
Space systems — Safety requirements —

Part 2:

Launch site operations

Systèmes spatiaux — Exigences de sécurité —

Partie 2: Opérations sur le site de lancement

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14620-2 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

This second edition cancels and replaces the first edition (ISO 14620-2:2000), which has been technically revised.

ISO 14620 consists of the following parts, under the general title *Space systems — Safety requirements*:

- *Part 1: System safety*
- *Part 2: Launch site operations*
- *Part 3: Flight safety systems*

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Introduction

Space activities, carried out within the framework of outer space treaties adopted by the United Nations, may cause harm to people and create damage to public and private property and the environment. The variety of professional disciplines linked to space activities and the legal liabilities incumbent on countries require international regulations to protect Earth populations against the consequences of a possible mishap caused by these activities. The international treaties listed in Annex A define the liabilities for damage related to space activities.

This part of ISO 14620 pertains to exposed people (including populations and personnel), launch systems, manned or unmanned space vehicles, operations carried out on or from a launch site and associated procedures, natural environment, etc., during prelaunch (integration, test, checking, preparation, etc.) and launch activities.

This part of ISO 14620 is intended to be applied by any country, by any international organization, whether governmental or non-governmental, and by any operator undertaking space activities within the framework of outer space treaties adopted by the United Nations.

This part of ISO 14620 is intended to be applied by agencies, enterprises, manufacturers, customers, designers, operators, facility authorities, launch service providers, etc., participating in the activities carried out on or from a launch site, unless more restrictive requirements are imposed by the national regulations in effect on the launch site.

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Space systems — Safety requirements —

Part 2: Launch site operations

1 Scope

This part of ISO 14620 specifies requirements for the safety liabilities of countries undertaking space activities or allowing operators to perform space activities on or from their territory under outer-space treaties adopted by the United Nations. It defines the safety responsibilities for the operators involved in commercial or non-commercial space launch activities. This part of ISO 14620 establishes the overall safety requirements to be observed on a launch site for prelaunch (integration, test, checking, preparation, etc.) and launch operations of a space object. It provides the basic principles to enable any operator to implement its own safety methods, tools and procedures to ensure the safety of people and personnel, public and private property, and the environment, in a consistent and uniform manner.

2 Normative reference

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9000:2005, *Quality management systems — Fundamentals and vocabulary*

ISO 14620-1:2002, *Space systems — Safety requirements — Part 1: System safety*

ISO 14620-3:2005, *Space systems — Safety requirements — Part 3: Flight safety systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000 and the following apply.

3.1

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).

3.2

authorization

permission granted to an operator by a responsible authority to perform specified space activities

NOTE Space activities include conducting space operations, conducting launch operations, operating one or more sites, and operating one or more space vehicles on or from one or more launch sites.

3.3

damage

loss of human life, personal injury or other health impairments, occupational illness, total or partial loss of public or private property, or degradations caused to the aforesaid property or to the environment

**3.4
dangerous area**
area associated with a mishap or a potential mishap, inside which the consequences are catastrophic or critical

**3.5
failure**
termination of the ability of an item to perform the function for which it was designed

**3.6
flight plan**
plan related to the in-flight launch vehicle, including data directly or indirectly related to launch site safety

**3.7
flight safety**
arrangements intended to control safety risks from launch through the flight of a space object, and to protect people, public and private property, and the environment, against any damage that may possibly be caused by in-flight manoeuvres of this space object

**3.8
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 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.

**3.9
hazard**
existing or potential condition of an item that can result in a mishap

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NOTE This condition can be associated with the design, fabrication, operation, or environment of the item, and has the potential for mishaps.

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**3.10
hazardous**
property of an item and its environment which provides the potential for mishaps

**3.11
inhibit**, noun
verifiable design feature intended to prevent a hazardous situation from occurring, that provides an interruption between an energy source and a function actuator

EXAMPLE An inhibit can be a function, a product, a hardware, a software, a physical property, or a technological device.

**3.12
item**
anything which can be individually described and considered

EXAMPLE An item may be an activity, an operation, a process, a procedure, a product, a system, an organization, a person, or any combination thereof.

**3.13
launch**
initial action to place, or attempt to place, a launch vehicle and payload, if any, in a suborbital trajectory, in Earth orbit in outer space, or otherwise in outer space

**3.14
launch complex**
site assigned to or owned by a launch vehicle operator to operate a launch vehicle

3.15**launch phase**

period which begins when the launch vehicle is no longer in physical contact with the launch complex or the carrier aircraft and continues up to the end of the mission assigned to it including disposal and passivation actions

NOTE The launch phase ends when any planned and unplanned physical contact with the ground or destruction or breakdown of the vehicle takes place.

