

December 20, 2022

The Honorable Maria Cantwell Chair, Committee on Commerce, Science, and Transportation United States Senate Washington, DC 20510

Dear Chair Cantwell:

Enclosed is the *Final Report on Voluntary Industry Consensus Standards Development* for the period between June 20, 2019 and December 31, 2021. Section 111 of Public Law 114-90 (the Commercial Space Launch Competitiveness Act) modified 51 U.S.C. § 50905(c)(5) and required the Secretary of Transportation to submit a series of reports on the progress of the commercial space transportation industry in developing voluntary industry consensus standards that promote best practices to improve industry safety. The Secretary delegated responsibility for writing these reports to the Federal Aviation Administration.

The report discusses voluntary industry consensus standards accepted by the industry at large; areas with the potential to become voluntary industry consensus standards that currently are under consideration by the industry at large; the industry's progress in adopting voluntary industry consensus standards; lessons learned regarding the development, potential application, and acceptance of voluntary industry consensus standards, best practices, and commercial space launch operations; and recommendations, findings, or observations from the Commercial Space Transportation Advisory Committee.

The U.S. Department of Transportation continues to monitor standards development activity and appreciates the opportunity to provide this report.

Identical letters have been sent to the Ranking Member of the Senate Committee on Commerce, Science and Transportation, and the Chairwoman and Ranking Member of the House Committee on Commerce, Space and Technology.

Sincerely,

Billy Nolen Acting Administrator

Enclosure

Office of the Administrator



December 20, 2022

The Honorable Roger F. Wicker Ranking Member, Committee on Commerce, Science, and Transportation United States Senate Washington, DC 20510

Dear Ranking Member Wicker:

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Sincerely,

Billy Nolen Acting Administrator

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December 20, 2022

The Honorable Eddie Bernice Johnson Chairwoman, Committee on Science, Space, and Technology U.S. House of Representatives Washington, DC 20515

Dear Chairwoman Johnson:

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Sincerely,

Billy Nolen Acting Administrator

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December 20, 2022

The Honorable Frank LucasRanking Member, Committee on Science, Space, and TechnologyU.S. House of RepresentativesWashington, DC 20515

Dear Ranking Member Lucas:

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Sincerely,

Billy Nolen Acting Administrator

Enclosure



FEDERAL AVIATION ADMINISTRATION

Report to Congress:

Final Report on Voluntary Industry Consensus Standards Development – December 2021

U.S. Commercial Space Launch Competitiveness Act (CSLCA), Public Law 114-90, Section 111; 51 U.S.C. § 50905(c)(5), as amended

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Executive Summary

Title 51 of the United States Code (51 U.S.C.) § 50905(c)(5), *Interim Voluntary Industry Consensus Standards Reports*, requires the Secretary of the U.S. Department of Transportation (DOT) to report to Congress on the progress of the commercial space transportation industry in developing voluntary industry consensus standards that promote best practices to improve industry safety.¹ 51 U.S.C. § 50905(c)(5) also requires the Secretary to coordinate and consult with the commercial space sector, including the Commercial Space Transportation Advisory Committee (COMSTAC), or its successor organization, in preparing these reports. This report covers the period between June 30, 2019 and December 31, 2021, and is the last report in the series required under 51 U.S.C. § 50905(c)(5).

During the reporting period, non-governmental standards development organizations (SDOs) published 35 standards related to the global commercial space transportation industry. There are 38 proposed standards and 21 existing standards that are undergoing revision. Appendix A details standards that are under development, proposed, or under revision. DOT is encouraged by the increasing availability of commercial space transportation standards, particularly those from ASTM International (ASTM). In the period since the last report on this topic, the number of standards published has increased. It is unclear the extent to which industry is utilizing these standards.

