS Antenna
UHPA	High Power Amplifier
ULS	Up Link Stations (C-Band)
UPS	Uninterruptible Power Supply
USF	Uplink Scheduling Facility
UTP	Unshielded Twisted Pair
VSAH	Hub Antenna for VSAT Network
VSAT	Very Small Aperture Terminal
XCVR	Transceiver

2.4 Glossary of Terms

Workstation	Workstation is just a generic term for a user's machine (client machine) in contrast to a "server". A workstation is composed of hardware, operating system(s), firmware, system software, application software. A workstation encompasses necessary system peripherals, possibly shared with other workstations, and user interfaces.
Working Position	A working position may be fitted with a single or multiple workstations. Access to multiple workstations may be accomplished through set of common peripherals (e.g. switchable screens, keyboards and mice) or through separate ones.
Workplace	Used, in some instances, as synonymous of working position

Table 1 Glossary of terms

3 INTEGRATION STANDARD

3.1 EQUIPMENT IN RACKS

The requirements presented in the following subsections shall define guidelines and boundary conditions that apply to Galileo equipment to be deployed to equipment rooms inside fixed buildings, shelters, and/or containers.
The term (equipment) rack is used throughout the document but not necessarily as a synonym for cabinet. Cabinets do always represent complete enclosures. A rack may be anything from a complete enclosure to a sort of open support structure for equipment enclosures in the sense that it is not fitted with a front door, a rear door or panel, two side panels, a top cover, a bottom plate, or any combination of these. At the extreme, an arrangement could be considered as a rack, which is composed of just four vertical profiles kept in position and stabilized by the equipment fixed to these profiles and, thereby, kept in position between them. A
cabinet is usually a rack but a rack is not necessarily a cabinet.

3.1.1 General Guidelines on Rack Siting

The following guidelines shall be observed when installing racks at remote sites or GCCs:

GGSIS-434 (GGSIS 3.1.1-1)
These rules shall apply to the siting/positioning of Galileo (including GDDN) equipment racks. They should also apply to any equipment rack provided by a Hosting Entity/Hosting Services Provider in the context of their hosting obligations.

(a) Racks shall be positioned in straight rows.
(b) Racks shall be arranged in functional blocks.
(c) Racks deployed to equipment rooms/equipment areas in the GCCs shall be positioned such that a clear space is provided both in the front and rear of each rack (for installation and maintenance invention), at a minimum depth of 1.200 mm.
(d) Racks deployed to a remote Galileo site shall be positioned such that a clear space (for installation and maintenance intervention) is left at the front and the rear of each rack, at a minimum depth of 1.100 mm at the front and 800 mm in the rear. This shall apply irrespective as to whether rack deployment is to a fixed building provided by the Hosting Entity, a prefabricated shelter or container, or an area or room inside the TT&C antenna complex.
(e) There shall be no more than 8 individual racks to form one row. Depending on the size of the room/area segmentation may have to be applied also to a row, which is composed of less than 8 individual racks.
(f) A minimum distance equivalent to the size of one rack shall be observed between two adjacent segments, which form one and the same row,
(g) Racks shall be installed in such a way that access to the rear side of each rack is possible from both sides of the row.
(h) Segment and GDDN providers as well as Hosting Services Providers and Hosting Entities shall optimize/plan for an optimised usage of the floor space required for rack hosting.

Note: Segment and GDDN providers as well as HSPs shall also optimize the usage of space inside racks when integrating the various elements/GDDN in-door equipment, which are subject to their respective contracts.

GGSIS-435 (GGSIS 3.1.1-1a)
Racks shall be constructed in such a way that they can be bayed together or safely anchored to the ground/floor. Baying together shall be done side by side.

GGSIS-438 (GGSIS 3.1.1-2)
Racks shall usually be deployed to and operated in confined equipment rooms and/or other areas of respectively a GCC or the Main Equipment Building (MEB), a prefabricated shelter (container) or the antenna building at a remote Galileo site.
Equipment rooms are usually unmanned areas where communications equipment,

RF/IF equipment and/or computers are located. Personnel will be present in such rooms only when activities need to be carried out, relevant to installation, test, maintenance and/or contingency operations.

GGSIS-439 (GGSIS 3.1.1-3)
Environmental and health & safety constraints, which may or will affect the final installation at different sites, shall be taken into consideration by the GDDN and Ground Segment Providers respectively to ensure adequate boundary conditions for GDDN equipment and Ground Segment Element design.

GGSIS-440 (GGSIS 3.1.1-4)
Floor space utilization plans shall unambiguously indicate per room/area both the location of each individual equipment enclosure already deployed and the positions reserved for future deployments.

GGSIS-441 (GGSIS 3.1.1-5)
In case of any change/update during installation and integration of the Ground Segments, the "As Built" documentation shall be updated accordingly. Updates shall be submitted at intervals sufficiently small to ensure an accurate system overview at any time.

GGSIS-442 (GGSIS 3.1.1-6)
Detailed floor space utilization plans shall be established and maintained under the responsibility of the Galileo System Prime in coordination with all parties concerned (Segment Primes/GDDN, HE, HSP).

GGSIS-443 (GGSIS 3.1.1-6a)
The rack naming convention shown in Table 2 shall be used to support the identification of deployed equipment enclosures on the "As Built" site documentation.

GGSIS-444 (GGSIS 3.1.1-7)
The detailed layout of equipment racks and other enclosures shall be coordinated with the Galileo System Prime in the context of applicable Galileo Element/GDDN critical design or factory qualification/factory acceptance reviews.

3.1.2 Characteristics of the Racks

GGSIS-446 (GGSIS 3.1.2-1)
All racks, cabinets and other enclosures shall comply with the 19" standard EIA-310- D. The mounting dimensions shall be compliant with DIN 41494 part. 1.

GGSIS-447 (GGSIS 3.1.2-2)
The dimensions, weight and colour of the racks shall be as follows:

a) Dimensions

1) Racks deployed in the Galileo Control Centres or fixed buildings

- Height

For racks deployed in rooms not part of Secure Areas, the nominal height shall be 42 RU
The total height of the rack shall be 2.000 mm not including top cover, base plinths and lifting eyes, and shall not exceed 2.230 mm including them
For racks deployed in rooms part of Secure Areas, the nominal height shall be 47 RU
The total height of the rack shall be 2.200 mm not including top cover, base plinths and lifting eyes, and shall not exceed 2.430 mm including them

- Depth

1.000 mm

2) Racks deployed in pre-fabricated shelters/containers or antenna buildings at Galileo remote sites

- Height

The nominal height shall be 38 RU
The total height of the rack shall be 1.800 mm

- Depth

600 mm

b) Colour

In order to preserve visual harmony in the rooms where the racks are deployed:

- the doors, covers and side panels shall be of colour RAL 7035
- the frames shall be of colour RAL 7021

c) Model

- equipment racks shall be of the Varistar series produced by Schroff

The Contractor shall use to the maximum extent the same family of hardware for the racks accessories.

Alternative makes/models can be proposed provided they offer as a minimum the same functionalities.

Final decision for alternative solutions shall be taken in agreement with the Agency.

GGSIS-448 (GGSIS 3.1.2-3)
All racks deployed to the same equipment room/area shall be of the same physical size (in height, width and depth).
This requirement is not applicable to equipment racks hosting

- servo equipment (installed inside or outside a building)
- equipment located at GDDN antenna hubs.

GGSIS-449 (GGSIS 3.1.2-3a)
Requirement GGSIS 3.1.2-3 shall not apply to equipment racks installed in rooms/areas, which host both

(a) replica racks of Elements and sub-elements designed for use at a GCC

and

(b) replica racks of Elements designed for use at Galileo remote sites.

However, racks according to (a) shall be grouped together so as to form one row. The same shall apply to racks according to (b). Observing the constraints given by requirement 3.1.1-1 it shall be possible to site the two groups such that they form a single row.

GGSIS-450 (GGSIS 3.1.2-4)
Each equipment enclosure shall allow the operation and maintenance of the enclosed equipment wherever these enclosures will be located.

GGSIS-451 (GGSIS 3.1.2-5)
Noise produced by fan and blowers motors (refer to GGSIS 3.1.4.1-2 and GGSIS 3.1.4.2-7) shall be minimized in order to improve the overall ambient acoustic comfort. The acoustic noise pressure generated by each individual rack shall not exceed 45 dBA (following the ISO 7779 and ISO 9296 standards) when all fan and blower motors are operating (this value does not consider the noise pressure level produced by the equipment inside the rack).
For racks installed in unmanned equipment areas, provided the rack cooling requires the installation of fan and blower units for high air throughput, the maximum acoustic noise pressure of an individual rack can be relaxed to 65 dBA, following the ISO 7779 and ISO 9296 standards.

GGSIS-452 (GGSIS 3.1.2-6)
All racks shall meet the applicable EC regulations and shall be marked accordingly.

GGSIS-453 (GGSIS 3.1.2-7)
All racks shall meet the electrical and safety standards applicable in the countries in which they will be installed.

GGSIS-454 (GGSIS 3.1.2-8)
The lay-out of a rack shall allow for maintenance of the equipment hosted to be conducted with the minimum disruption of Element/rack/system operations.

GGSIS-455 (GGSIS 3.1.2-10)

All racks/cabinets, which include transformers or active elements shall be fitted with an internal temperature sensor. This sensor shall be used to trigger an alarm. The threshold shall be adjustable to a value commensurate with the nominal operating temperature of the populated rack.
The alarm shall be reported:

- locally by a visible red alarm light at the top of the rack (i.e. on the front panel or on top of the cover panel).
- remotely to the Galileo Ground Assets Control Facility (GACF), if applicable through a mid- level manager (e.g. CMCF, GNMF).

In order to minimise dependency upon other components the communications path to be used for this alarm reporting shall be independent - to the extent possible - of other communications links within and/or with this rack/cabinet.
For security reasons, remote reporting from racks located in the Secure Area cannot be done with direct connection to the CMCF and an alternative solution shall be proposed by the Contractor.
The Contractor shall be responsible for justifying alternative solutions, if not found adequate to fulfil the technical requirements or if an alternative solution offers a significant benefit. Final decision shall be taken in agreement with the Agency.

