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Space systems — General test requirements for launch vehicles

Systèmes spatiaux — Exigences générales d'essai pour véhicules lanceurs

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Foreword

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ISO 24917 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Introduction

This International Standard provides space launch vehicle customers, contractors and manufacturers with general requirements for test types and programmes for space launch vehicles and rocket units (modules) to be used in the documentation associated with their test activity.

This International Standard is intended to help reduce the development time and cost of space launch vehicles and rocket units, and to enhance their quality and reliability through the use of common, optimized and approved requirements in the space launch vehicle test scope and organization.

Space systems — General test requirements for launch vehicles

1 Scope

This International Standard establishes general test requirements for launch vehicles equipped with liquid-propellant engines, launched from stationary ground-, sea- and air-based launchers, in all phases of their development.

2 Normative references

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 14302, *Space systems — Electromagnetic compatibility requirements*

ISO 14303, *Space systems — Launch-vehicle-to-spacecraft interfaces*

3 Terms and definitions

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

3.1
space-rocket complex
set of a space vehicle or space launch vehicles with functionally interconnected means and the constructions intended for transportation, storage, maintenance service, preparation, launching and flight control of space launch vehicles on a trajectory of launching of payload

3.2
space rocket
space launch vehicle plus space nose section integration

3.3
space launch vehicle
component of the space rocket designed for payload injection in a pre-assigned trajectory or orbit

3.4
rocket unit
space launch vehicle stage including the upper stage vehicle, body, propulsion system, control systems or control system elements, rocket units separation aids and telemetry hardware

3.5
upper stage vehicle
upper stage of flight vehicle capable of injecting a space vehicle or vehicles into their orbit from the sub-orbital trajectory that resulted from operation of a launch vehicle

3.6
space nose section
set of a space vehicle with fairing and adapter and upper stage vehicle

NOTE Upper stage vehicle can be absent.

3.7
fairing
technical device intended for protection of a space vehicle or of a space nose section from external influences at transportation of the space launch vehicle on a launcher and on a start of the space launch vehicle and on a trajectory of launching into an orbit of a space vehicle

3.8
integration site
equipment and facility designed for launch vehicle storage, assembly, testing, preparation, maintenance, servicing and preparation for transportation to the launch pad

[ISO/TR 17400:2003, definition 3.1]

3.9
launch pad
equipment and facility designed to provide for the pre-launch and launch operations of spacecraft

[ISO/TR 17400:2003, definition 3.3]

3.10
launch pad for space launch vehicle
device intended to maintain the space launch vehicle in readiness for launch, and for the launch itself

3.11
technical project on development of a product
initial document establishing a complex of technical requirements to created products, and to the contents, volume and terms of performance of design experiment works as well

3.12
technical specification
specification expressing technical requirements for designing and developing the solution to be implemented

NOTE The technical specification evolves from the functional specification and defines the technical requirements for the selected solution as part of a business agreement.

[ISO 21351:2005, definition 3.1.11]

3.13
requirement
need or expectation that is stated, generally implied or obligatory

NOTE 1 “Generally implied” means that it is custom or common practice for the organization, its customers and other interested parties that the need or expectation under consideration is implied.

NOTE 2 A qualifier can be used to denote a specific type of requirement, e.g. product requirement, quality management requirement, customer requirement.

NOTE 3 A specified requirement is one which is stated, for example, in a document.

NOTE 4 Requirements can be generated by different interested parties.

[ISO 9000:2005, definition 3.1.2]

3.14
interface control document
ICD
document of launcher and fairing/payload which defines all physical, electrical and mechanical interfaces between the payload and the launch vehicle hardware and software, and interfaces between payload and support equipment and space site facilities, systems and hardware used for spacecraft launch preparation

3.15
test
formal process of exercising or putting to trial a system or item by manual or automatic means to identify differences between specified, expected and actual results

3.16
test conditions
combination of effects of factors, or object operation conditions, or both, during the test

3.17
test metrological provision
establishment and application of scientific and organizational basis, technical means, rules and standards necessary for achieving the measurement unity demanded, precision, completeness, operativeness and the reliability of parameters control and technical characteristics of items

3.18
ground test programme
organizational-methodological document obligatory for execution, which specifies the test object and objectives, types, sequence and scope of conducted experiments, order, conditions, place, time and support of test, test reporting, as well as responsibility for test support and conduct

3.19
reliability assurance programme
programme document specifying a set of requirements and measures aimed at providing and controlling the satisfaction of requirements established for the statement of work for a space launch vehicle and its components reliability during their development

3.20
space launch vehicle (unit) experimental optimization
operations of modelling units, mock-ups, test prototypes in order to assure operation of items in accordance with statement of work, definition their efficiency margins

3.21
safety assurance programme
programme document which establishes a set of requirements and measures aimed at assuring that all safety risks associated with the space launch vehicle design, development, manufacture and use are accordingly identified, assessed, minimized, controlled and accepted

3.22
telemetry measurement programme
programme document establishing the composition of telemetry measurement hardware born set on space launch vehicle, launch pad and positioned along the flight route necessary for satisfying the measurement requirements as well as places and orientation of sensors arrangement and their characteristics, frequency bands, minimal frequency of sensor polling

3.23
flight test
tests in real conditions of functioning and performance of target tasks

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