

---

---

**Space systems — Interface control documents between ground systems, ground support equipment and launch vehicle with payload**

*Systèmes spatiaux — Documents de contrôle d'interface entre les systèmes au sol, l'équipement de soutien au sol et le véhicule de lancement de charge utile*

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

[ISO 17689:2015](https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015)

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>



**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 17689:2015

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, 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  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Terms and definitions</b> .....	<b>1</b>
<b>3 General</b> .....	<b>3</b>
<b>4 Requirements to ICD execution</b> .....	<b>7</b>
4.1 Requirements to item ICD execution.....	7
4.2 Requirements to execution of summary list of launch site ICD.....	14
<b>5 ICD development, validation and verification stages</b> .....	<b>14</b>
5.1 Working stages.....	14
5.2 Verification and validation procedures.....	16
<b>Bibliography</b> .....	<b>17</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 17689:2015](https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015)

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>

## 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](http://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](http://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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

ISO 17689:2015

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>

## Introduction

This International Standard is intended for application at realization of interstate, intergovernmental or non-governmental space activity, between operators of some country and different organizations on the basis of their space activity contracts.

Interfaced (connected) devices development by two and more designers (commands, organizations, developers of other specializations, etc.) creates a need for coordination between them to prevent interfaces discrepancy for unlimited possibilities of design (construction) perfection during the creation of space technics.

This International Standard establishes basic requirements for interface control documents (ICD) writing and interface control procedures for the following items included in launch system: payload, launch vehicle, ground support equipment (according to ISO 14625:2007) and launch site (buildings with technical systems). Notably

- a) ICD between payload and launch vehicle (according to ISO 15863:2003),
- b) ICD between ground support equipment and payload (this International Standard),
- c) ICD between ground support equipment and launch vehicle (this International Standard),
- d) ICD between items of ground support equipment (this International Standard), and
- e) ICD between ground support equipment and launch site (this International Standard).

ICD enables systematic creation (development), operation and management of interfaces b) to e) at all stages of life cycle of launch system. It is necessary for the purpose of guarantee of launch system normal functioning, prevention of accident and reduces of acceptable risk at joint space projects and services of space vehicles insertion into space.

Application of this International Standard at design and development stages will improve control and compatibility of all interfaces [b) to e)].

Application of this International Standard at operation stage will improve launch system safety and facilitate control of interfaces.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 17689:2015

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>

# Space systems — Interface control documents between ground systems, ground support equipment and launch vehicle with payload

## 1 Scope

This International Standard is applied for organizations developing ground support equipment and also for operators performing space activity.

Interface control documents format defined here does not contain the descriptions regarding various properties of ground support equipment (i.e. performance, functions or endurance to launch mechanical environment or quality assurance provisions) which are defined in technical specifications.

Control of interfaces, independently of its frequency or depth, cannot replace stages of parameters definition of high-quality production and development of technical requirements of project, design and development. Interfaces control is used as a control process that can provide necessary verification of successful finishing of design at a stated in contract period.

This International Standard establishes basic requirements for interface control documents (ICD) writing and interface control procedures for the following items included in launch system: payload, launch vehicle, ground support equipment (according to ISO 14625:2007) and launch site (buildings with technical systems). Notably

- a) ICD between payload and launch vehicle (according to ISO 15863:2003),
- b) ICD between ground support equipment and payload (this International Standard),
- c) ICD between ground support equipment and launch vehicle (this International Standard),
- d) ICD between items of ground support equipment (this International Standard), and
- e) ICD between ground support equipment and launch site (this International Standard).

## 2 Terms and definitions

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

### 2.1

#### **interface control document for ground support equipment**

document which describes mechanical, hydraulic, pneumatic, thermal, electric and other parameters of interfaces between ground support equipment and launch vehicle, items of ground support equipment, ground support equipment and launch site objects (building constructions with technical systems), and which is used to control these parameters

### 2.2

#### **ground support equipment**

units and systems necessary for the prelaunch operations and operations for launch of payload and launch vehicle (rocket fuelling systems, gas supply systems, thermostating systems, launch pad, units for LV installation on launch pad, ground support equipment control systems, etc.)