3.1.3 Connection to the Site-Provided Electrical Power

The supplier of the rack, console or equipment shall have the responsibility of connecting it to the site provided electrical power. The electrical power interface point shall be the cable termination point at the site provided power distribution panel (PDP).
Connection to the site's electrical power and grounding system shall be subject to acceptance by the site provider's/HSP's certified electrician engineer, who will activate the provision of electrical power to the rack.

GGSIS-464 (GGSIS 3.1.3-6)
Each rack shall be fitted with a Power Interface Box (PIB), which allows the connection of:

- one power cable for each of the two no-break power supplies
- one power cable for short-break power supply

The PIB shall be located at an easily accessible position inside the rack.

GGSIS-465 (GGSIS 3.1.3-7)
Equipment, which requires a three phase power supply, and equipment designed for single phase 230Vac, which draws a current in excess of 16A, shall be connected directly to the appropriate circuit breaker (BRKR) of the power distribution panel (PDP).

3.1.4 Cooling Methods

Two possible cooling methods may be applied to the equipment cabinets. The cooling method to be selected is determined by the available site infrastructure.

3.1.4.1 Computer Floor (False Floor) Installation (GCC Sites)

GGSIS-469 (GGSIS 3.1.4.1-1)
Cabinets installed on a computer floor (false floor) shall be cooled from cold air coming from the plenum under the floor. The air-flow inside a cabinet shall be from its bottom plate to the rack cover (see Figure 1).

GGSIS-470 (GGSIS 3.1.4.1-2)
Cabinets installed on a computer floor shall be supplied with non-perforated doors and a top cover with vents and gaps fitted with a sufficient number of fans capable of dissipating the heat inside the cabinet.

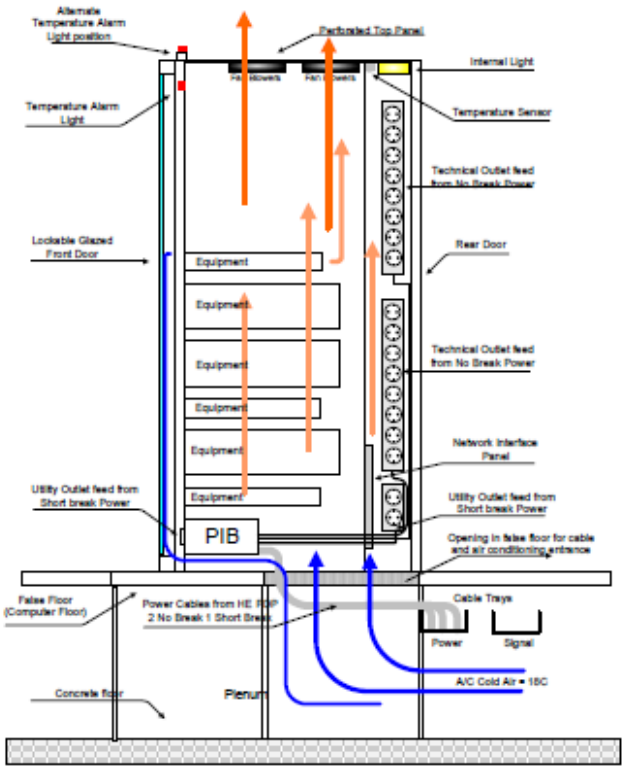

Figure 1: Typical Rack to be installed on false floor

GGSIS-473 (GGSIS 3.1.4.1-3)
Fan drawer motors shall be powered from short break power (refer to GGSIS 3.1.6-8).

GGSIS-474 (GGSIS 3.1.4.1-4)
The gap between the bottom of the cabinet and the computer floor below shall be sealed to avoid air leakage.

GGSIS-475 (GGSIS 3.1.4.1-5)
The design of the air-flow, needed for the cooling of equipment highly sensitive to smallest temperature variations and/or installed in areas with clean room characteristics, shall be subject to prior coordination with the GaIileo Project.

3.1.4.2 Solid Floor

GGSIS-477 (GGSIS 3.1.4.2-1)
Racks installed on a solid floor shall be cooled from air coming from the ambient.

GGSIS-478 (GGSIS 3.1.4.2-7)
Cabinets shall be provided with one or more fan units. These shall establish the required air flow for cooling the equipment inside a rack. The air flow internal to the rack is from the bottom at the front to the top of the rack. Exhaust air shall leave the cabinet (see Requirement GGSIS-3.1.4.2.-6) at the upper part of its back panel (see Figure 2).

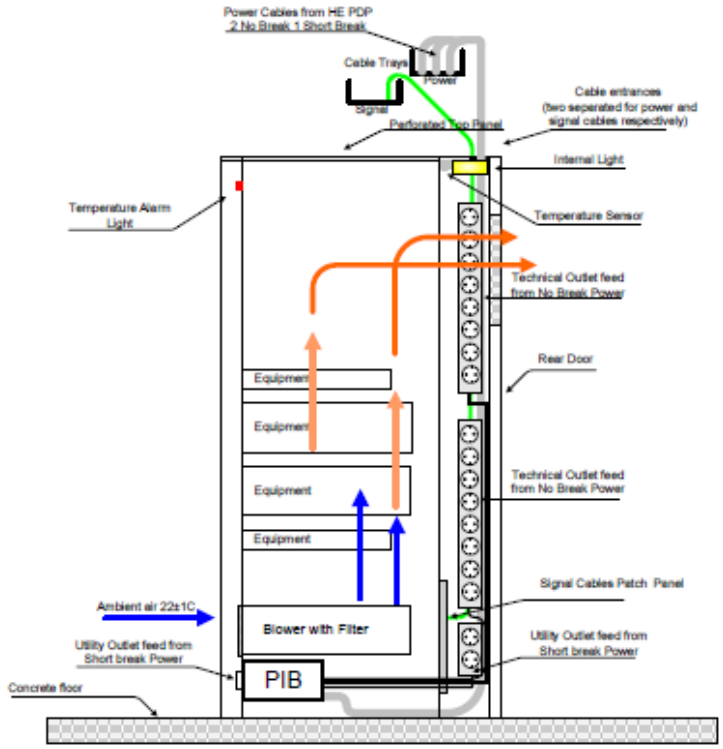

Figure 2: Typical Solid Floor Rack Cooling

Note: Air leaving the rack may be exhausted from the top, instead from the back, provided this type of exhaust does not interfere with the principle of ambient cooling of racks/cabinets in the same room.

GGSIS-482 (GGSIS 3.1.4.2-3)
The air inlet for the fresh air shall be fitted with a filter capable of blocking the dust coming from the ambient. This filter shall be easily removable for cleaning.

GGSIS-483 (GGSIS 3.1.4.2-5)
Fan motors shall be powered from the short break power (refer to GGSIS 3.1.6-8).

GGSIS-484 (GGSIS 3.1.4.2-6)
Exhaust air shall leave the cabinet through suitable ventilation slots on the upper part of the back door.
NOTE:
Requirements GGSIS 3.1.2-5, GGSIS 3.1.2-9, GGSIS 3.1.4.1-1, GGSIS 3.1.4.2-7, GGSIS 3.1.4.2-3, GGSIS 3.1.4.2-5and GGSIS 3.1.4.2-6 may not be applicable to outdoors equipment. It may also not apply to racks containing HPAs, servo drives, SSPAs, and LNAs as these might require a different type of cooling.

3.1.5 Mechanical Fitting

GGSIS-487 (GGSIS 3.1.5-1)
Equipment in the rack shall be installed on suitably angled chassis runners or telescopic slides in line with the Health and Safety recommendations from the manufacturer for handling the said equipment.

GGSIS-488 (GGSIS 3.1.5-8)
Equipment cabinets shall be fitted with side panels and lockable front and rear doors. Wall cabinets shall be fitted with a lockable front door.
Locks shall be selected such that the same key can be used to lock and unlock all cabinets/other enclosures forming part of the same Galileo ground segment, and being subject to the same level of classification.

GGSIS-489 (GGSIS 3.1.5-2a)
Side panels between adjacent racks, which are bayed together, may be removed unless this would constitute a non compliance with applicable EMC regulations.

At the GCCs, side panels should be avoided between adjacent racks, which host respectively LAN switches and wiring centres, compliance with applicable EMC regulations provided.
Note: The Galileo System Prime may waive the requirement for front doors on cabinets deployed to remote sites.

GGSIS-491 (GGSIS 3.1.5-3)
Racks shall be provided with the necessary hardware (bolts, threaded bars, anchors etc) either:

- to bolt them to the surface or to otherwise fix them to the position they are installed at.

or

- to bay them with adjacent racks.

Base plinths shall be provided, for racks deployed at GCCs, for air guidance and dust protection.

GGSIS-493 (GGSIS 3.1.5-5)
Blank panels of the appropriate dimension shall cover empty spaces between equipment installed in cabinets.

GGSIS-494 (GGSIS 3.1.5-6)
The cable entrance(s) to a cabinet shall be adequately sealed to minimize the leakage of air entering or leaving the cabinet.

GGSIS-495 (GGSIS 3.1.5-7)
The rear doors of cabinets installed in prefabricated shelters shall be easily removable.

3.1.6 Electrical Fitting

GGSIS-507 (GGSIS 3.1.6-3)
Racks hosting equipment, which requires three phase 400Vac power supply or 230Vac equipment drawing more than 16A are not required to have a PIB and power outlets power strips. This equipment shall be connected directly to the corresponding circuit breaker on the site-provided PDP (refer to GGSIS 3.1.3-1).

GGSIS-508 (GGSIS 3.1.6-4)
Racks shall be provided with internal power outlet strips for the UPS power. The power outlet strip shall be connected to the corresponding circuit breaker in the PIB.

GGSIS-509 (GGSIS 3.1.6-5)
Should a rack contain redundant equipment (not recommended) separate power strips shall be provided for the prime and the redundant equipment (Refer to GGSIS 3.1.7-9).

GGSIS-510 (GGSIS 3.1.6-6)
Electrical power outlets shall comply with the DIN 49 440 (“Schuko”) standard.

GGSIS-511 (GGSIS 3.1.6-7)
The number of No-Break power outlets shall be sufficient to connect all the relevant equipment and to leave at least two additional outlets (one on each No-Break circuit).

GGSIS-512 (GGSIS 3.1.6-8)
The racks shall be supplied with at least one power strip connected to the short break (via the PIB). This power strip shall be used to supply the fans internal lighting and provide at least 1 spare outlet.

