



ISO/TC 197
Hydrogen technologies

Email of secretary: jim.ferrero@bnq.qc.ca
Secretariat: SCC (Canada)

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ISO/TC 20 / SC 14 Status Report

1 Title and Scope

Title: Space Systems and Operations

Scope: Standardization of manned and unmanned space vehicles that include management of space programs, design, test, production, launch, maintenance, operation, and disposal of space vehicles, and for the environment in which the space programs operate.

2 Chairman and secretary

Chairman:

Name (tenure): Paul Gill (ANSI/USA)
Organization/Country: NASA/USA
Address: NASA Marshall Space Flight Center, Huntsville, AL 35812
Phone: +1-256-544-2121
E-mail: paul.gill@nasa.gov

Secretary:

Name (tenure): Nick Tongson (ANSI/USA)
Organization/Country: American Institute of Aeronautics and Astronautics - AIAA
Address: 12700 Sunrise Valley Drive, Suite 200, Reston, VA 20191, USA
Phone: +1-703-264-7515
E-mail: nickt@aiaa.org

3 Meetings Held Since Last Report (SC and WG)

Meetings held

No.	Date	Place
25	2015-06-05	Washington, DC, USA
26	2016-05-27	Beijing, China
27	2017-06-16	Paris, France

Schedule of future meetings

28	2018-06-15	Helsinki, Finland
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SC14 WGs will meet in October and November 2017 in various locations.

4 Participation and liaisons

4.1 P-member bodies

No.	Country	Member Body
1	USA (Secretariat)	ANSI
2	BRAZIL	ABNT
3	CHINA	SAC
4	FINLAND	SFS
5	FRANCE	AFNOR
6	GERMANY	DIN
7	INDIA	BIS
8	ITALY	UNI
9	JAPAN	JISC
10	NORWAY	SN
11	RUSSIAN FEDERATION	GOST R
12	UKRAINE	DSSU
13	UNITED KINGDOM	BSI

4.2 O-member bodies

No.	Country	Member Body
1	Argentina	IRAM
2	Iran, Islamic Republic of	ISIRI
3	Israel	SII
4	Kazakhstan	KAZMEMST
5	Korea, Republic of	KATS
6	Poland	PKN
7	Romania	ASRO
8	Slovakia	SUTN
9	Sweden	SIS

Total (Secretariat + P + O) = 22 Member Bodies

4.3 Liaisons (Contact)

TC/SC	Organization	Category	Person	Contact E-mail
	ASD-STAN	A	Andreas Jain	andreas.jain@asd-europe.org
	CCSDS	A	James Afarin	james.afarin@nasa.gov
	COSPAR	A		cospar@cosparhq.cnes.fr
	ECSS	A	Wolfram Knorr Fabien Castanet	wolfram.knorr@airbus.com Fabien.Castanet@cnes.fr
	ESA	A		contactesa@esa.int
	IAA	A		sgeneral@iaaweb.org

NAMES OF LIAISON BODIES:

- ASD-STAN: AeroSpace and Defense Industries Association of Europe – Standardization
- CCSDS: Consultative Committee for Space Data Systems
- COSPAR: Committee on Space Research
- ECSS: European Cooperation for Space Standardization
- ESA: European Space Agency
- IAA: International Academy of Astronautics
- WCO: World Customs Organization

4.4 Changes since last plenary meeting of ISO/TC 20

- New P-Member Norway (SN)

4.5 Inactive P-member bodies

India, Italy (presence at meetings)

5 Constitution**5.1 Working Groups****WG 1: Design Engineering and Production**

Convenor: Keiichiro Eishima
 Organization/Country: Japan
 E-mail: keiichiro.eishima@castle.ocn.ne.jp

WG 2: Interfaces, Integration and Test

Convenor: Stan Kennedy
 Organization/Country: USA
 E-mail: stanley.kennedy@oak-aero.com

WG 3: Operations and Ground Support

Convenor: Andre Lacroix
 Organization/Country: Germany
 E-mail: andre.a.lacroix@airbus.com

WG 4: Space Environment (Natural and Artificial)

Convenor: Mikhail Panasyuk
 Organization/Country: Russia
 E-mail: panasyuk@sinp.msu.ru

WG 5: Program Management

Convenor: Severin Drogoul
 Organization/Country: France
 E-mail: severin.drogoul@airbus.com

WG 6: Materials and Processes

Convenor: Naoko Baba
Organization/Country: Japan
E-mail: baba.naoko@jaxa.jp

WG 7: Orbital Debris

Convenor: Hedley Stokes
Organization/Country: UK
E-mail: hedley_stokes@msn.com

5.2 Changes since last plenary meeting of ISO/TC 20

- New WG2 Convenor, Mr. Stanley Kennedy (USA), replacing Mr. James Haughton (USA)

6 Any other matters of importance to ISO/TC 20

SC 14 will continue to review and monitor the relationship with TC 20/SC 6 (Standard Atmosphere) to determine future steps, in consultation with the experts of SC 14/WG 4 (Space Environment [natural and artificial]).