Now that the 14 CFR Part 450 *Streamlined Launch and Reentry Licensing Requirements* regulation is in effect, SDOs and companies can submit standards to be used as a means of compliance in vehicle operator license applications.² Additionally, the Federal Aviation Administration (FAA) is developing an evaluation process to review voluntary industry consensus standards and identify those standards the FAA believes serve as best practices for the safety of human space flight participants although there are no requirements established in rules. The FAA's Office of Commercial Space Transportation (AST) expects that both processes will encourage industry to increase the use of consensus standards in operations.

COMSTAC recommended that the areas of consensus for standard setting in human commercial space flight should be informed by industry feedback from firms conducting human space flight, existing standards documents from SDOs, including ASTM and the International Organization for Standardization (ISO), as well as existing regulations in 14 CFR Part 460 that currently apply to the crew and space flight participants. COMSTAC also recommends that standards should stay at the performance-based level and more prescriptive content should be moved to accompanying guidance documents.

¹ In accordance with Title 49 of the 49 CFR § 1.83(b), the Secretary delegated the responsibility of writing these reports to the Administrator of the FAA.

² 14 CFR § 450.35(b) states that "[a] person requesting acceptance of a proposed means of compliance outside a license application must submit the proposed means of compliance to the FAA in a form and manner acceptable to the Administrator." More information about 14 CFR Part 450 *Streamlined Launch and Reentry Licensing Requirements* is available at https://www.faa.gov/space/streamlined_licensing_process/.

Number of Standards related to the Global Commercial Space Transportation Industry June 30, 2019 through December 31, 2021

Status	Number of Standards
Finalized	35
Proposed	38
Under Revision	21

Legislative Mandate

The Commercial Space Launch Competitiveness Act (CSLCA) requires the U.S. Secretary of Transportation to report to Congress on the commercial space transportation industry's progress in developing voluntary industry consensus standards that promote best practices to improve industry safety. Section 111(5) of the CSLCA modified 51 U.S.C. § 50905(c) by adding, among other things, paragraph (5), which states:

(A) IN GENERAL.—Not later than December 31, 2016, and every 30 months thereafter until December 31, 2021, the Secretary, in consultation and coordination with the commercial space sector, including the Commercial Space Transportation Advisory Committee, or its successor organization, shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on the progress of the commercial space transportation industry in developing voluntary industry consensus standards that promote best practices to improve industry safety.

(B) CONTENTS.—The report shall include, at a minimum—

(i) any voluntary industry consensus standards that have been accepted by the industry at large;

(ii) the identification of areas that have the potential to become voluntary industry consensus standards that are currently under consideration by the industry at large;

(iii) an assessment from the Secretary on the general progress of the industry in adopting voluntary industry consensus standards;

(iv) any lessons learned about voluntary industry consensus standards, best practices, and commercial space launch operations;

(v) any lessons learned associated with the development, potential application, and acceptance of voluntary industry consensus standards, best practices, and commercial space launch operations; and

(vi) recommendations, findings, or observations from the Commercial Space Transportation Advisory Committee, or its successor organization, on the progress of the industry in developing voluntary industry consensus standards that promote best practices to improve industry safety.

Industry Progress in Developing Voluntary Industry Consensus Standards

The commercial space transportation industry has made moderate progress in developing voluntary industry consensus standards that promote best practices to improve industry safety. Standards often can apply to various aspects of commercial space transportation, including human space flight. Therefore, to avoid overlooking a potentially relevant standard, this report includes information on standards development related to the entire commercial space transportation industry. However, standards related to other areas of the greater aerospace industry but not specifically tied to commercial space transportation, such as those related to communications satellite operations are not included in this report.

Several organizations are engaged in working on industry consensus standards, including the American Institute of Aeronautics and Astronautics (AIAA), ASTM, ISO, the National Fire Protection Association (NFPA), and SAE International (SAE). Appendix A details all standards that are under development, proposed, or being revised during the time period of this report (June 2019 – December 2021).

1) Voluntary consensus standards accepted by the industry at large

From June 2019 through December 2021, SDOs have published 35 standards related to commercial space transportation. Twenty-eight (28) out of the 35 standards were published by ISO. Four (4) standards were published by ASTM and an additional 3 were published by AIAA. Topics include failure tolerance for occupant safety, space data exchange, storage, use, and handling of liquid rocket propellants, test requirements for launch vehicles, and safety requirements for launch site operations. Appendix A lists the published standards.