GGSIS-513 (GGSIS 3.1.6-9)
Each rack shall be supplied internally with a ground bar and supporting brackets.

GGSIS-514 (GGSIS 3.1.6-10)
The racks shall be provided with an internal lighting capable of providing sufficient light for maintenance activities (and operations activities if applicable).

GGSIS-515 (GGSIS 3.1.6-11)

The racks' internal lighting shall be automatically turned on when the cabinet's rear door is opened or removed. It shall be automatically tuned off when that door is closed again.

GGSIS-516 (GGSIS 3.1.6-12)
Any rack internal lighting shall be connected to the short break power.

3.1.7 Equipment in Racks

GGSIS-518 (GGSIS 3.1.7-1)
All equipment to be hosted in a rack shall meet the 19" EIA-310-D standard with mounting dimension according to DIN 41 494 part 1.

GGSIS-519 (GGSIS 3.1.7-2)
All equipment front panels shall be of colour RAL 7035. This requirement does not apply for remote sites.

GGSIS-520 (GGSIS 3.1.7-3)
All equipment shall meet the relevant EC standards and shall be marked accordingly.

GGSIS-521 (GGSIS 3.1.7-4)
Equipment shall meet the electrical and safety standards of the country in which it will be installed.

GGSIS-523 (GGSIS 3.1.7-6)
All equipment shall be capable of being powered by an electrical power supply of standard single phase 230Vac (210Vac to 250Vac, 50Hz±3%) or - if needed - three phase 400Vac (360Vac to- 440Vac, 50Hz±3%) without degradation in its required performance.

GGSIS-525 (GGSIS 3.1.7-8)
For workstations and PCs the 19" rack-mount layout is preferred; it is mandatory when these are installed in racks located in an equipment room.
Should Commercial Off The Shelf (COTS) computer equipment be selected with tower or desktop housing, the installation shall be engineered in such a way that the impact on the serviceability and maintainability of the equipment is minimized and that the installation does not adversely affect the cooling of other equipment in the rack.

GGSIS-526 (GGSIS 3.1.7-9)
Prime and redundant equipment shall not be hosted by the same rack.

GGSIS-527 (GGSIS 3.1.7-10)
Prime and redundant equipment shall be powered from separate No-Break circuits
(Refer to GGSIS 3.4.2-2).

GGSIS-528 (GGSIS 3.1.7-11)
Keyboards shall be mounted on a 1 RU telescopic drawer.

GGSIS-529 (GGSIS 3.1.7-12)
Monitors shall be able to fit flat in the front of a 19"rack.

GGSIS-531 (GGSIS 3.1.7-14)
The total radiated power from all the equipment in the rack shall not exceed 1.5 kW. This requirement can be relaxed in case of racks containing equipment such as high power amplifiers (HPA) and servo drives.
Note: The relaxation shall be duly justified, including provision of total radiated power.

3.1.8 Internal Cabling and Wiring

GGSIS-533 (GGSIS 3.1.8-1)

Whenever there is more than one coaxial cables entering and leaving the rack, they shall pass via an interface panel located internally in the rear bottom part, or in the rear upper part of the rack. The location of this interface panel shall depend on the type of cable entrance to the rack.

GGSIS-534 (GGSIS 3.1.8-2)
All test outputs / inputs ports of the patch panels shall be properly terminated / loaded.

GGSIS-535 (GGSIS 3.1.8-3)
Cables and wires in the racks shall be properly bound and strapped inside cable ducts located in the inside at the rear of the rack.
Exceptions are accepted for multi pair and coaxial cables whose external diameter is greater than 3/8": these however shall be securely strapped to appropriate fixing hardware inside the rack.

GGSIS-536 (GGSIS 3.1.8-4)
All equipment power cables shall be internally routed in such a way that the best possible separation is achieved between power and signal cables.

GGSIS-537 (GGSIS 3.1.8-5)
Cabling and wiring in the back of the equipment shall not unnecessarily obstruct maintenance access to equipment and cabling inside the rack.

GGSIS-538 (GGSIS 3.1.8-6)
In case equipment is mounted on telescopic slides, all cables shall be left long enough to ensure that the shelves can be fully extracted to the service position.

GGSIS-539 (GGSIS 3.1.8-7)
Any excess signal cable lengths shall be laid in the signal cable trays and secured with cable ties instead of being left loose in the rack.

GGSIS-541 (GGSIS 3.1.8-9)
With the exception of LAN racks themselves, all Local Area Network (LAN) cables leaving or entering a rack or cabinet shall pass via a patch panel.

GGSIS-542 (GGSIS 3.1.8-10)
LAN patch panels shall be compatible with either RJ45 or TERATM connectors.

3.1.9 Key Management Facilities Cabling and Wiring

GGSIS-544 (GGSIS 3.1.9-1)
GCS and GMS Key Management Facilities (xKMF) shall be hosted in the Secure Area of the respective GCC. The Secure Area will be fitted with a Tempest boundary.

GGSIS-545 (GGSIS 3.1.9-2)
Signalling cables to cross the Tempest boundary shall be implemented in form of optical fibres. Optical fibre will be of the ITU-T G-651/ISO-IEC 1181 Revision 2 (3)
OM3 Multimode type. These cables will be terminated on dual SC terminators.

GGSIS-546 (GGSIS 3.1.9-3)
In case signalling cables need to be extended inside and outside the Tempest boundary by means of cables of a different medium, media converters are required to perform the corresponding adaptation. The same applies in case the signalling cable is to be connected to an end-equipment that provides a port which does not allow connection to optical fibre.

GGSIS-547 (GGSIS 3.1.9-4)
Each media converters required in the sense of GGSIS 3.1.9-3, together with the optical fibre connected to it forms part of the respective Key Management Facility (xKMF).

GGSIS-548 (GGSIS 3.1.9-5)

Deviating from GGSIS 3.1.9-2 optical fibres which are used to for IRIG-B signal transmission shall be terminated on ST (tbc) connectors.

3.2 EQUIPMENT IN CONSOLES

Consoles will normally be provided as part of the infrastructure of GCCs only.

3.2.1 Guidelines on Console Positioning and Hosting of Equipment

3.2.1.1 General Guidelines on the Positioning of Consoles

GGSIS-55 (GGSIS 3.2.1-5)
The positioning of consoles in operational rooms shall in general be determined by

- the shape and size of the floor space available in the given (GCC) facility
- the number of working positions to be implemented
- the operational specifics of each working position, and the required equipment in terms of components of/access devices to Galileo Elements.

The operational interactions anticipated between operators at the individual working positions shall be taken into account.

GGSIS-554 (GGSIS 3.2.1-1)
An installation/maintenance space of a minimum depth of 1.200 mm shall be provided in the rear of each console.

GGSIS-555 (GGSIS 3.2.1-6)
A clear space shall be provided in front of the operator side of each console. A planning target of 1.800 mm shall be assumed for the depth of this space.

Note: The clear space in front of the operator side of each rack shall include the manoeuvre space to be provided to the console operator and, optionally, a second person (e.g. trainee).

GGSIS-556 (GGSIS 3.2.1-7)
The depth of the installation/maintenance space according to GGSIS 3.2.1-1 may be reduced or completely eliminated for consoles in operator rooms, which are dedicated to training, test and validation purposes only. Accessibility from the operator side of the console of all console related infrastructure and any hosted equipment shall be a pre-requisite for the former.

GGSIS-557 (GGSIS 3.2.1-8)
The clear space in front of the operator side of a console may be reduced in case the constraints resulting from (GGSIS 3.2.1-5 cannot be met otherwise. However, the minimum depth to be maintained shall not be less than

- 1.200 mm in case maintenance access to the console is to be provided from its front or the reduction in depth applies to the full length of the console
- 1.000 mm in case no maintenance access to the console is required from its front, and the reduction in depth applies to less than 50% of the console length only.

3.2.1.2 Floor Plan

GGSIS-559
A floor space utilization plan for each and every operator facility (i.e. room) in a GCC will be coordinated between and agreed by the System Prime and the Operations & ILS Contractor. Inputs submitted by the Segment Primes for the establishment and maintenance of these plans will be considered.

All floor space utilization plans shall unambiguously identify

(1) the location of each and every console inside the given GCC facility
(2) the size and type of console bays any individual console is composed of
(3) the assignment of (Segment) provided equipment to each console bay
(4) the OPS support systems/systems access each console bay is equipped with (5) the electrical power and ADMIN LAN outlets accessible to the console operator (6) the location of (a) CIOD wiring centre(s) if available

They shall document the "As Built" configuration and show foreseen extensions.

GGSIS-560 (GGSIS 3.2.1-4)
In case of changes during installation and integration of the GCC, the "As Built" documentation shall be updated accordingly.

GGSIS-561 (GGSIS 3.2.1-3)
The naming convention shown in Table 2 shall be applied to support the identification of each console and the equipment installed in its bays.

3.2.2 Console Characteristics

GGSIS-563 (GGSIS 3.2.2-9)
Consoles shall be composed of one or more individual (console) bays.
Console bays may differ in their capacity to host workstations and other equipment.

GGSIS-564 (GGSIS 3.2.2-2)
The console design shall facilitate the implementation of working positions, which are to be fitted with multiple flat screens. It shall permit accommodation of flat screens in up to two rows placed vertically on top of each other.

GGSIS-565 (GGSIS 3.2.2-3)
The design of the consoles shall anticipate the provisions (e.g. internal phone absorbing linings) necessary to meet the requirements as set forth in [AD.2].
This requirement shall be met taking into account the acoustic noise pressure produced by the equipment inside each console, and the total number of consoles to be hosted inside the same GCC facility (i.e. operational room).

GGSIS-566 (GGSIS 3.2.2-4)
Each console shall be designed to accommodate, and to permit optimum operability, of the client workstations installed in it together with the following items of operations support:

- Voice Intercom terminal
- Telephone
- Control panel for the Video Data Distribution System
- Stop clock

The surface of the console working area shall be sufficient to accommodate, in addition to the above, a laptop computer that may be needed for procedure generation, procedure verification, troubleshooting and similar purposes.