7 Programme of work (since last ISO/TC 20 Plenary)

7.1 Published standards (Stage 60): 7

ISO 16192:2017	Space systems — Experience gained in space projects (lessons learned) — Principles and guidelines	60.60	WG 5
ISO 17666:2016	Space systems — Risk management	60.60	WG 5
ISO 17770:2017	Space systems — Cube satellites (CubeSats)	60.60	WG 1
ISO 18257:2016	Space systems — Semiconductor integrated circuits for space applications — Design requirements	60.60	WG 1
ISO 19826:2017	Space systems — Programme management — Management of product characteristics	60.60	WG 5
ISO 19923:2017	Space environment (natural and artificial) — Plasma environments for generation of worst case electrical potential differences for spacecraft	60.60	WG 4
ISO/TR 20590:2017	Space systems — Debris mitigation design and operation manual for launch vehicle orbital stages	60.60	WG 7

7.2 Registered Work items: 39

Approval stage (Stage 50): 6

ISO/FDIS 18322	Space systems — General quality and safety requirements for space test centers	50.00	WG 2
ISO/FDIS 18676	Space systems — Guidelines for the management of systems engineering processes	50.00	WG 5
ISO/FDIS 19683	Space systems — Design qualification and acceptance tests of small spacecraft and units	50.20	WG 1
ISO/PRF 19924	Space systems — Acoustic testing	50.00	WG 2
ISO/FDIS 20892	Space systems — Launch complex — Modernization process: General requirements	50.00	WG 5
ISO/FDIS 23038	Space systems — Space solar cells — Electron and proton irradiation test methods	50.00	WG 1

Enquiry stage (Stage 40): 9

ISO/DIS 10794	Space systems — Programme management — Material, mechanical parts and processes	40.00	WG 5
ISO/DIS 14620-1	Space systems — Safety requirements — Part 1: System safety	40.00	WG 4
ISO/DIS 16157	Space systems — Human-life activity support systems and equipment integration in space flight — Techno-medical requirements for space vehicle human habitation environments	40.99	WG 6
ISO/DIS 16726	Space systems — Human-life activity support systems and equipment integration in space flight — Techno-medical requirements for space vehicle human habitation environments — Requirements for the air quality affected by harmful chemical contaminants	40.99	WG 6

ISO/DIS 17763	Space systems — Human-life activity support systems and equipment integration in space flight	40.99	WG 6
ISO/DIS 19971	Space systems — Spacecraft and launch vehicle Combined Operation Plan (COP) at launch site — General format	40.99	WG 2
ISO/DIS 20188	Space systems — Product assurance requirements for commercial satellites	40.99	WG 5
ISO/DIS 20780	Space systems — Fiber optic components — Design and verification requirements	40.99	WG 1
ISO/DIS 20930	Space systems — Calibration requirements for satellite-based passive microwave sensors	40.00	WG 1

Committee Stage (Stage 30): 13

ISO/CD 10789	Space systems — Programme management — Information and documentation management	30.99	WG 5
ISO/CD 10795	Space systems — Programme management and quality — Vocabulary	30.00	WG 5
ISO/CD 11231	Space systems — Probabilistic risk assessment (PRA)	30.00	WG 5
ISO/CD 14620-2	Space systems — Safety requirements — Part 2: Launch site operations	30.99	WG 2
ISO/CD 14624-4	Space systems — Safety and compatibility of materials — Part 4: Determination of upward flammability of materials in pressurized gaseous oxygen or oxygen-enriched environments	30.00	WG 6
ISO/CD 16091	Space systems — Integrated logistic support	30.20	WG 5
ISO/DTS 18667	Space systems — Requirements for the management of capability-based safety, dependability, and quality assurance (SD&QA) programme	30.20	WG 5
ISO/CD 20893	Space systems — Prevention of break-up of orbital launch stages	30.00	WG 3
ISO/CD TS 20991	Space systems — Requirements for small spacecraft	30.00	WG 1
ISO/CD 21095	Space systems — Procedure for limiting risk of re-entering spacecraft and launch vehicle orbital stages	30.99	WG 1
ISO/CD 23041	Space systems — Unmanned spacecraft operational procedures — Documentation	30.99	WG 3
ISO/CD 24917	Space systems — General test requirements for launch vehicles	30.99	WG 2
ISO/CD 26872	Space systems — Disposal of satellites operating at geosynchronous altitude	30.99	WG 3