2.3

**launch site**

site necessary for the prelaunch and launch operations of a space vehicle and for the in-flight operations during the launch phase

[SOURCE: ISO 14620-2:2011, 3.16]

2.4

**launch system**

system made up of a launch vehicle, the associated launch complex, launch site, payload, ground support equipment and associated airborne equipment (including software), control systems, navigation system, trajectories, procedures, necessary personnel, and any other associated items

[SOURCE: ISO 14620-2:2011, 3.18]

2.5

**launch range**

systems, facilities and means, not part of the launch system, required to provide the necessary service and support for carrying out a launch campaign and to ensure safety and security of persons, assets and protection of the environment

2.6

**launch complex**

site assigned to or owned by a launch vehicle operator to operate a launch vehicle

[SOURCE: ISO 14620-2:2011, 3.14]

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

2.7

**launch vehicle**

any vehicle constructed for the purpose of operating in outer space, or placing one or more payloads in outer space, as well as any suborbital rocket

[ISO 17689:2015](#)

[https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-](https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015)

[SOURCE: ISO 14620-2:2011, 3.19]

[712a9e4b5844/iso-17689-2015](https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015)

2.8

**payload**

space vehicle or group of space vehicles on a single-launch vehicle intended to perform a specified function or series of functions

[SOURCE: ISO 14620-2:2011, 3.24]

2.9

**ground safety**

arrangements intended to reduce and control safety risks identified in ground prelaunch and launch activities of a manned or unmanned space vehicle

Note 1 to entry: Arrangements include protecting people, public and private property, and the environment and completing and adjusting the national regulatory laws related to occupational safety and health, workers, environment, space, etc.

[SOURCE: ISO 14620-2:2011, 3.8]

2.10

**hazard**

existing or potential condition of an item that can result in a mishap

Note 1 to entry: This condition can be associated with the design, fabrication, operation, or environment of the item, and has the potential for mishaps.

[SOURCE: ISO 14620-2:2011, 3.9]



### 2.11 mishap accident

unplanned event or series of events resulting in damage or potential for damage

Note 1 to entry: While sometimes used synonymously, an “accident” generally means a severe type of “mishap”.

[SOURCE: ISO 14620-2:2011, 3.20]

### 2.12 acceptable risk

safety risk, the severity and the probability of which may be reasonably accepted by humanity, without durable or irreversible foreseeable consequence on health, Earth, and the environment, at the present time and in the future

EXAMPLE A safety risk may be acceptable for crew members of a manned space vehicle when it is comparable to that of test pilots, for the personnel participating in hazardous activities when it is comparable to that of industrial workers, for people, public and private property, and the environment, when it is comparable to that of other hazardous human activities (e.g. high-speed surface travel).

[SOURCE: ISO 14620-2:2011, 3.1]

### 2.13 interfaces controller

specialist in the scope of launch complexes or organization of space activity which controls ICD observance by organization-executor at realization of contract of space technics creation

Note 1 to entry: Interface controller may be indicated in contract between space technics leading developer and executors. Leading developer can let a contract with controller.

## 3 General

ISO 17689:2015

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>

**3.1** ICD for ground support equipment is developed as separate document for each part included in launch system: payload, launch vehicle, items of ground support equipment, launch site (building constructions with technical systems):

- a) ICD between ground support equipment and payload (this International Standard);
- b) ICD between ground support equipment and launch vehicle (this International Standard);
- c) ICD between items of ground support equipment (this International Standard);
- d) ICD between ground support equipment and launch site (this International Standard).

The leading enterprise-developer of ground support equipment is responsible for the development of a list of ICD for this equipment.

The leading enterprise-developer of a launch site supervises types, quantity and location of interfaces of ground support equipment items which were developed by the enterprises according to ICD for items.

The developers of items of a launch site develop ICD and coordinate them with other enterprises which are developers of the items which are interfaced.

**3.2** The initiative in determination of interfaces design belongs to the enterprise having a ready (existing) item or element of the device in relation to the enterprises which should develop an interfaced item or device at participation in the joint project.

The organization which performs launch services of space vehicles gives the full information about interfaces of launch pad to the organization which orders the launch services.

The payload authorities shall provide interface condition to operator.

**3.3** It is necessary to have a note in the technical specification about presence of ICD on item.

Each interface shall have the code which contains the basic information about it.

EXAMPLE ICD XXXX-YYYY-000-AAA – interface code, where

- XXXX is the source item code,
- YYYY is the consumer item code,
- 000 is the interface number, and
- AAA is the code of place where the interface is located.

After interface number, a reference number or code (in brackets) may indicate the drawing (list) where this interface is figured.

EXAMPLE A110-B010-001-005 (A110.08.03.01).

Number of symbols and use of figures and letters in index should correspond to approved codes in technical specifications.

**3.4** ICD can be drawn in the form of text, in the form of picture (drawing) or in complex (text and picture) form.

The specific indicator like the letter «G» may be added separately to picture (drawing) code (for example, ICD XXXX-YYYY-000-AAA-G).

The internal ICD is developed when there are many interfaces inside items of ground support equipment which need to be controlled.