GGSIS-567 (GGSIS 3.2.2-5)
The design of the consoles shall take into account the ergonomic requirements, recommendations and guidelines for the design of workplaces (i.e. working positions) in control centres as defined in [AD.1].
Particular attention shall be given to Paragraph
5 ("Factors determining control workstation design") and Paragraph 6 ("Control workstation layout").

GGSIS-568 (GGSIS 3.2.2-10)
All console bays shall be adequately dimensioned so as to accommodate up to two "flat screen" video terminals/monitors, with dimensions up to (monitor without stand): 510 mm/490mm/300 mm (width/height/depth).
In case two "flat screens" are to be accommodated, these shall be mounted vertically above each other.

GGSIS-569 (GGSIS 3.2.2-11)
Each console bay shall be fitted with (a) mounting device(s) (e.g. mast with swivel arms), which allow(s) the "flat screen(s)" to be individually adjusted in both their vertical and their horizontal plane.
It shall be permissible to provide:

- separate mounting devices, one per screen
- a single mounting device which supports both screens
- different mounting devices for the support of respectively one or two screens, with one to be replaced by the other in case of a changed demand for screen accommodation.

GGSIS-570 (GGSIS 3.2.2-12)
The mechanical interface of screen and mounting device shall either be adjustable to the built-in fastenings of different screen types or easily replaceable by one to match the specification of the fastening as built-in to the screen.

GGSIS-571 (GGSIS 3.2.2-6)
All consoles shall accommodate standard 19" equipment drawers as well as tower and desktop housings of workstations and PCs.

GGSIS-572 (GGSIS 3.2.2-14)
All consoles shall be capable of accommodating two workstations.

GGSIS-573 (GGSIS 3.2.2-15)
Workstations, PCs, other Segment equipment (e.g. LAN switches) and OPS Support equipment shall be hosted in lockable enclosures (see Fig.6), which are part of the console or console bay.

GGSIS-574 (GGSIS 3.2.2-16)
Equipment enclosures provided as part of a console bay shall have the form of a cabinet, which reaches from the (false) floor to the console desk. The depth of this cabinet shall not be less than 700 mm.
Smaller enclosures (both in height and depth) may be used for HSP provided equipment to be installed in the console.

GGSIS-575 (GGSIS 3.2.2-17)
It shall be permissible for consoles, which are composed of three or more console bays, to have one (or more) central console bay(s) not fitted with an equipment console enclosure.

GGSIS-576 (GGSIS 3.2.2-7)
All console bays shall meet relevant EC regulations and shall be marked accordingly.

GGSIS-577 (GGSIS 3.2.2-8)
The dimensions of consoles and console bays, unless explicitly stated in this document, result from the selection taken by the HSP. The following target values are recommended,

- height of console desk surface above (false) floor 800 - 810 mm
- depth of a console deployed to an operational room 1100 - 1200 mm
- depth of a console deployed to a test and validation room..... >= 900 mm

GGSIS-578 (GGSIS 3.2.2-18)
Recommended console colours shall be :

- for doors, covers, panels RAL 7035 light grey
- for the frame colour RAL 7030 stone grey

GGSIS-579 (GGSIS 3.2.2-19)
Consoles deployed to the GCC's classified area may deviate from the requirements stated in this section.

3.2.3 Connection to the Site-Provided Electrical Power

GGSIS-581 (GGSIS 3.2.3-1)

The same requirements as those for the racks shall be applicable (refer to GGSIS 3.1.3-1 through GGSIS 3.1.3-7).

3.2.4 Cooling Methods

GGSIS-583 (GGSIS 3.2.4-1)
Equipment installed in a console shall be cooled by fresh air coming from the plenum under the false floor. The ground plates of the console bays' equipment enclosures shall be fitted with slots or a suitable perforation to allow for the fresh air to enter.
Floor tiles (of the false floor) shall provide suitably dimensioned cut outs underneath the equipment enclosure.

GGSIS-585 (GGSIS 3.2.4-8)
Gaps between the bottom plate of the console bay's equipment enclosure and the surrounding false floor should be closed to avoid unnecessary losses of fresh cooling air.

GGSIS-586 (GGSIS 3.2.4-4)
(Warm) Exhaust air shall leave the console through ventilation slots or perforated panels in its rear.

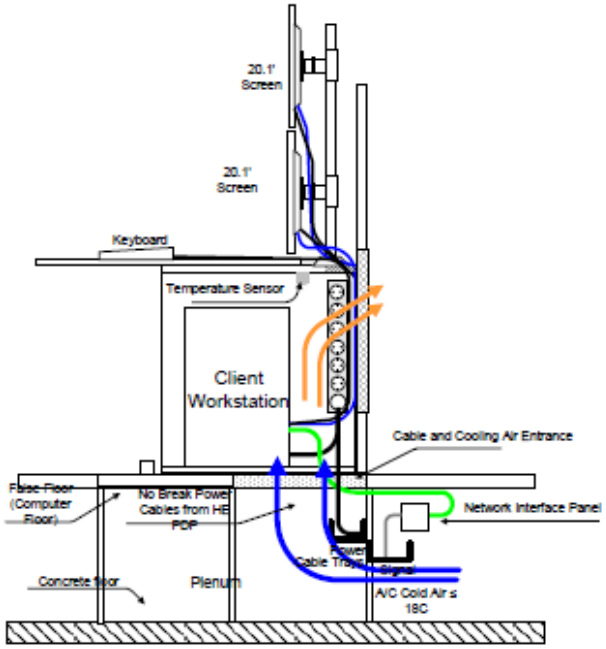

Figure 3: Console Layout

GGSIS-589 (GGSIS 3.2.4-2)
If required by the amount of dissipated heat to cope with, a console bay's equipment enclosure shall be equipped with a fan drawer installed near the enclosure's outlet for exhaust air. The fans inside the drawer shall be activated by a thermostat in case the temperature inside the enclosure rises beyond a threshold to be proposed by the provider of the equipment installed in it.

GGSIS-590 (GGSIS 3.2.4-6)
Noise produced by the fan motors shall be minimized in order to improve the overall ambient acoustic level, taking into account the limits set forth with requirement GGSIS 3.2.2-3.

GGSIS-591 (GGSIS 3.2.4-5)
In case of (a) fan drawer(s) being installed, the fan motors shall be powered from short break power.

GGSIS-592 (GGSIS 3.2.4-3)

In case equipment is to be installed in a console, which is built in such a way that the heat dissipated by the installed equipment could potentially result in hot spots inside the enclosure, this enclosure shall be fitted with a temperature alarm sensor. In general, fitting console (bay) enclosures with temperature alarm sensors is recommended.
Temperature alarm sensors shall be installed at a location inside the enclosure, which is in closest possible vicinity to the area where the warmest air is expected to accumulate or pass through.
The temperature alarm shall be locally reported at the console (visually by means of a flashing alarm light), and a corresponding signal be made available for being sent to
and processed by the Galileo Ground Assets control Facility (GACF).

3.2.5 Mechanical Fitting

GGSIS-594 (GGSIS 3.2.5-2)
Console bays/console bays' equipment enclosures shall have side panels on all exterior sides.
Note: Interior side panels may be removed provided the adjacent console bays are bayed together, and there is no need to use metallic side panels for purposes of electromagnetic shielding.

GGSIS-595 (GGSIS 3.2.5-7)
Console bays shall be fixed to the floor. They shall be delivered with the hardware required to accomplish this.

GGSIS-596 (GGSIS 3.2.5-4)
Console bays shall be provided with the necessary hardware which allows them to be bayed together with adjacent console bays so as to integrate them into working positions composed of several adjacent consoles (refer to GGSIS 3.2.1-2 and GGSIS 3.2.2-2) and to integrate an individual console into a group of adjacent consoles. If exceptionally so required it shall also be possible to bay together a console bay and an equipment cabinet.

GGSIS-597 (GGSIS 3.2.5-8)
Console/console bay enclosures shall be easily accessible from the front and the rear of the bay to facilitate installation and maintenance activities. Access shall be provided by access doors or easily removable back panels
If so required by the Element provider/device operating concept, suitably located flaps shall allow for Operator access to specific workstation or PC interfaces (e.g. USB ports, disk drive, reset button)

GGSIS-598 (GGSIS 3.2.5-6)
If applicable, cable entrances to a console bay shall be adequately sealed to minimize the leakage of air entering from the computer floor.

3.2.6 Electrical Fitting

GGSIS-601 (GGSIS 3.2.6-2)
Consoles shall be provided with power outlet strips for no-break power. The power strips shall be connected to their associated BKR on the PIB.
In case local regulations so permit, the BKR on the PIB may be replaced by a BKR in the PDP.

GGSIS-602 (GGSIS 3.2.6-3)
Should redundant equipment be fitted in the same console or console bay electrical power for the main and redundant equipment shall be provided through separate and independent power outlet strips (refer to GGSIS 3.2.7-4).

GGSIS-603 (GGSIS 3.2.6-11)
Power outlet strips shall be installed in such a way that these are protected against unauthorized access.

GGSIS-604 (GGSIS 3.2.6-6)

Consoles shall be supplied with a minimum of two fixed power outlet sockets, fed from the no-break power. Electrical protection of these outlets and their feeder circuit(s) shall be independent from the one used for any other electrical installation in the same or in another console.
Access to these outlets shall be possible without the need of opening console doors or access panels.
Note: These outlets are foreseen for connecting laptop computers or test instruments necessary for troubleshooting.

GGSIS-605 (GGSIS 3.2.6-4)
Power outlets shall meet with the DIN 49 440 ("Schuko") standard.

GGSIS-606 (GGSIS 3.2.6-5)
The number of outlets on each power outlet strip shall be sufficient to allow the connection of all the relevant equipment and provide some 30% of additional (spare) capacity, which shall not be less 2 additional outlets.

GGSIS-607 (GGSIS 3.2.6-7)
Each console shall be supplied with a ground bar and supporting brackets.

GGSIS-608 (GGSIS 3.2.6-8)
Console/console bay enclosures shall be fitted with an internal lighting wherever there would otherwise not be sufficient light available to enable work to be performed inside that enclosure.

GGSIS-609 (GGSIS 3.2.6-9)
The internal lighting of a console's/console bay's enclosure shall be automatically turned on and off when a door in the enclosure is respectively opened and closed. Inn case access to the inside of an enclosure requires the removal of a panel, internal enclosure lighting shall be controlled by a manual switch.