Preparatory Stage (Stage 20): 11

ISO/AWI 20584	Space environment (natural and artificial) — Spacecraft charging — Earth orbit	20.00	WG 4
ISO/AWI TR 20891	Space systems — Space batteries — Guidelines for easing in-flight health assessment	20.00	WG 1
ISO/AWI 21442	Space systems — General requirements for control engineering	20.00	WG 1
ISO/AWI 21494	Space systems — Magnetic testing	20.00	WG 2

ISO/AWI 21886	Space systems — Configuration management	20.00	WG 5
ISO/AWI TS 21979	Space environment (natural and artificial) — Procedure for obtaining worst case and confidence level of fluence using the quasi-dynamic model of earth's radiation belts	20.00	WG 4
ISO/AWI 21980	Space systems — Evaluation of radiation effects on Commercial-Off-The-Shelf (COTS) parts for use on low-orbit satellites	20.00	WG 4
ISO/AWI 22137	Space systems — Program management — Test reviews	20.00	WG 5
ISO/AWI TS 22295	Space environment (natural and artificial) — Modeling of space environment impact on nanostructured materials — General principles	20.00	WG 4
ISO/AWI 22591	Space systems — Satellite-based service for a snowplow support system	20.00	WG 1
ISO/AWI 24113	Space systems — Space debris mitigation requirements	20.00	WG 7

7.3 Possible new work items: 5

Proposal Stage (Stage 10): 5

ISO/NP 14621-1	Space systems — Electrical, electronic and electromechanical (EEE) parts — Part 1: Parts management	10.99	WG 5
ISO/NP 14621-2	Space systems — Electrical, electronic and electromechanical (EEE) parts — Part 2: Control programme requirements	10.99	WG 5
ISO/NP TR 17400	Space systems — Space launch complexes, integration sites and other facilities — General testing guidelines	10.99	WG 3
ISO/NP 24638	Space systems — Pressure components and pressure system integration	10.99	WG 1
ISO/NP 26871	Space systems — Explosive systems and devices	10.99	WG 1

Preliminary Stage (Stage 00): 0

NONE

7.4 Standards withdrawn (Stage 95): 0

NONE

7.5 Standards under Review (Stage 90): 87

ISO 10784-1:2011	Space systems — Early operations — Part 1: Spacecraft initialization and commissioning	90.93	WG 2
ISO 10784-2:2011	Space systems — Early operations — Part 2: Initialization plan	90.93	WG 2
ISO 10784-3:2011	Space systems — Early operations — Part 3: Commissioning report	90.93	WG 2
ISO 10785:2011	Space systems — Bellows — Design and operation	90.93	WG 1
ISO 10786:2011	Space systems — Structural components and assemblies	90.93	WG 1