3.16**launch site**

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

3.17**launch site country**

country that has jurisdiction over a specified launch site

3.18**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

3.19**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

3.20**mishap****accident**

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

NOTE While sometimes used synonymously, an "accident" generally means a severe type of "mishap".

3.21**national regulatory laws**

set of official statutes of a country

NOTE The official statutes include constitution, law, decree, administrative order, code, regulation, etc.

3.22**operation**

technical, industrial, or implementing activity, or any combination of such activities, performed by one or more entities for the purpose of contributing to a specified objective

3.23**operator**

governmental or non-governmental entities, international organization, or natural person carrying out a space operation independently and under its responsibility

3.24**payload**

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

3.25**residual safety risk**

safety risk associated with the hazards and/or hazardous situations remaining in a space system after eliminating hazards and hazardous situations as much as practical, and reducing the unacceptable safety risks

3.26

responsible authority

ministry, department, agency, subsection, or office of a government or international governmental organization, which is responsible for space activities including, but not limited to, launch operations in a specified location or country

3.27

risk

quantitative or qualitative measure of the severity of a potential damage and the probability of incurring that damage

3.28

safe

property of an item and its environment that limits its potential for damage to an acceptable risk

3.29

safety

arrangements intended to control safety risks stemming from activities contributing to the flight of a manned or unmanned space object, in order to ensure the protection of people, public and private property, and the environment, against any damage caused by these activities to the surface of Earth or to in-flight aircraft, or in atmospheric or outer space

3.30

safety risk

measure of the potential consequences of a hazard considering the probability of the associated mishap, the harm caused to people and the damage caused to public and private property and the environment

NOTE 1 The safety risk is defined to be differentiated from political, financial, industrial, project, and other risks.

NOTE 2 An example of a safety risk is the expected number of casualties.

3.31

site

land, ground/airborne/marine facilities, equipment, utilities and infrastructure assigned to or owned by an operator on a launch site

3.32

space object

space vehicle of artificial earthly origin and any of its component parts, except space debris, if any

3.33

space vehicle

manned or unmanned vehicle constructed or assembled for the purpose of manoeuvring, moving, operating, or being placed in outer space

NOTE A space vehicle can be a launcher, a rocket, a payload, a space capsule, a space shuttle, a space plane, a space station, etc., or any assembled combination thereof.

3.34

specific authorized operator

entity allowed or licensed to conduct a space operation in an independent way according to relevant applicable space law

3.35

system

set of interdependent elements constituted to achieve a given objective by performing a specified function

3.36

waiver

written and duly signed authorization given on an occasional, exceptional, provisional and limited basis, relative to the acceptance of a hazardous item that does not comply with the applicable safety regulations or rules

4 Operator's safety responsibilities

4.1 General

The following subclauses define the general allocation of the safety responsibilities and requirements for the prelaunch (integration, test, checking, preparation, etc.) and launch operations related to a launch system. It is understood, in this part of ISO 14620, that each operator is either duly authorized or entered into an appropriate contract (specific agreement, commercial contract, etc.) with a responsible authority or an authorized operator. Several operators (e.g. launch site operator, site operator, launch vehicle operator, payload operator) can operate simultaneously on the same launch site. They can be concerned either with the same launch system or with different systems.

4.2 Occupational safety and health

Any operator carrying out operations on a launch site shall respect and apply the national occupational safety and health regulations of the launch site country.

4.3 Ground and environment safety

4.3.1 Ground safety operator

Ground safety responsibilities and requirements vary among operators. Generally, the different operators should determine themselves how safety concerns should be met. However, on the same launch site, the following conditions or criteria may exist:

- a) several operators can carry out hazardous operations simultaneously;
- b) hazardous operations can cause harm to personnel or damage to private or public property (external to the launch site facilities) or the environment;
- c) hazardous operations carried out by one operator can cause harm to personnel or property damage to another operator;
- d) some hazardous operations are performed by several operators.

Therefore, ground safety responsibilities and requirements shall be allocated between a specific operator selected from all the authorized operators, the ground safety operator in this part of ISO 14620, and other operators carrying out prelaunch (integration, test, checking, preparation, etc.) or launch operations on the launch site.

4.3.2 Ground safety operator responsibilities

Some ground safety responsibilities are general enough to be specified in this part of ISO 14620.

The ground safety operator shall be approved by the national responsible authority of the launch site country to perform the activities related to its ground safety responsibilities.

The ground safety operator shall be responsible for:

- a) identifying, supervising and coordinating the allocation of ground safety responsibilities and requirements among the operators;
- b) specifying ground safety rules to be applied by the operators meeting one or more of the previous criteria (as described in 4.3.1) associated with the hazardous operations;
- c) verifying the application of the specified rules;
- d) approving the schedule of hazardous operations meeting one or more of the previous criteria (as described in 4.3.1);