As noted below, COMSTAC has found that although several standard setting organizations have done work on standards for space flight safety, including ISO and ASTM, the ASTM F47 committee was found to have the largest engagement of U.S. industry, government, and academia. U.S. companies have more to gain from collaborating on a domestic safety framework that satisfies FAA licensing requirements than from engaging with international entities that have yet to develop similar capabilities.

That said, COMSTAC has also determined that published voluntary space flight safety standards are in minimal use by U.S. commercial industry.³

2) Areas that have the potential to become voluntary industry consensus standards and are currently under consideration by the industry at large

Three SDOs are developing an additional 38 standards that will be applicable to commercial human space flight and are revising 21 standards. A majority of these standards are from ISO. ISO has 25 standards under development and 21 standards under

³https://www.faa.gov/space/additional_information/comstac/media/COMSTAC_Safety_WG_white_paper_14_Sept_2020.pdf

revision. As of July 2021, ASTM had 12 standards under development and NFPA has 1 standard under development. These standards cover the following areas: crew safety, spacecraft vehicle types, reportable safety-related events, training and qualification of safety-critical space operations personnel, space flight participant safety and emergency training, spaceport standardization and classification, crew rest, verification of software and systems for commercial space flight vehicles, design of suborbital space vehicles, design of orbital space vehicles, and fire protection of spaceport facilities.

Appendix A lists the proposed standards and standards under revision.

In September 2020, the COMSTAC Safety Working Group stated that voluntary industry consensus standards should be informed by industry feedback from firms (Blue Origin, Boeing, SpaceX, and Virgin Galactic) conducting human space flight currently or in the near future, existing standards documents from sources including ASTM and ISO, and existing regulations in 14 CFR Part 460 that currently apply to crew.

COMSTAC identified several areas of consensus for standards setting in commercial human space flight, including:

- Cabin Safety (Focus on "loss of crew/loss of occupants" vs. "loss of mission"; pressure, temperature, and humidity maintenance; occupant restraint systems; and smoke and fire management)
- Emergency Procedures (Efficient and simple egress; escape systems; search and rescue; medevac preparations; and mishap investigations)
- Ground Operations & Material Handling (Ground safety and limiting hazardous operations risk to occupants and adjacent operations)
- Software (Software development, validation, and testing standards)
- Testing, Information, & Training (Informed consent standards; critical personnel trained for safety of occupants; flight testing; and qualification testing of components, including flight termination systems)
- Data Standards (Lessons learned/incident database; risk analysis standards; occupant risk assessment standards; collision avoidance standards; orbital debris catalog; and definitions)

COMSTAC also identified additional areas that lack consensus and require further exploration, including autonomy and testing to qualification/failure.

COMSTAC recommended that standards stay at the performance-based level and that the FAA move prescriptive content to an accompanying guidance document. COMSTAC also recommended leveraging governmental insight (NASA, FAA, etc.) and continuing support of ASTM F47 with FAA representation.⁴

3) <u>Assessment of the general progress of the industry in adopting voluntary industry consensus</u> <u>standards</u>

⁴ <u>https://www.faa.gov/space/additional_information/comstac/media/COMSTAC_September_2020_Public_Mtg_Full</u> Deck_Final.pdf

Since the last report to Congress on this topic, SDOs have made moderate progress in finalizing and proposing additional needed standards.

DOT assigned COMSTAC to assess and report on industry's adoption of voluntary consensus standards. In September 2020, COMSTAC determined that published voluntary space flight safety standards are in minimal use by U.S. commercial industry, but several standards should be investigated by the FAA. Numerous standards were found to have relevance and could serve as a starting point for industry consensus.⁵

The number of companies planning to fly space flight participants in the next several years has grown (to include SpaceX, Boeing, Virgin Galactic, Blue Origin, and Sierra Space), and the first space flight participant to purchase a ticket and fly to space on a privately-funded and licensed space vehicle from a private launch site flew in July 2021. As a result of this increased activity, the FAA expects that the pace of standards development for commercial space flight will increase.