ISO 10830:2011	Space systems — Non-destructive testing — Automatic ultrasonic inspection method of graphite ingot for solid rocket motors	90.93	WG 6
ISO 11221:2011	Space systems — Space solar panels — Spacecraft charging induced electrostatic discharge test methods	90.93	WG 4
ISO 11892:2012	Space systems — Subsystems/units to spacecraft interface control document	90.93	WG 2
ISO 11893:2011	Space systems — Programme management — Project organization	90.93	WG 5
ISO 14300-1:2011	Space systems — Programme management — Part 1: Structuring of a project	90.93	WG 5
ISO 14300-2:2011	Space systems — Programme management — Part 2: Product assurance	90.93	WG 5
ISO 14302:2002	Space systems — Electromagnetic compatibility requirements	90.93	WG 1
ISO 14303:2002	Space systems — Launch-vehicle-to-spacecraft interfaces	90.93	WG 2
ISO 14619:2003	Space systems — Space experiments — General requirements	90.93	WG 3
ISO 14620-3:2005	Space systems — Safety requirements — Part 3: Flight safety systems	90.93	WG 5
ISO 14622:2000	Space systems — Structural design — Loads and induced environment	90.93	WG 1
ISO 14623:2003	Space systems — Pressure vessels and pressurized structures — Design and operation	90.93	WG 1
ISO 14624-1:2003	Space systems — Safety and compatibility of materials — Part 1: Determination of upward flammability of materials	90.93	WG 6
ISO 14624-2:2003	Space systems — Safety and compatibility of materials — Part 2: Determination of flammability of electrical-wire insulation and accessory materials	90.93	WG 6
ISO 14624-3:2005	Space systems — Safety and compatibility of materials — Part 3: Determination of offgassed products from materials and assembled articles	90.93	WG 6
ISO 14624-5:2006	Space systems — Safety and compatibility of materials — Part 5: Determination of reactivity of system/component materials with aerospace propellants	90.92	WG 6
ISO 14624-6:2006	Space systems — Safety and compatibility of materials — Part 6: Determination of reactivity of processing materials with aerospace fluids	90.92	WG 6
ISO 14624-7:2006	Space systems — Safety and compatibility of materials — Part 7: Determination of permeability and penetration of materials to aerospace fluids	90.92	WG 6
ISO 14625:2007	Space systems — Ground support equipment for use at launch, landing or retrieval sites — General requirements	90.93	WG 3
ISO 14711:2003	Space systems — Unmanned mission operations concepts — Guidelines for defining and assessing concept products	90.93	WG 3
ISO 14950:2004	Space systems — Unmanned spacecraft operability	90.93	WG 3
ISO 14952-1:2003	Space systems — Surface cleanliness of fluid systems — Part 1: Vocabulary	90.93	WG 6
ISO 14952-2:2003	Space systems — Surface cleanliness of fluid systems — Part 2: Cleanliness levels	90.93	WG 6
ISO 14952-3:2003	Space systems — Surface cleanliness of fluid systems — Part 3: Analytical procedures for the determination of nonvolatile residues and particulate contamination	90.93	WG 6
ISO 14952-4:2003	Space systems — Surface cleanliness of fluid systems — Part 4: Rough-cleaning processes	90.93	WG 6
ISO 14952-5:2003	Space systems — Surface cleanliness of fluid systems — Part 5: Drying processes	90.93	WG 6

ISO 14952-6:2003	Space systems — Surface cleanliness of fluid systems — Part 6: Precision-cleaning processes	90.93	WG 6
ISO 14953:2000	Space systems — Structural design — Determination of loading levels for static qualification testing of launch vehicles	90.93	WG 1
ISO 14954:2005	Space systems — Dynamic and static analysis — Exchange of mathematical models	90.93	WG 1
ISO 15387:2005	Space systems — Single-junction solar cells — Measurements and calibration procedures	90.93	WG 1
ISO 15388:2012	Space systems — Contamination and cleanliness control	90.60	WG 6
ISO 15389:2001	Space systems — Flight-to-ground umbilicals	90.93	WG 3
ISO 15390:2004	Space environment (natural and artificial) — Galactic cosmic ray model	90.93	WG 4
ISO 15856:2010	Space systems — Space environment — Simulation guidelines for radiation exposure of non-metallic materials	90.93	WG 4
ISO 15859-1:2004	Space systems — Fluid characteristics, sampling and test methods — Part 1: Oxygen	90.93	WG 6
ISO 15859-2:2004	Space systems — Fluid characteristics, sampling and test methods — Part 2: Hydrogen	90.93	WG 6
ISO 15859-3:2004	Space systems — Fluid characteristics, sampling and test methods — Part 3: Nitrogen	90.93	WG 6
ISO 15859-4:2004	Space systems — Fluid characteristics, sampling and test methods — Part 4: Helium	90.93	WG 6
ISO 15859-5:2004	Space systems — Fluid characteristics, sampling and test methods — Part 5: Nitrogen tetroxide propellants	90.93	WG 6
ISO 15859-6:2004	Space systems — Fluid characteristics, sampling and test methods — Part 6: Monomethylhydrazine propellant	90.93	WG 6
ISO 15859-7:2004	Space systems — Fluid characteristics, sampling and test methods — Part 7: Hydrazine propellant	90.93	WG 6
ISO 15859-8:2004	Space systems — Fluid characteristics, sampling and test methods — Part 8: Kerosine propellant	90.93	WG 6
ISO 15859-9:2004	Space systems — Fluid characteristics, sampling and test methods — Part 9: Argon	90.93	WG 6
ISO 15859-10:2004	Space systems — Fluid characteristics, sampling and test methods — Part 10: Water	90.93	WG 6
ISO 15859-11:2004	Space systems — Fluid characteristics, sampling and test methods — Part 11: Ammonia	90.93	WG 6
ISO 15859-12:2004	Space systems — Fluid characteristics, sampling and test methods — Part 12: Carbon dioxide	90.93	WG 6
ISO 15859-13:2004	Space systems — Fluid characteristics, sampling and test methods — Part 13: Breathing air	90.93	WG 6
ISO 15860:2006	Space systems — Gas contamination — Measurement methods for field tests	90.93	WG 3
ISO 15862:2009	Space systems — Launch-vehicle-to-spacecraft flight environments telemetry data processing	90.93	WG 2
ISO 15863:2003	Space systems — Spacecraft-to-launch-vehicle interface control document	90.93	WG 2
ISO 15864:2004	Space systems — General test methods for space craft, subsystems and units	90.93	WG 2
ISO 15865:2005	Space systems — Qualification assessment	90.93	WG 5
ISO 16454:2007	Space systems — Structural design — Stress analysis requirements	90.93	WG 1
ISO 16458:2004	Space systems — Unmanned spacecraft transportation — General requirements	90.93	WG 3
ISO/TS 16697:2012	Space systems — Safety and compatibility of materials — Method to determine the flammability thresholds of materials	90.93	WG 6