GGSIS-610 (GGSIS 3.2.6-10)
The internal light of the console's/console bay's enclosure shall be connected to the short break power.

3.2.7 Equipment in Consoles

GGSIS-612 (GGSIS 3.2.7-10)
Any equipment to be installed in a console shall be accommodated in its enclosure/the enclosure(s) of its console bay(s). This shall not apply to HMI devices (screens, keyboards, electronic mice etc) are excluded.

GGSIS-613 (GGSIS 3.2.7-11)
All console/console bay enclosures shall be capable of hosting equipment for installation in 19" racks and/or COTS computer equipment of a different design.

GGSIS-748 (GGSIS 3.2.7-12)
Video terminals and monitors shall be equipped with at least two Digital Interfaces (DVI or HDMI) input connectors.

GGSIS-614 (GGSIS 3.2.7-7)
The design of the console's/console bay's enclosures shall allow accommodation of equipment in a vertical multiple layer arrangement. In case of a corresponding implementation a minimum free space of one RU shall be observed between equipment.

GGSIS-615 (GGSIS 3.2.9-1)
The enclosure of any computer and other equipment to be installed in a console shall not exceed a width of 19".

GGSIS-616 (GGSIS 3.2.7-3)
Workstations and PCs should preferably be provided as 19" rack mountable units.
In case COTS computer equipment is provided in a tower or desk top housing, the console/console bay enclosure shall be engineered in such a way that serviceability, maintainability and cooling of this equipment does not adversely affect other equipment in the same console.

GGSIS-617 (GGSIS 3.2.7-1)
For equipment other than a COTS computer in tower or desk top housing, drawers and sub-rack chassis to be installed shall meet the 19" EIA-310-D standard with mounting dimension according to DIN 41 494 part 1.

GGSIS-618 (GGSIS 3.2.7-2)
Video terminals and monitors shall either support an aspect ratio of 4:3 or 16:9. In case of an aspect ratio of 4:3 the Video Card interface standard (i.e. the video outputs of the segment/element workstations) shall support a resolution of 1600 x 1200 (60Hz). In case of an aspect ratio of 16:9 the Video Card interface shall support a resolution of 1920 x 1080 (59/60Hz).
The following dimensions shall not be exceeded (monitor without stand): 510 mm/490mm/300 mm (width/height/depth).

GGSIS-619 (GGSIS 3.2.7-4)
As a principle, prime and back-up equipment shall not be installed in the same console, at least not in the same console bay enclosure.
Note: A justified deviation might be accepted in case of COTS, design re-use or other operational constraints.

GGSIS-620 (GGSIS 3.2.7-6)
The design of the console bays shall allow keyboards to be installed on slide mounted keyboard drawers, which can be moved into or under the console desk. Use of keyboard drawers shall be optional.

GGSIS-621 (GGSIS 3.2.7-5)
Unless otherwise requested by the supplying Segment deployment of the international QWERTY style keyboard with 105 keys (English UK lay out) shall be assumed.

GGSIS-622 (GGSIS 3.2.7-8)
The total amount of heat dissipated by all the equipment fitted to any multiple bay console (i.e. 2 or more bays) shall not exceed 1500 Watts.
Heat dissipation by all equipment installed in a single console bay enclosure shall not exceed 800 Watts (tbc).

GGSIS-623 (GGSIS 3.2.7-9)
The colour of visible equipment front panels, with the possible exception of COTS equipment, shall be compliant with RAL 7035.

3.2.8 Console Wiring

GGSIS-625 (GGSIS 3.2.8-1)
A patch panel shall be used to connect signal cables to a console.

GGSIS-626 (GGSIS 3.2.8-7)
Ports on LAN patch panels shall be compatible with male RJ45 (for CAT5/CAT6 cabling) or preferably TERA™ connectors.

GGSIS-627 (GGSIS 3.2.8-8)
For cables providing access to the Cabling Infrastructure for the Interchange of Operational Data (CIOD) a cable outlets strip installed underneath the console may fulfil the function of the console's patch panel.

GGSIS-628 (GGSIS 3.2.8-2)
Inside the console cables and wires shall be properly bounded and shall be strapped inside cable ducts in the rear lateral console area.
Excluded from this general rule are multiple wire cables with an external diameter in excess of 3/8". Such cables shall be strapped to suitable fixing hardware inside the console.

GGSIS-629 (GGSIS 3.2.8-3)
Inside the console signal and electrical power cables shall be routed in such a way that a maximum separation is established them.

GGSIS-630 (GGSIS 3.2.8-9)
Cables and individual wires connected to any equipment installed at the console shall be arranged such that they do neither obstruct maintenance access to this and other equipment installed nor to console infrastructure proper.

GGSIS-631 (GGSIS 3.2.8-5)
No cable shall be left loose; instead it shall be retracted to its respective cable tray and secured with cable ties.

3.3 CABLING AND CONNECTORS

3.3.1 General

GGSIS-634 (GGSIS 3.3.1-1)
Segment Primes shall provide the System Prime with 3 copies of local wiring diagrams that clearly show the source and destination of each individual cable

- within an Element rack or Sub-element rack
- between different racks of the same Element or Sub-element
- between Element racks and client workstations
- with the CIOD
- with the IRIG B distribution system (if applicable)\
- with antennae, which from part of the Element
- with other external components of the Element/Sub-element

If and as applicable, the naming convention as presented in Tables 5 and 5a shall be used to support the identification of each cable on the wiring diagrams.

GGSIS-635 (GGSIS 3.3.1-3)
The GDDN provider shall provide the System Prime with wiring diagrams, which include as the minimum:

- all access cables to the site's electrical power distribution system
- all access cables to the site's earthing system (protective earth)
- all inter-facility cabling with his local VSAT sites
- all access cabling to the Segment provided xNEs
- any other external signal cables (e.g. with his deployed NMS workstations)

GGSIS-636 (GGSIS 3.3.1-4)
The wiring diagrams shall be complemented by cable and connector lists.

GGSIS-638 (GGSIS 3.3.1-2)
All the cabling specifications shall contain the following details:

- Cable description
- Cable type
- Interface type
- Cable length
- Cable manufacturer
- Source connector type
- Source connector pin layout
- Destination connector
- Destination connector pin layout

GGSIS-639 (GGSIS 3.3.1-5)
The System Prime shall distribute copies of the above wiring diagrams to the Galileo ground segment maintenance provider (OPS&ILS) and to the local HE or HSP.

3.3.2 Cables

GGSIS-641 (GGSIS 3.3.2-1)
All cables shall be made from material which is compliant with the EN 60950 standard.

GGSIS-642 (GGSIS 3.3.2-2)
Each cable shall be identified by the code shown in Table 4 and Table 5 as applicable. This code shall allow an easy identification of:

- the element, site and the location where the cable is installed
- the cable number.

GGSIS-643 (GGSIS 3.3.2-3)
Cables shall be listed in the cabling list using the same code format shown in Table 4 and Table 5 as applicable.

3.3.3 Connectors

GGSIS-645 (GGSIS 3.3.3-1)
Each connector shall be identified in the connector list by a code as outlined in Table 6. This code shall allow identification of:

- the connector number within an equipment/unit
- the unit within the rack or console
- the rack or console where the unit is located.

Each connector proper shall carry an ID number, which is specific to respectively the Element and GDDN installation.

3.3.4 Rack-to-Rack and Rack-to-Console Cabling

GGSIS-647 (GGSIS 3.3.4-1)
Interface cables shall be without intermediate junction points.

GGSIS-648 (GGSIS 3.3.4-2)
Coaxial cables for RF, flexible and semi-rigid, shall comply with the MIL-DTH-17H.

GGSIS-649 (GGSIS 3.3.4-3)
LAN cables external to racks for a distance greater than 10m shall be of the solid conductor type. Network cables up to a length of 100 meters shall be preferably Class F/Fa. Cables provided by the Segment Primes and not forming part of the HSP provided CIOD shall, as a minimum, meet the specifications of CAT 5 (or CAT 6 TBD) unshielded twisted pair (UTP), suitable for 100Mbps network traffic. In particularly in noisy environments shielded twisted pair (STP) or foil twisted pair cable (FTP) shall be used. All cables shall be rated for installation in the plenum.

GGSIS-650 (GGSIS 3.3.4-4)
LAN cables longer than 100m and not provided by the HSP as part of the CIOD shall be of multimode fibre type.

GGSIS-651 (GGSIS 3.3.4-5)
Power cables and signal cables shall be laid in suitable, physically separated, site- provided trays.

GGSIS-652 (GGSIS 3.3.4-6)
Free running cables shall be strapped together. Cables running inside cable trays shall be strapped to suitable fixing points inside the cable tray.

GGSIS-653 (GGSIS 3.3.4-7)
Space between fixings shall be adequate to allow a neat installation for both vertical and horizontal runs.

GGSIS-654 (GGSIS 3.3.4-8)

No cables shall be suspended without support for more than 1.200 mm. Supports shall be fitted to avoid any undue mechanical strain on the cables and their terminations.

3.3.5 Inter Facility Links (IFLs)

GGSIS-656 (GGSIS 3.3.5-1)
Power cables and signal cables shall be laid in adequate, physically separated, site- provided IFL cable ducts.

GGSIS-657 (GGSIS 3.3.5-2)
Cables running in IFL cable ducts shall be marked every 10m as the minimum, for easy identification.

GGSIS-658 (GGSIS 3.3.5-3)
Power, coaxial, fibre optic and signal cables shall be of a type suitable for outdoor use and capable to sustain the environmental conditions of the site where they are installed at. Such cables shall be rodent protected.

GGSIS-659 (GGSIS 3.3.5-4)
HPA output cables of air dielectric type shall be adequately pressurized.

3.3.6 Earthing

GGSIS-661 (GGSIS 3.3.6-1)
Cabinets, racks, consoles and junction box ground bars shall be connected to the site- provided safety ground (earthing) point.

GGSIS-662 (GGSIS 3.3.6-2)
Connection to the ground bar of the earthing point of an equipment chassis shall be established through a properly colour-coded earthing wire.

GGSIS-663 (GGSIS 3.3.6-3)
Earthing shall be carried out in accordance with existing building and national electrical standards. Earthing systems shall fully conform to the minimum requirements as detailed in the IEC 364 standard.

