

ISO/TC 20/SC 14

Secretariat: ANSI

Voting begins on:
2020-04-13

Voting terminates on:
2020-06-08

Space systems — Requirements of launch vehicle (LV) to electrical ground support equipment (EGSE) interfaces

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/aae3ad25-54e6-4d0c-8646-c886ed8095a/iso-fdis-22772>

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.



Reference number
ISO/FDIS 22772:2020(E)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/aae3ad25-54e6-4d0c-8646-c886edb8095a/iso-fdis-22772>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	1
5 Interface design principles	2
5.1 General.....	2
5.2 Design process.....	2
5.3 Design principles.....	3
6 Interface design requirements	4
6.1 General.....	4
6.2 Types of interface implementation.....	4
6.2.1 Bus interface.....	4
6.2.2 Digital I/O interface.....	4
6.2.3 Analog interface.....	5
6.2.4 AC/DC power supply interface.....	5
6.2.5 RF/electromagnetic interface.....	5
6.3 Interface connectors.....	5
7 Induced environment	6
7.1 General.....	6
7.2 Mechanical environment.....	6
7.2.1 Low frequency vibration.....	6
7.2.2 Random vibrations.....	6
7.2.3 Acoustic noise.....	6
7.2.4 Shock.....	6
7.3 Thermal environment.....	6
7.3.1 General.....	6
7.3.2 Thermal environment during pre-launch phase.....	7
7.3.3 Thermal environment during launch phase.....	7
7.4 Radio and electromagnetic environment.....	7
7.4.1 Launch-vehicle-generated.....	7
7.4.2 EGSE-generated.....	7
7.4.3 Launch-range-generated.....	7
8 Verification analysis and test	7
8.1 Verification analysis methods.....	7
8.2 Verification analysis implementation.....	8
8.2.1 Feasibility analysis.....	8
8.2.2 Simulation analysis.....	8
8.2.3 Verification.....	8
8.2.4 Launch preparation state evaluation.....	8
9 Interface documentation requirements	8
9.1 Interface requirements document.....	8
9.2 Interface control document.....	8
10 Interface inspection and operation at launch site	9
10.1 Documentation and confirmation.....	9
10.2 Interfaces inspection verification.....	9
10.3 Combined operations.....	9
10.4 Safety requirements.....	9
Bibliography	10

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides design requirements of electrical interfaces between launch vehicles (LV) and electrical ground support equipment (EGSE) for launch system or interface designers. The defined interface type and requirements constitute the LV to EGSE interface control document (ICD).

The purpose of this document is to specify standardized requirements and help the designer specify the LV to EGSE ICD and subsequently help users to clearly understand the designer's intentions, and hence minimize costs and reduce risk from errors resulting from miscommunication. This document does not consider interface design details and does not limit LV or EGSE organizational requirements to specify a unique interface.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/aac3ad25-54e6-4d0c-8646-c886eddb8095a/iso-fdis-22772>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/aac3ad25-54e6-4d0c-8646-c886edb8095a/iso-fdis-22772>

Space systems — Requirements of launch vehicle (LV) to electrical ground support equipment (EGSE) interfaces

1 Scope

This document provides requirements for launch system designers or interface designers regarding interfaces between LV and EGSE, which is used to support on-line processing. It defines electrical interface types, design requirements, environment requirements, verification methods (analyses and tests), and interface check operation requirements.

This document is intended to minimize design costs and reduce risks from errors resulting from miscommunication. It does not limit LV or EGSE organizational requirements to specify a unique interface.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

electrical ground support equipment EGSE

non-flight electrical equipment or system used to support on-line processing and associated launching services

3.2

interface control document ICD

formal means of describing the inputs and outputs of a system, the interfaces among systems, or the protocols among physical or electronic elements of an entity

[SOURCE: ISO/TR 16158:2013, 3.6]

4 Abbreviated terms

The following abbreviations are used in this document.

LV	Launch vehicle
EMC	Electromagnetic compatibility
IRD	Interface requirements document
I/O	Input/Output

AC	Alternating current
DC	Direct current
RF	Radio frequency
CAN	Controller area network
FC	Fibre channel
TM	Telemetry
TC	Telecontrol

5 Interface design principles

5.1 General

The LV to EGSE interface requirements presented in this standard may be tailored depending on negotiations between LV contractor and EGSE contractor.

In general, the LV to EGSE interface design shall include the following requirements:

- a) control requirements for the LV electrical system;
- b) test requirements for the LV electrical system;
- c) power supply requirements for the LV electrical system.

5.2 Design process

The design shall be based on an LV to EGSE interface requirement analysis. The design process shall follow the general workflow shown in [Figure 1](#).

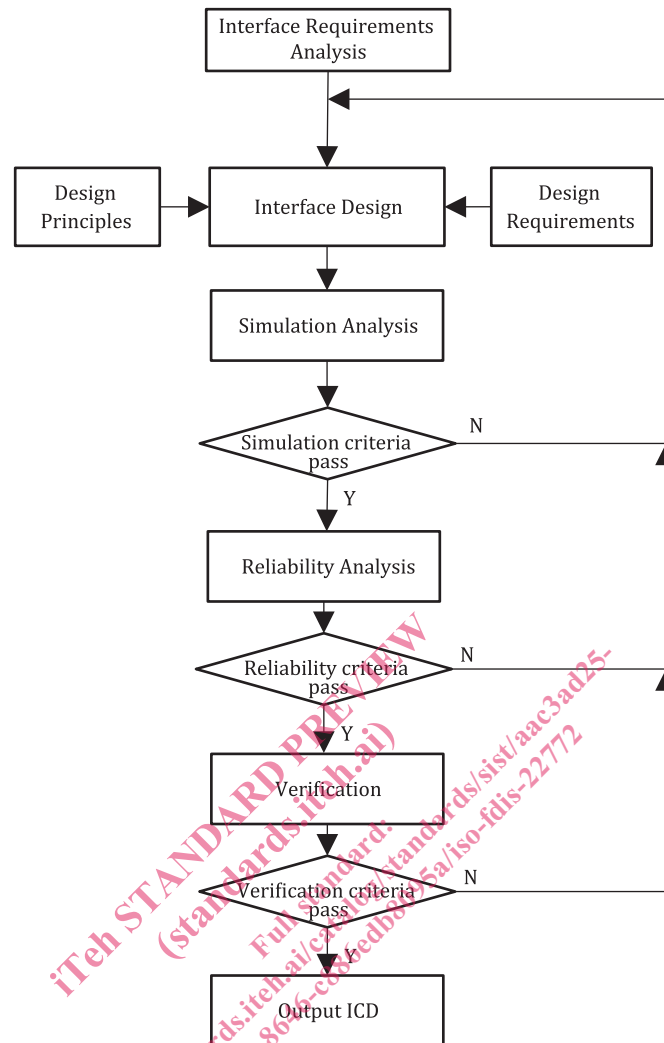


Figure 1 — Launch vehicle to electrical ground support equipment interface design process

5.3 Design principles

The design principles are as follows.

- a) The interface signal definition shall be clear and unambiguous.
- b) A ready-made standard interface must be adopted to decrease the number of interface types.
- c) The necessary provisions should be put in place for development and implementations of measures aimed at preventing mixes in connection between equipment communications and the same type component items.
- d) Electrical performance shall be matched between sources and loads.
- e) Isolation measures shall be taken to prevent mutual influences among the equipment or systems under a failure state.
- f) Electromagnetic compatibility shall be considered, including but not limited to, filtering, shielding, and grounding.
- g) Redundancy design shall be considered.