ISO 17401:2004	Space systems — Spacecraft interface requirements document for launch vehicle services	90.93	WG 2
ISO 17566:2011	Space systems — General test documentation	90.93	WG 2
ISO 19933:2007	Space systems — Format for spacecraft launch environment test report	90.93	WG 2
ISO 21347:2005	Space systems — Fracture and damage control	90.93	WG 1
ISO 21348:2007	Space environment (natural and artificial) — Process for determining solar irradiances	90.93	WG 4
ISO 21349:2007	Space systems — Project reviews	90.93	WG 5
ISO 21350:2007	Space systems — Off-the-shelf item utilization	90.93	WG 5
ISO 21351:2005	Space systems — Functional and technical specifications	90.93	WG 5
ISO 21648:2008	Space systems — Flywheel module design and testing	90.93	WG 1
ISO 22009:2009	Space systems — Space environment (natural and artificial) — Model of the earth's magnetospheric magnetic field	90.93	WG 4
ISO 22010:2007	Space systems — Mass properties control	90.93	WG 1
ISO 22108:2008	Space systems — Non-flight items in flight hardware — Identification and control	90.93	WG 3
ISO 22538-1:2007	Space systems — Oxygen safety — Part 1: Design of oxygen systems and components	90.93	WG 6
ISO 22538-2:2007	Space systems — Oxygen safety — Part 2: Selection of metallic materials for oxygen systems and components	90.93	WG 6
ISO 22538-3:2007	Space systems — Oxygen safety — Part 3: Selection of non-metallic materials for oxygen systems and components	90.93	WG 6
ISO 22538-4:2007	Space systems — Oxygen safety — Part 4: Hazards analyses for oxygen systems and components	90.93	WG 6
ISO 22538-5:2010	Space systems — Oxygen safety — Part 5: Operational and emergency procedures	90.93	WG 6
ISO 22538-6:2010	Space systems — Oxygen safety — Part 6: Facility planning and implementation	90.93	WG 6
ISO 23339:2010	Space systems — Unmanned spacecraft — Estimating the mass of remaining usable propellant	90.93	WG 3
ISO 23460:2011	Space systems — Programme management — Dependability assurance requirements	90.93	WG 5
ISO 23461:2010	Space systems — Programme management — Non-conformance control system	90.93	WG 5
ISO 24637:2009	Space systems — Electromagnetic interference (EMI) test reporting requirements	90.93	WG 1
ISO 26869:2012	Space systems — Small-auxiliary-spacecraft (SASC)-to-launch-vehicle interface control document	90.93	WG 2
ISO 26870:2009	Space systems — Launch pad and integration site operational documents	90.93	WG 3
ISO 27025:2010	Space systems — Programme management — Quality assurance requirements	90.93	WG 5
ISO 27026:2011	Space systems — Programme management — Breakdown of project management structures	90.93	WG 5
ISO 27875:2010	Space systems — Re-entry risk management for unmanned spacecraft and launch vehicle orbital stages	90.93	WG 3