GGSIS-664 (GGSIS 3.3.6-4)
All removable panels such as doors, sliding panels, side panels, blind panels etc, shall be connected to the common earthed chassis by an earth cable with a cross section of 2.5 mm^2.

GGSIS-665 (GGSIS 3.3.6-5)
All outdoors equipment shall be connected to the earthing point provided by the HE/HSP at the installation site. Connection to the earthing point shall be made through a properly colour-coded earthing wire with a cross section of 16mm^2

3.4 POWER DISTRIBUTION PANELS

Power Distribution Panels (PDP) provide the user interfaces to the site provided electrical power.

3.4.1 Positioning

GGSIS-669 (GGSIS 3.4.1-1)
Each shelter, each container and each equipment room at a remote Galileo site shall have be fitted with its dedicated PDP. PDPs shall be located as close as practically possible to the equipments, which electrical power shall be delivered to. PDPs and their location shall conform to the National Electric Installation Standards applicable to the respective site.

GGSIS-670 (GGSIS 3.4.1-1a)

Each equipment room and each operator room at a GCC shall be fitted with its dedicated PDP. This PDP shall be located as close as practically possible to the equipments, which electrical power shall be delivered to.

GGSIS-671 (GGSIS 3.4.1-2)
The lay-out of each PDP shall be documented and three copies of the documentation provided to the System Prime, who will submit one copy each to the Segment Primes/GDDN provider, whose equipment will be connected to the respective PDP.

GGSIS-672 (GGSIS 3.4.1-.2a)
The PDP documentation shall show the lay-out of the PDP in terms of the schematics of the distribution of electrical power from the site provided electrical power supply system to the respective user equipment. Furthermore, it shall identify which access points are assigned to which rack/other user equipment and which circuit breakers with which characteristics are installed to protect the corresponding circuits.
The naming convention shown in Table 7 shall be used to support the identification of PDP on its "As Built" documentation.

GGSIS-673 (GGSIS 3.4.1-3)
In case of any changes during installation, integration and verification of the Segments/GDDN and/or during their life-cycle, the "As Built" documentation shall be updated accordingly and the result re-submitted within one week. Hand-written updates shall bridge the period between the implementation of the change and the re- submission of the updated documentation.

GGSIS-674 (GGSIS 3.4.1-4)
The detailed PDP layout shall be coordinated for all Galileo sites between the HE/HSP and the Galileo System Prime.

3.4.2 Features

GGSIS-676 (GGSIS 3.4.2-1)
No-break power and short break power distribution shall be separated from each other, either by using separate PDPs or by assigning separate sections within the same PDP to no-break and short break power.

GGSIS-677 (GGSIS 3.4.2-2)
Circuit breakers for prime and redundant no-break power shall be located in separate PDPs, or in separate sections within the same PDP.

GGSIS-678 (GGSIS 3.4.2-4)
Separated distribution lines shall be connected to the PDP for the prime and redundant equipment.

GGSIS-679 (GGSIS 3.4.2-5)
All circuit breakers (BKR) installed in a given PDP shall be identified by the code presented in Table 8. As the very minimum this code shall allow the identification of:

- the rack, console or individual equipment being connected
- the location of the above.

GGSIS-680 (GGSIS 3.4.2-6)
Each PDP shall provide a minimum of 20% expansion capability or 2 circuit breakers each for No-Break 1, No-Break 2 and Short Break power, whatever number is larger.

GGSIS-681 (GGSIS 3.4.2-7)
As concerns its location and lay-out, each and every PDP shall conform to the National Electric Installation Standards applicable to the site of installation.

3.5 LABELLING

3.5.1 General

GGSIS-684 (GGSIS 3.5.1-1)
Each equipment (enclosure), such as rack/cabinet, console, PDP, junction box, other equipment, cable and connector shall be properly labelled.

GGSIS-685 (GGSIS 3.5.1-2)
Labelling shall be in accordance with the naming convention in the As Built documentation.

3.5.1.1 Equipment Enclosures

GGSIS-687 (GGSIS 3.5.1.1-1)
Each rack, cabinet, console, and other equipment enclosure shall be identified and labelled in accordance with the examples presented respectively in:

- Table 2 for racks, consoles and in general any type of cabinet and other enclosure
  Note: For practical reason, these labels may have to be fitted only upon installation at the installation site.
- Table 3 for equipment installed in racks, consoles and in general any type of cabinet and other enclosures
  Note: These labels should be fitted by the Element provider in factory.

GGSIS-688 (GGSIS 3.5.1.1-2)
Diagrams showing the internal wiring of a rack shall be provided in a format suitable for permanent display inside the rack.

GGSIS-689 (GGSIS 3.5.1.1-3)
Each equipment shall be identified as specified in Table 3.

GGSIS-690 (GGSIS 3.5.1.1-4)
Devices such as LAN switches, routers, network concentrators, workstations, PCs etc., which are fitted with multiple boards, shall be labelled with a unique name that identifies the complete equipment.

3.5.1.2 Cables

GGSIS-692 (GGSIS 3.5.1.2-1)
Each cable shall be identified by labels at both ends. Each label shall conform to the coding specification presented in:

- Table 4 for cables entering/leaving racks, cabinets, consoles and in general any type of enclosure :
- Table 5 for intra-rack cabling

GGSIS-693 (GGSIS 3.5.1.2-1a)
Deviating from requirement GGSIS 3.5.1.2-1 intra rack cabling may follow a scheme selected by the Element provider, provided

- his scheme does unambiguously identify cables and cable ends
- cables will never be extended outside the rack
- it is possible to unambiguously correlate the applied labels with a cabling list specific to this rack and delivered as part of the rack documentation.

GGSIS-694 (GGSIS 3.5.1.2-2)
Labels shall be fitted to the cable ends so as to be readable from left to right (i.e. bottom to top for vertically connected cables).

GGSIS-695 (GGSIS 3.5.1.2-4)
Labels contents shall be easily readable wherever the cables are installed.

GGSIS-696 (GGSIS 3.5.1.2-5)
The cable number as specified in Tabel 5 shall be repeatedly marked on the cable at minimum distances of 10 m.

3.5.1.3 Connectors

GGSIS-698 (GGSIS 3.5.1.3-1)
Each connector on an equipment, a patch panel or elsewhere in a rack/equipment enclosure shall easily identifiable.
NB: if the manufacturer's marking does not allow unique identification, an additional label, in line with the naming convention presented in Table 6, shall be affixed to the connector.

GGSIS-700 (GGSIS 3.5.1.3-3)
Compliance with the connector naming convention shall be mandatory for all connectors that support connections with entities external to the rack/equipment enclosure.
For connections internal to the rack/equipment enclosure other naming conventions and labels may be used as long as these enable unambiguous identification of connectors and as long as it is properly documented on a per rack/equipment basis.

GGSIS-701 (GGSIS 3.5.1.3-4)
The fields provided in Table 6 shall be used for documentation purposes. The individual connectors shall carry a connector number only (Jxxx). With the support of the documentation material, this number shall allow complete and unambiguous identification of the connector.

3.5.1.4 Power Distribution Panels

GGSIS-703 (GGSIS 3.5.1.4-1)
Each PDP shall be identified with a label in the front upper left corner and in the rear upper left corner, (the second part of this requirement to be ignored should the PDP be installed against a wall). In line with the coding presented in Table 7; the label shall allow identification of:

- the site where the PDP is installed
- location at the site where the PDP is installed (e.g. control room, equipment room, antenna equipment room, antenna shelter etc.)
- electrical power source (e.g. No-Break 1 and 2 (or UPS1, UPS2), Short Break, other)

GGSIS-704 (GGSIS 3.5.1.4-2)
Each circuit breaker (BRK) shall be identified by a label constructed according to the coding as presented in Table 8. This code shall allow identification of:

- the electrical power source the BRK is connected to
- the number assigned to this BRK within the PDP
- the destination device this BRK is to protect
- the location of that destination device.

GGSIS-705 (GGSIS 3.5.1.4-3)
Each instrument, meter and/or indicator shall be clearly labelled to identify its function.

RACKS / CONSOLES / ENCLOSURES NAMING CONVENTION						
YYY	Three characters shall be used to identify the site. (ref to Table 9)					
	YYYY (X)	Four letters shall be used to identify the location within the site (from Table 10), followed by one digit (X) in case there is more than one location at a site to which the same 4 letter identifier applies				
		Y	One character to identify: R = RACK, C= CONSOLE/TABLES, E= ENCLOSURES			
			YY	Two characters to identify the rack /console / enclosure number in a given location		
				YYYYYY	Up to Six characters shall be used to identify the facility. (ref. to Table 11 for GCS facilities and to Table 12 for GMS facilities).	
					YY	1 or 2 letters identifying the utilization of the equipment: • O= Operational or Product chain (GCS and GMS) • V= Validation chain (GCS only) • I= Integration chain (GCS only) • R= MTPF replica (MTPF chain) • OV= OPE and VAL chain (GCS only) • S= Spare Equipment located in the Stock Room

Example 1: Rack installed in the Galileo TTC Antenna Building at the remote site Korou housing TTC equipment.

From Table 9 Korou=KOU	From Table 10 TTC Antenna Building =	Rack=R	Rack Number	From Table 11 TTC
KOU	TANB	R	01	TTCF

Label Example: KOU_TANB_R_01_TTCF

Example 2: Rack installed in the GCS GCC in Oberpfaffenhofen housing SCPF and OPF elements of the validation chain.