4) <u>Lessons learned about voluntary industry consensus standards, best practices, and commercial space launch operations</u>

The primary lessons learned to date associated with the development of standards include the need for an institutional framework to develop standards and a need to assess the extent to which industry is accepting and implementing standards.

The Department assigned COMSTAC the task of making that assessment. COMSTAC has determined that while the industry is still learning, it has developed a valuable knowledge base on which to build voluntary standards.

Industry-led standards efforts have yielded progress, yet the pace of these efforts has been insufficient. In their report, COMSTAC determined that FAA leadership is needed to facilitate rapid progress on the safety framework to serve as a foundation for a safe and competitive industry.⁶

5) <u>Lessons learned associated with the development, potential application, and acceptance of voluntary industry consensus standards, best practices, and commercial space launch operations</u>

An institutional framework supporting the development of standards is helpful because creating these documents is resource- and time-intensive. It can take months to develop a level of consensus between a quorum of stakeholders before a standard that is acceptable to industry is ready to be published.

⁵ <u>https://www.faa.gov/space/additional_information/comstac/media/COMSTAC_Safety_WG_white_paper_14_Sept_2020.pdf</u>

⁶ <u>https://www.faa.gov/space/additional_information/comstac/media/COMSTAC_Safety_WG_white_paper_14_Sept_2020.pdf</u>

Furthermore, having sophisticated SDOs is helpful because the companies in the industry are often limited in the resources they can devote to writing standards. Performancebased regulations may allow for new opportunities for the development of standards as means of compliance. For example, the willingness of SDOs to provide an institutional framework for standards development would support the success of the new performance-based launch and reentry regulatory regime.

6) <u>Recommendations, findings, or observations from COMSTAC or its successor organization,</u> <u>on the progress of the industry in developing voluntary industry consensus standards that</u> <u>promote best practices to improve industry safety</u>

The following COMSTAC recommendations relate to voluntary industry consensus standards and related best practices from a top-level policy and process perspective. Below are COMSTAC's observations, findings, and recommendations:

Observation #1: COMSTAC observed that the commercial human space flight safety framework, while providing value to the public and crew, does not have the specificity nor the mandate necessary to address non-crew participant safety.

Finding #1: COMSTAC has determined that while the industry is still learning, it has developed a valuable knowledge base on which to build voluntary standards that may inform potential future regulations whenever the current moratorium terminates.

Recommendation #1: COMSTAC recommends that the FAA work to support industry efforts on voluntary standards development and help the space community apply relevant lessons learned.

This work could include the following tasks:

- 1. Commercial space flight industry standards and best practices development. This task includes prioritizing best practices and standards development activities, assessing suitability/adaptability of existing commercial and government practices and standards to support a future safety framework, and providing guidance on and evaluation of consensus standards in development.
- 2. Space flight safety lessons learned implementation. This task includes providing inputs to the FAA on communication of space safety lessons learned, evaluating lessons learned for incorporation into industry standards and best practices, reviewing aviation safety voluntary reporting practices and systems for applicability to the commercial space industry, and providing recommendations on implementation of a voluntary safety reporting system, including scope and information to be shared across industry.

Observation #2: COMSTAC reviewed existing commercial space standards published by multiple organizations to determine applicability to the human space flight safety framework.

Finding #2: While industry has contributed significant time and effort to this standards development process, overall development of commercial consensus standards has been a slow process, a phenomenon which is not uncommon in other industries.

Recommendation #2: COMSTAC recommends that the FAA retain a systems engineering and technical assistance organization (e.g., MITRE, Aerospace Corporation) as soon as possible to conduct the CSLCA-required independent review on readiness for an evolved commercial human space flight safety framework. The independent review is due in December 2022.