For simple search, it is permitted to indicate item of ground support equipment to which the interface belongs.

<https://standards.iteh.ai/catalog/standards/sist/9aba98ad-fb1d-4655-90b6-712a9e4b5844/iso-17689-2015>

**3.5** The general order of drawing up ICD as follows.

Launch complex developers shall order process of drawing up ICD.

The general requirements for an ICD are as follows:

- ICD provides distribution of work and responsibility between developers;
- ICD structure has hierarchical construction (see [Figure 2](#));
- ICD directs the control of works of developers during creation of interfaces.

Scheme of division of components launch site is presented in [Figure 1](#). The responsible developers are defined for working out and handing in to co-authors of requirements to interfaces of launch system components.

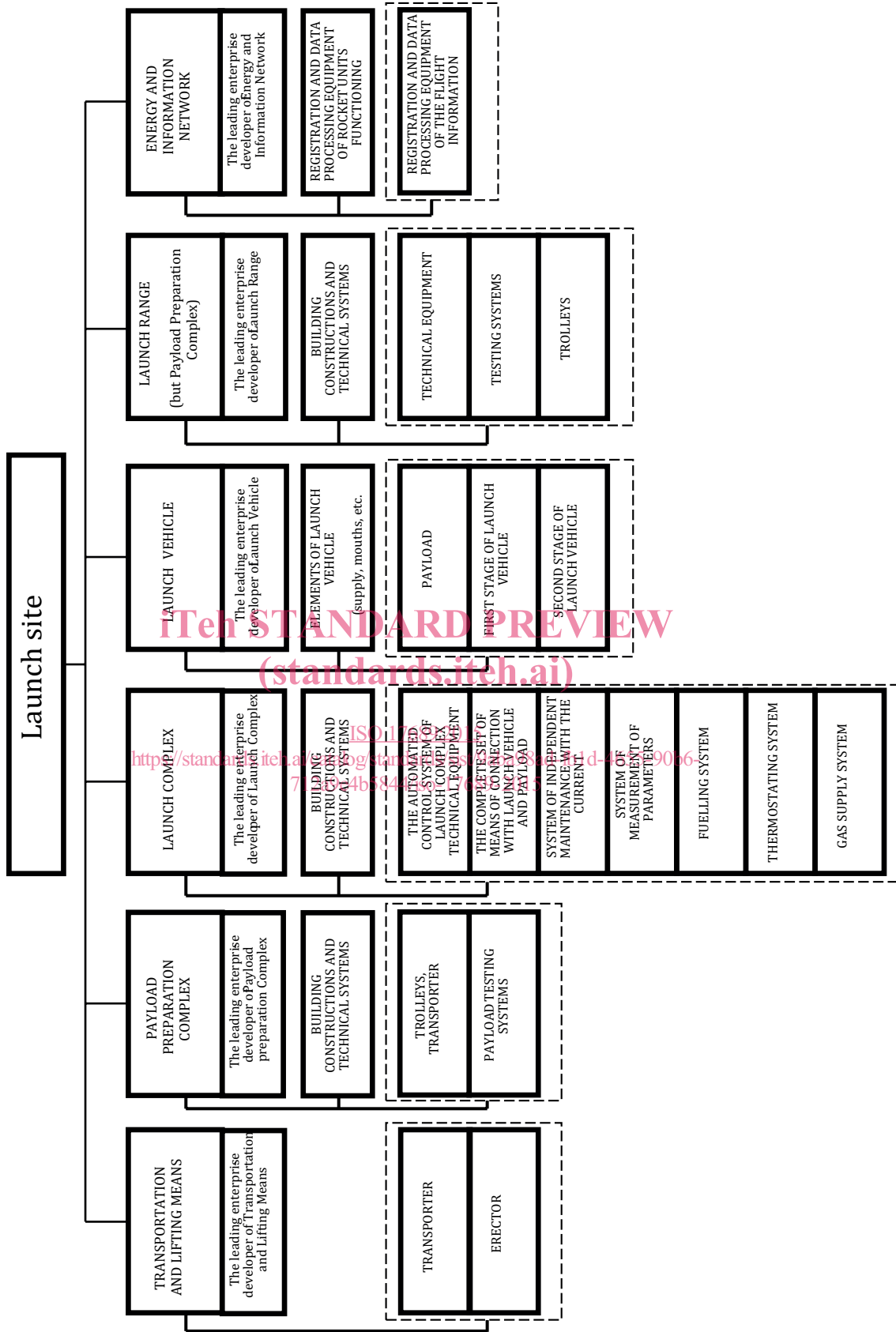


Figure 1 — Example of launch site structure