From table 9 Oberpfaffenhofen = OBE	From Table 10 Equipment Room Unclassified 1 = ERUC1	Rack=R	Rack Number	From Table 11 Operation Preparation Facility=OPF Spacecraft and Costellation Preparation Facility=SCPF	Elements utilization: Training and validation chain
OBE	ERUC1	R	D8	OPF SCPF	V

Label Example: OBE_ERUC1_R_D8_OPF_V
SCPF_V

Table 2 - Racks, consoles and enclosures naming convention and labelling

EQUIPMENT NAMING CONVENTION		
1	YYY	Three letters shall be used to identify the site. (from table 9)
2	YYYY (X)	Four letters shall be used to identify the location within the site. (from table 10), followed by one digit (X) in case there is more than one location at a site to which the same 4 letter identifier applies
3	Y	One letter to identify: R=RACK C=CONSOLE E=ENCLOSURE
4	YY	Two characters to identify the Rack/Console/Enclosure in a given location.
5	XX	Two digits to identify the position in the rack, in RU from the top
6	YYYYYY	Up to six letters shall be used to identify the equipment type.
7	XX	Two digits shall be used to identify the equipment number, which is to indicate the instance of the equipment within the Element.
8	YYYYYY	Up to 6 characters as identified in Table 11 for GCS and table 12 for GMS respectivelly to identify, as applicable, the Element or sub-element that the equipment is integrated in. In case an Element or sub-element is composed of two or more racks, the last symbol of its acronym shall be a number, that identifies the rack within the Element or sub-element.
9	YY	1 or 2 letters identifiing the utilization of the equipment • O: Operational or Product chain (GCS and GMS) • V: Validation chain (GCS only) • I: Integration chain (GCS only) • R: MTPF replica (GMS only) • OV: OPE and VAL chain (GCS only) • S: Spare Equipment located in the Stock Room

Example: SCCF1-OPE Barrier Server 1 positioned in the rack with its upper part 8 RU from the top installed in Oberpfaffenhofen in Unclassified Equipment Room 1 Rack Number C1.

Site (Table 9)	Equipment Room 1 Unclassified (Table 10)	Rack = R	Rack Number	Position in the Rack 8th RU from the top	Equipment type ID (Table 13)	Equipment Number	Element or Sub element (Table 11)		Equipment Utilization
OBE	ERUC1	R	C1	08	BSRVR	01	SCCF		O

Labels Example

Part(a) *Part(b)*

This constitutes the part of the label specific to deployment. It shall be fitted to the equipment upon installation at final destination. This part of the label may be applied in the factory should the location where the element is to be deployed be exclusively dedicated to this element, or should the location be known prior to and without the chance of being changed at deployment	This constitutes the Element or sub-element specific part of the label. The element provider is expected to label in factory only the part (b) of the label that comences with "position in the rack". Note2: Element/Sub-element identifier (fields 8 and 9) may be omitted should the location where the element is deplyed be exclusively dedicated to this element.

Table 3 - Equipment naming convention and labelling

Field		INTER-RACK CABLE NAMING CONVENTION AND LABELLING		Notes
1	1st Line	Cable Number	WXXXXX	W + Five digits to identify the cable number
2		Cable Description	Fields 2 thru 9 shall not appear on the cable label. However these fields shall be reported in the wire diagram.	Free field used to give a brief description of the cable
3		Interface Type		Description of the interface type (e.g. RF, IF, signal , power, LAN etc)
4		Cable Length m.		End to end length of the cable in meters
5		Cable Manufacturer		Free field used to identify the cable manufacturer
6		Source connector type		Connector type (e.g. N, RJ 45, terminal block etc.)
7		Source connector pin layout		For multi wires cables only, to identify pin versus wire assignment and signal ID
8		Destination connector type		Connector type (e.g. N, RJ 45, terminal block etc.)
9		Destination connector pin layout		For non standard multi wires cables only, to identify pin versus wire assignment and signal ID
10	2nd Line	YYY	Three characters shall be used to identify the site.	
11		YYYYYY	Up to 6 characters as identified in Table 11 for GCS and table 12 for GMS respectively to identify, as applicable, the Element or sub-element that the equipment is integrated in. In case and Element or sub-element is composed of two or more racks, a number after the acronym shall be used to identify the the rack within the Element or sub-element.	
12		YYYY(x)	Four characters shall be used to identify the close end location within the site.(1) (1)For GCS GCC DLR Internal room number may be used for identification of the location.	
13		Y	One character to identify: R=RACK C=CONSOLE/TABLE E=ENCLOSURE at close end	
14		~~XX~~ YY	Two characters to identify the Rack/Console/Enclosure at close end.	
15		YYYYYY	Up to six characters to identify the equipment type at close end.	
16		XX	Two digits to identify the equipment number at close end	
17		JXXX	J + three digits to identify close end connection point	
18	3rd Line	YYY	Three characters shall be used to identify the site.	
19		YYYYYY	Up to 6 characters as identified in Table 11 for GCS and table 12 for GMS respectively to identify, as applicable, the Element or sub-element that the equipment is integrated in. In case and Element or sub-element is composed of two or more racks, a number after the acronym shall be used to identify the the rack within the Element or sub-element.	
20		YYYY(x)	Four characters shall be used to identify the close end location within the site.(2) (2)For GCS GCC DLR Internal room number may be used for identification of the location.	
21		Y	One character to identify: R=RACK C=CONSOLE/TABLE E=ENCLOSURE at far end	
22		~~XX~~ YY	Two characters to identify the Rack/Console/Enclosure at far end.	
23		YYYY	Four characters to identify the equipment type at far end	
24		XX	Two digits to identify the equipment number at far end	
25		JXXX	J + three digits to identify the far end connection poiny	

Cable labelling example: Cable of the TTCF located at Kiruna going from J5 on TTC patch panel 1 in Antenna Building, Rack2 to the input of TT&C HPA 1 in antenna enclosure 1. Line 2 shows the close end, line 3 shows the far end.

Patch Panel Side	TTC HPA Side
W 00099 KRN_TTCF_TANB_R_02__TPP_01_J005 KRN_TTCF_TANT_E_01_THPA_01_J001	W 00099 KRN_TTCF_TANT_E_01_THPA_01_J001 KRN_TTCF_TANB_R_02__TPP_01_J005

Table 4 - Naming convention and labelling of cables to and from a rack/enclosure/equipment

Field		INTRA-RACK CABLE NAMING CONVENTION AND LABELLING		Notes
1	First Line	Cable Number	WXXXXX	W + Five digits to identify the cable number
3		Cable Description	Fields 3thru 10 shall not appear on the cable label. However these field shall be reported in the wire diagram.	Free field used to give a brief description of the cable
4		Interface Type		Description of the interface type (e.g. RF, IF, signal , power, LAN etc)
5		Cable Length m.		End to end length of the cable in meters
6		Cable Manufacturer		Free field used to identify the cable manufacturer
7		Source connector type		Connector type (e.g. N, RJ 45, terminal block etc.)
8		Source connector pin layout		For multi wires cables only, to identify pin versus wire assignment and signal ID
9		Destination connector type		Connector type (e.g. N, RJ 45, terminal block etc.)
10		Destination connector pin layout		For non standard multi wires cables only, to identify pin versus wire assignment and signal ID
11	2nd line	YYYYYY	Up to 6 characters as identified in Table 11 for GCS and table 12 for GMS respectively to identify, as applicable, the Element or sub-element that the equipment is integrated in. In case an Element or sub-element is composed of two or more racks, the last symbol of its acronym shall be a number, that identifies the rack within the Element or sub-element	
12		YYYYYY	Up to six characters to identify the equipment type at close end.	
13		XX	Two digits to identify the equipment number (count) at close end	
14		JXXX	J + three digits to identify close end connection point	
15	3rd line	YYYYYY	Up to 6 characters as identified in Table 11 for GCS and table 12 for GMS respectively to identify, as applicable, the Element or sub-element that the equipment is integrated in. In case an Element or sub-element is composed of two or more racks, the last symbol of its acronym shall be a number, that identifies the rack within the Element or sub-element	
16		YYYYYY	Up to six characters to identify the equipment typeat far end	
17		XX	Two digits to identify the equipment number (count) at far end	
18		JXXX	J + three digits to identify far end connection point	
Cable labelling example: Cable 9 internal to the SCCF 1 rack connectig the Barrier Server 1 to the Rack Ntework Panel in the same rack.. Line 2 shows the close end , line 3 shows the far end.				
Server Side	W 00009 SCCF-1_BSRVR_01_J005 SCCF-1_NIP_01_J001	Network Inetrface Panel Side	W 00009 SCCF-1_NIP_01_J001 SCCF-1_BSRVR_01_J005	

Table 5 - Naming convention and labelling for intra rack cables

CONNECTORS NAMING CONVENTION AND LABELLING		
1	YYY	**Three characters shall be used to identify the site.** (ref to table 7 To Be Provided (TBP) for the list of the sites
2	YYYY	**Four characters shall be used to identify the location within the site.** (ref. to table 8 identification of the locations(TBC))
3	Y	**One character to identify: R=RACK C=CONSOLE E=ENCLOSURE**
4	XX	**Two digits to identify the Rack/Console/Enclosure in a given location.**
5	XX	**Two digits to identify the position in the rack, in RU from the top**
6	YYYY	**Four characters shall be used to identify the equipment type.** (ref. to table 11)
7	XX	**Two digits shall be used to identify the equipment number**
8		**J followed by three digits to identify the connector number wirthin the equipment**
9	YYYYYYYYY Y	**Up to ten characters to identify the connector type**
10		**Free field to describe connector pin layout**
Connectors shall be properly identified by a label containing the **J** number as shown in field 8. Fields 1 thru 10 shall be reported in the connector list ref to **GGSIS-988: GGSIS 3.3.3-1**.		
Connector Label Example **J 001**		

Table 6 - Naming convention and labelling for connectors

POWER DISTRIBUTION PANELS NAMING CONVENTION				
YYY	Three characters shall be used to identify the site. For the list of the sites ref to table 9.			
	YYYY(X)	Four letters shall be used to identify the location within the site. (from table 10), followed by one digit (X) in case there is more than one location at the site to which the same 4 letter identifier applies		
		PYYY	Three characters shall be used to identify: Power Distribution Panel =P UPS = UPS SHORT BREAK = SHB Combined UPS and SHB in separate section = U/S	
		XX	Two digits to identify the power distribution panel in a given location	
Example 1:UPS PDP installed in the GCCsite BETA Main Control Room (MCR)				
From table 9 Oberpfaffenhofen= OBE	From table 10 Equipment Room Unclassified 1= ERUC1	UPS PDP = PUPS	PDP 1	
OBE	ERUC1	PUPS	01	
Label Example	OBE__ERUC1_PUPS_01			
Example 2: Combined UPS/SHB PDP installed at the remote site ALPHA in ULS shelter 2.				
From table 9 Svalbard=SVA	From Table 10 Shelter =ESHT	Combined UPS /SHB PDP = PU/S	PDP 1	
ALP	ESHT	PU/S	01	
Label Example	SVA_USHT2_PU/S_01			