Observation #3: Several standard setting organizations have done work on standards for space flight safety. These include ISO, the International Association for the Advancement of Space Safety, and ASTM.

Finding #3: While all of these organizations have contributed valuable material for consideration by industry and rule makers, ASTM F47 was found to have the largest engagement of U.S. industry, government, and academia. U.S. companies have more to gain from collaborating on a domestic safety framework that satisfies FAA licensing requirements than from engaging with international entities that have yet to develop similar capabilities. The FAA has had significant involvement as observers in the development process.

Recommendation #3: The FAA and COMSTAC should continue to support the ASTM International Committee on Commercial Spaceflight as the technical standards organization responsible for development of U.S. commercial industry consensus standards.

Summary

DOT is encouraged by the increasing availability of commercial space transportation standards and expects that the pace of standards development in the commercial space industry will continue to increase. With its performance-based approach, 14 CFR Part 450 creates a programmatic framework to accept standards as means of compliance. DOT will explore other opportunities to review, evaluate, and accept standards developed by the commercial space industry.

Appendix A: Status	of Commercial Space	Transportation	Standards As of	f July 31, 2021 ⁷
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ID Number	Standard Title	Responsible Org	Current Status	Published
ASTM F3479 – 20	Failure Tolerance for Occupant Safety of Suborbital Vehicles	ASTM International, Committee F47 on Commercial Spaceflight; F47.01	Published	2020
ASTM WK70011	New Practice for Crew Safety	ASTM International, Committee F47 on Commercial Spaceflight; F47.02	Under Development	N/A
ASTM WK61254	New Classification for Spacecraft vehicle types	ASTM International, Committee F47 on Commercial Spaceflight; F47.03	Under Development	N/A
ASTM WK64814	New Guide for Training and Qualification of Safety Critical Space Operations Personnel	ASTM International, Committee F47 on Commercial Spaceflight; F47.03	Under Development	N/A
ASTM F3344 - 19	Standard Guide for Storage, Use, and Handling of Liquid Rocket Propellants	ASTM International, Committee F47 on Commercial Spaceflight; F47.04	Published	2019
ASTM F3514 - 21	New Guide for Space Data Exchange to Support the Integration of Space Operations into Air Traffic Management	ASTM International, Committee F47 on Commercial Spaceflight; F47.05	Published	2021
ASTM WK65152	New Classification for Reportable safety related events	ASTM International, Committee F47 on Commercial Spaceflight; F47.05	Under Development	N/A
ASTM F3377 - 20	Standard Terminology Relating to Commercial Spaceflight	ASTM International, Committee F47 on Commercial Spaceflight; F47.91	Published	2020
ASTM WK73835	New Practice for Spaceflight Participant Safety and Emergency Training	ASTM International, Committee F47 on Commercial Spaceflight; F47.03	Under Development	N/A
ASTM WK74068	New Guide for Standard for Spaceport Standardization & Classification	ASTM International, Committee F47 on Commercial Spaceflight; F47.04	Under Development	N/A
ASTM WK74125	New Guide for Crew Rest in Commercial Spaceflight	ASTM International, Committee F47 on Commercial Spaceflight; F47.05	Under Development	N/A

⁷ Organizations included in Appendix A are members of, or have an affiliation with the American National Standards Institute (ANSI). ANSI facilitates the development of American National Standards by accrediting the procedures of SDOs. The ISO is a worldwide federation of national standards bodies. ISO's work results in international agreements, which are published as International Standards. These groups work cooperatively to develop voluntary national consensus standards. The government has the purview to evaluate and accept industry developed standards. Each SDO develops its own internal numbering/tracking nomenclature.