Table 7 - PDPs naming convention and labelling

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CIRCUIT BRAKERS NAMING CONVENTION AND LABELLING						
YYY	Three characters shall be used to distinguish between UPS and SHB Circuit Breakers					
	XX	Two digits shall be used to identify the circuit breaker number in a given PDP, or in a PDP given section				
		Y	One character shall be used to identify the device fed by the circuit breaker : R=RACK C=CONSOLE EN=ENCLOSURE EQ=EQUIPMENT			
			XXX	Three digits to identify the rack / console / enclosure /equipment number in a given location		
				YYYY (X)	From table 10 the location where the RK, CN, EN or EQ is located	
					YYYY	Four characters shall be used to identify if the breaker feds a prime or redundant chain of equipment Prime = PRME Redundant = RDNT
Example: UPS Circuit breaker number 12 feding rack 1 in shelter 1 prime equipment TTC up link chain						
Power Source	BKRR number	Rack	Rack number	Location	Prime or redundant equipment	
UPS	12	R	001	SHT1	Prme	
Label Example	UPS_12_R_001 SHT1_PRME					

Table 8 - Circuit breakers naming convention and labelling

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Site	Naming Convention	Site	Naming Convention
Ascension Island	ASC	Perth	PER
Azores Island	AZO	Pforzheim	PFO
Bahrain	BAH	Port Moresby	POM
Bangalore	BLR	Redu	RED
Bermuda	BER	Reunion	REU
Canberra	CBR	Reykjavik	REY
Cordoba	COR	Rio de Janeiro	RIO
Curacao	CUR	Santiago de Chile	AGO
Dakar	DAK	Santiago de Cuba	SCU
Djibouti	DJI	Shangai	SHA
Dubai	DUB	Singapore	SIN
Dunedin	DUN	St. Croix	STX
Easter Island	EAS	South Korea	SOK
Fairbanks	FAI	Suva	SUV
Falklands	FAL	Svalbard	SVA
Fiji	FIJ	Thule	THU
Fucino	FUC	Toulouse	TLS
Galapagos	GAL	Townsville	TSV
Guam	GUA	Trivandrum	TRV
Hawaii	HWI	Troll	TRO
Haikou	HAK	Tromso	TOS
Hartebeeshoek	HBK	Ulaanbaatar	ULN
Honolulu	HNL	US Naval Observatory	USN
Kiruna	ESR	Urumqi	URC
Kourou	KOU	Vancouver	VAN
Libreville (N'Koltang)	LBV	Wallis et Futuna	WEF
Lucknow	LUK	Wuhan	WUH
Madeira	MAD	Yellowknife	YEL
Malindi	MAL	Yogyakarta	JOG
Maspalomas	MAS	Jan Mayen	JMY
Noumea	NOU	Kerguelen	KER
Oberpfaffenhofen	OBE	St. Pierre & Miquelon	SPM
Papeete	PAP		

Table 9 - GCCs, TTC, ULS and GSS sites

Note: The following rules shall be applied for undefined locations:

- *For Galileo sites currently not yet defined use always the first three letters of the name as Site naming Convention. However, in case such sites are co-located with an existing satellite ground station, the 3-letter code of that ground station shall be applied.*
- *PTF Facilities shall use as site identifier GCC*

On Site Location	Location Identifier
ARchive **R**oom **1**	ARR1
ARchive **R**oom **2**	ARR2
Classified **T**raining & Validation **O**perations **R**oom [1)]	CTOR [1)]
CLEan **R**oom [1)] (at satellite factory or other satellite test facility)	CLER [1)]
COnfidential **O**perations **R**oom	COOR
Communications **S**ervice **P**rovider **R**oom (at a GSMC)	CSPR
Equipment **R**oom **C**lassified for **T**raining & Validation	ERCT
Equipment **R**oom **CO**nfidential	ERCO [1)]
Equipment **R**oom **RE**stricted	ERRE [1)]
Equipment **R**oom **SE**cret	ERSE
Equipment **R**oom **T**raining & Validation **C**onfidential [1)]	ERTC [1)]
Equipment **R**oom **T**raining & Validation **R**estricted [1)]	ERTR [1)]
Equipment **R**oom **T**raining & Validation **S**ecret	ERTS
Equipment **R**oom **T**raining & Validation **U**nclassified [1)]	ERTU [1)]
Equipment **R**oom **UnC**lassified [1)]	ERUC [1)]
EQuipment **SH**elter [1)]	EQSH [1)]
GDDN Control Room, **O**ffice and Warehouse (at GCC-I)	GDDO
GDDN Equipment **R**oom at a GCC [1)]	GDDR [1)]
GDDN Equipment Room at a Galileo remote site [1)]	GDDN [1)]
General **C**omms **E**quipment **R**oom (at a GSMC)	GCER
GSS Antenna (up to 3 per site)	GSS+ (+ = {1,2,3})
GSS Building	GSB
GSS Equipment Room (at a GSS Building)	GSS Note: Future installations should use the acronym GSR to identify this location.
GSS Equipment **R**oom (at a GSS Building)	GSR
GSS **PRS R**oom	PRSR
INTegration **A**rea (at a GSMC or industry site)	INTA
Integration **R**oom **UnC**lassified (at a GCC)	IRUC
LOGistics **A**rea	LOGA
MEETing Room	MEET [1)]
Main **C**ontrol **R**oom	MCR
NDIU Room or **A**rea (at satellite factory, test facility or launch site)	NDA

OFFiCe [1)]	OFFC[1)] Note: For use at non GCC sites
Office	OXXX Note: The XXX is a 3 character code is to be taken from the GCC office denomination (eg O101 at GCC-D or OA01 at GCC-I)
Planning and **O**ff line **A**nalysis **R**oom	POAR
Point **O**f **C**ontact Platforms **R**oom (at a GSMC)	POCR
Power Distribution and Generation **SH**el**T**er (at a Galileo remote site)	PSHT
Project **S**upport **R**oom (at a GSMC)	PSR
PTF **C**lock **R**oom (up to 3 per GCC, 0 to be used for access room)	PCL+….(+ = {0,1,2,3})
SEcurity **OF**fice	SEOF
SEcret **O**perations **R**oom	SEOR
SHel**T**er [1)]	SHT [1)]
Special **O**perations **R**oom [1)]	SOR [1)]
Training & Validation Operations **R**oom **CO**nfidential [1)]	TRCO [1)]
Training & Validation Operations **R**oom **RE**stricted [1)]	TRRE [1)]
Training & Validation Operations **R**oom **SE**cret	TRSE
Training & Validation Operations **R**oom **U**n**C**lassified [1)]	TRUC [1)]
TTC **ANT**enna	TANT
TTC **AN**tenna **B**uilding	TANB
ULS SHelter (up to 2 per site)	ULSH + (+ = {1,2})
ULS ANtenna (up to 4 per site)	ULN+ (+ = {1,2,3,4})
VPN Equipment **R**oom (at GSMC)	VPER
VSAT **H**ub Antenna **S**ite (for GDDN Network) [1) 2)]	VSHS [1)]

1) followed by a number should more than one facility with a corresponding function exist at a given site
2) note: GDDN Hub Antennas are to be identified as VSAH 1)

Table 10 : ON-SITE LOCATION IDENTIFIERS

Elements (and sub-elements of the SDDN)	Abbreviations
Central Archive/Back Up Facility	CAF
Central M&C Facility	CMCF
Computer Based Training	CBT
Common Network Equipment	CNE
Constellation Simulator	CSIM
Flight Dynamics Facility	FDF
SDDN Network Element (SNE) at a GCC	GCCSNE
SDDN External Entities Network Element	S-ENE
GCS Key Management Facility	S-KMF
ILS Tools for Classified Equipment	ILSCL
ILS Tools for Unclassified Equipment	ILSUC
SDDN LAN Hub at the GCC[1]	SLAN[1]
GCS-AIV[1]	GCSAIV[1]
Operations Preparation Facility	OPF
Satellite Data Dissemination Network	SDDN
Spacecraft and Constellation Planning Facilities	SCPF
Spacecraft Constellation Control Facility	SCCF[1]
Telemetry, Tracking and Control Facility	TTCF[1]
SDDN Network Element (SNE) associated to a TTCF	TTCSNE

Table 11 - Ground Control Segment Facilities

[1] Followed by a number should multiple racks needed for the same facility

Element (or sub-element of the MDDN)	Abbreviation
Assembly Integration and Verification Platform	AIVP
Galileo Sensor Stations	GSS
MDDN Network Element at the GCC	GCCMNE
MDDN External Entities Network Element	MENE
Ground Asset Control Facility	GACF
Ground Network Monitoring Facility	GNMF
Ground Network Monitoring Facility-S	GNMF=S
MDDN Network Element at a Galileo Sensor Station[1]	GSSMNE[1]
Infrastructure Service Capacity	ISC
Maintenance and Training Platform	MTPF
Element Replica within of the Maintenance and Training Platform	MTP(+Element Acronym)
MDDN LAN Hub at the GCC[1]	MLAN[1]
Message Generation Facility	MGF
Mission Key Management Facility	MKMF
Mission Support Facility	MSF
Mission Uplink and Control Facility	MUCF
Orbitography & Synchronization Processing Facility	OSPF
Precision Timing Facility CTT	PTFC
Precision Timing Facility KT	PTFK
PRS Key Management Facility	PKMF
PTF-Galileo Sensor Stations	PTFGSS
RF Environment Estimation Facility	REEF
Security Operation and Intelligence Facility	SOIF
Service Product Facility	SPF
MDDN Network Element at a Galileo Uplink Station	ULSMNE[1]
Galileo Uplink Station (C-Band) [1]	ULS[1]

Table 12 - Ground Mission System Facilities

[1] Followed by a number should multiple racks needed for the same facility

Equipment	Abbreviation
Equipment Type	*YYYY (Note 1)*

Table 13 - Type abbreviations

Note 1: The acronyms to identify the equipment type IDs may be up to 6 letters long.
The Element providers shall propose these acronyms; the Segment Prime shall harmonise the set of proposed acronyms in the sense that pieces of equipment that are identical between Element/sub-elements shall carry the same ID irrespective of the respective acronyms proposed by the individual Element providers. ESA reserve the right to harmonize acronyms between Segments should there be a corresponding need. The outcome of the harmonization processes will eventually be included in the table above

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