ASTM WK74019	New Guide for Qualification for Safety-Critical Systems in Spaceflight	ASTM International, Committee F47 on Commercial Spaceflight; F47.05	Under Development	N/A
ASTM WK76057	New Guide for Medical Qualifications for Suborbital Vehicle Passengers	ASTM International, Committee F47 on Commercial Spaceflight; F47.01	Under Development	N/A
ASTM WK76298	New Test Method for Verification of Software and Systems for Commercial Spaceflight Vehicles	ASTM International, Committee F47 on Commercial Spaceflight; F47.02	Under Development	N/A
ASTM WK77620	New Practice for The Design of Suborbital Space Vehicles	ASTM International, Committee F47 on Commercial Spaceflight; F47.01	Under Development	N/A
ASTM WK77622	New Practice for The Design of Orbital Space Vehicles	ASTM International, Committee F47 on Commercial Spaceflight; F47.02	Under Development	N/A
NFPA 461	NFPA 461 Standard for Fire Protection of Spaceport Facilities	NFPA	Under Development	N/A
ANSI/AIAA S- 153-2021	Human Spaceflight: Spacecraft Architecture and Systems Engineering Ontology	AIAA	Published	2021
AIAA S-114A- 2020	Moving Mechanical Assemblies for Space and Launch Vehicles	AIAA	Published	2020
ANSI/AIAA S- 102.0.1-2019	Capability-based mission assurance program – General requirements	AIAA	Published	2019
ISO 13541:2010	Space data and information transfer systems — Attitude data messages	ISO; Space data and information transfer systems	Under Revision	2010
ISP/NP 6180	Space systems Cybersecurity management guidelines	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI 5461	Space systems Failure reporting, analysis, and corrective action system (FRACAS) management requirements	ISO; Space Systems and Operations	Under Development	2021
ISO/WD 24412	Space systems — Thermal vacuum environmental testing	ISO; Space Systems and Operations	Under Development	N/A
ISO/WD 24411	Space systems — Micro-vibration testing	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI 16126	Space systems — Survivability of unmanned spacecraft against space debris and meteoroid impacts for the purpose of space debris mitigation	ISO; Space Systems and Operations	Under Revision	2014

ISO/TR 23989:2020	Space environment (natural and artificial) — Operational estimation of the solar wind energy input into the Earth's magnetosphere by means of the ground-based magnetic polar cap (PC) index	ISO; Space Systems and Operations	Published	2020
ISO/TR 20891:2020	Space systems — Space batteries — Guidelines for in-flight health assessment of lithium-ion batteries	ISO; Space Systems and Operations	Published	2020
ISO/TR 18146:2020	Space systems — Space debris mitigation design and operation manual for spacecraft	ISO; Space Systems and Operations	Published	2020
ISO 16781:2021	Space systems — Simulation requirements for control system	ISO; Space Systems and Operations	Published	2021
ISO/NWIP 5150	Space systems Manufacturing readiness review	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI TR 6832	Space systems — Technical guidelines of thermal vacuum chamber	ISO; Space Systems and Operations	Under Development	N/A
ISO 20893:2021	Space systems — Detailed space debris mitigation requirements for launch vehicle orbital stages	ISO; Space Systems and Operations	Published	2021
ISO/TR 20590:2021	Space systems - Space debris mitigation design and operation guidelines for launch vehicle orbital stages	ISO; Space Systems and Operations	Published	2021
ISO/PRF TR 16158	Space systems — Avoiding collisions among orbiting objects	ISO; Space Systems and Operations	Under Revision	2013
ISO/DIS 24638	Space systems — Pressure components and pressure system integration	ISO; Space Systems and Operations	Published	2008
ISO/FDIS 23569	Space systems — Spacecraft system level (RF) performance test in compact range	ISO; Space Systems and Operations	Under Development	N/A
ISO/FDIS 23129	Space systems — Thermal control coatings for spacecraft — Atomic oxygen protective coating on polyimide film	ISO; Space Systems and Operations	Under Development	N/A
ISO/FDIS 23020	Space Systems — Determination of test methods to characterize material or component properties required for break-up models used for Earth re-entry	ISO; Space Systems and Operations	Under Development	N/A
ISO/DIS 22893	Space systems — Software Product Assurance (SPA)	ISO; Space Systems and Operations	Under Development	N/A
ISO/DIS 21442	Space systems — General requirements for control engineering	ISO; Space Systems and Operations	Under Development	N/A
ISO/FDIS 14620-3	Space systems — Safety requirements — Part 3: Flight safety systems	ISO; Space Systems and Operations	Under Revision	2005

ISO 14200:2021	Space environment (natural and artificial) Process-based implementation of meteoroid and debris environment models (orbital altitudes below GEO + 2000 km)	ISO; Space Systems and Operations	Published	2021
ISO/TS 22295:2021	Space environment (natural and artificial) — Modeling of space environment impact on nanostructured materials — General principles	ISO; Space Systems and Operations	Published	2021
ISO/PRF TR 17400	Space systems — Space launch complexes, integration sites and other facilities — General testing guidelines	ISO; Space Systems and Operations	Under Revision	2003
ISO/DIS 26870	Space systems — Launch pad and integration site operational documents	ISO; Space Systems and Operations	Under Revision	2009
ISO/DIS 23835	Space Systems — Mechanism design and verification	ISO; Space Systems and Operations	Under Development	N/A
ISO/CD 23670	Space systems — Vibration testing	ISO; Space Systems and Operations	Under Development	N/A
ISO/DIS 23312	Space systems — Detailed space debris mitigation requirements for spacecraft	ISO; Space Systems and Operations	Under Development	N/A
ISO/TR 22639:2021	Space systems – Design guidelines for multi-GEO spacecraft collocation	ISO; Space Systems and Operations	Published	2021
ISO/CD 22010	Space systems — Mass properties control	ISO; Space Systems and Operations	Under Revision	2007
ISO/CD 22009	Space systems — Space environment (natural and artificial) — Model of the earth's magnetospheric magnetic field	ISO; Space Systems and Operations	Under Revision	2009
ISO/CD 17401	Space systems — Spacecraft interface requirements document for launch vehicle services	ISO; Space Systems and Operations	Under Revision	2004
ISO/DIS 16457	Space environment (natural and artificial) — The Earth's ionosphere model — International reference ionosphere (IRI) model and extensions to the plasmasphere	ISO; Space Systems and Operations	Under Revision	2014
ISO/CD 16378	Space systems — Measurements of thermo-optical properties of thermal control materials	ISO; Space Systems and Operations	Under Revision	2013
ISO 15864:2021	Space systems — General test methods for space craft, subsystems and units	ISO; Space Systems and Operations	Published	2021
ISO/CD 15390	Space environment (natural and artificial) — Galactic cosmic ray model	ISO; Space Systems and Operations	Under Revision	2004
ISO/CD 15388	Space systems — Contamination and cleanliness control	ISO; Space Systems and Operations	Under Revision	2012

ISO/CD 14624-5	Space systems — Safety and compatibility of materials — Part 5: Determination of reactivity of system/component materials with aerospace propellants	ISO; Space Systems and Operations	Under Revision	2006
ISO/CD 14624-3	Space systems — Safety and compatibility of materials — Part 3: Determination of offgassed products from materials and assembled articles	ISO; Space Systems and Operations	Under Revision	2005
ISO/CD 14624-2	Space systems — Safety and compatibility of materials — Part 2: Determination of flammability of electrical-wire insulation and accessory materials	ISO; Space Systems and Operations	Under Revision	2003
ISO/CD 14624-1	Space systems — Safety and compatibility of materials — Part 1: Determination of upward flammability of materials	ISO; Space Systems and Operations	Under Revision	2003
ISO/CD 14302	Space systems — Electromagnetic compatibility requirements	ISO; Space Systems and Operations	Under Revision	2002
ISO/DIS 14222	Space environment (natural and artificial) — Earth upper atmosphere	ISO; Space Systems and Operations	Under Revision	2013
ISO/AWI TR 23689	Space environment (natural and artificial) — Space weather information for use in space systems operations	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI 5879	Space systems Separation test methods for spacecraft	ISO; Space Systems and Operations	Under Development	2021
ISO/DIS 24330	Space systems — Rendezvous and Proximity Operations (RPO) and On Orbit Servicing (OOS) — Programmatic principles and practices	ISO; Space Systems and Operations	Under Development	N/A
ISO/DIS 23135	Space systems — Verification program and management process	ISO; Space Systems and Operations	Under Development	N/A
ISO/CD 14625	Space systems — Ground support equipment for use at launch, landing or retrieval sites — General requirements	ISO; Space Systems and Operations	Under Revision	2007
ISO 27875:2019/A MD 1:2020	Space systems — Re-entry risk management for unmanned spacecraft and launch vehicle orbital stages	ISO; Space Systems and Operations	Published	2020
ISO 27875:2019	Space systems — Re-entry risk management for unmanned spacecraft and launch vehicle orbital stages	ISO; Space Systems and Operations	Published	2019

ISO 26871:2020	Space systems — Explosive systems and devices	ISO; Space Systems and Operations	Published	2020
ISO 24917:2020	Space systems — General test requirements for launch vehicles	ISO; Space Systems and Operations	Published	2020
ISO 24113:2019	Space systems — Space debris mitigation requirements	ISO; Space Systems and Operations	Under Development	2019
ISO 22772:2020	Space systems — Requirements of launch vehicle (LV) to electrical ground support equipment (EGSE) interfaces	ISO; Space Systems and Operations	Published	2020
ISO 22137:2020	Space systems — Program management — Test reviews	ISO; Space Systems and Operations	Published	2020
ISO 21886:2019	Space systems — Configuration management	ISO; Space Systems and Operations	Published	2019
ISO 21494:2019	Space systems — Magnetic testing	ISO; Space Systems and Operations	Published	2019
ISO 16698:2019	Space environment (natural and artificial) — Methods for estimation of future geomagnetic activity	ISO; Space Systems and Operations	Published	2019
ISO 16404:2020	Space systems — Programme management — Requirements management	ISO; Space Systems and Operations	Published	2020
ISO 14621- 2:2019	Space systems — Electrical, electronic and electromechanical parts — Part 2: Control programme requirements	ISO; Space Systems and Operations	Published	2019
ISO 14621- 1:2019	Space systems — Electrical, electronic and electromechanical parts — Part 1: Parts management	ISO; Space Systems and Operations	Published	2019
ISO 14620- 2:2019	Space systems — Safety requirements — Part 2: Launch site operations	ISO; Space Systems and Operations	Published	2019
ISO 11231:2019	Space systems — Probabilistic risk assessment (PRA)	ISO; Space Systems and Operations	Published	2019
ISO 10795:2019	Space systems — Programme management and quality — Vocabulary	ISO; Space Systems and Operations	Published	2019
ISO/NP 5847	Space Systems – Space Traffic Coordination and Management	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI TS 6434	Space systems — Design, testing and operation of a spacecraft large constellation	ISO; Space Systems and Operations	Under Development	N/A

ISO/WD	Space systems — Adhesives — General requirements	ISO; Space Systems and Operations	Under Development	N/A
24564 ISO/TS	Snace systems — Snace-based services for a high accuracy			
22591:2021	positioning system with safety requirements	ISO; Space Systems and Operations	Published	2021
ISO/DIS 24246	Space systems — Requirements for Global Navigation Satellite System (GNSS) positioning augmentation centers	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI 24245	Space systems — Global Navigation Satellite System (GNSS) receiver class codes	ISO; Space Systems and Operations	Under Development	N/A
ISO/AWI 23230	Space systems — Paint materials — Processes, procedures, requirements	ISO; Space Systems and Operations	Under Development	N/A
ISO 26872:2019	Space systems — Disposal of satellites operating at geosynchronous altitude	ISO; Space Systems and Operations	Under Revision	2019
ISO 21980:2020	Space systems — Evaluation of radiation effects on Commercial-Off-The-Shelf (COTS) parts for use on low-orbit satellite	ISO; Space Systems and Operations	Published	2020