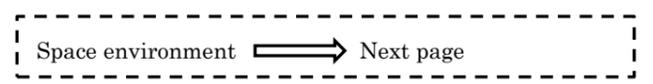


Systems Engineering (Phased-Plan, Technologies, Risk-assess., Test Methods, Environment, etc.)	
Systems engineering	
18676	Guidelines for the management of systems engineering
16290	Definition of the Technology Readiness Levels (TRL) and their criteria of assessment
23135	Space systems — Verification program and management process
Analysis	
14954	Exchange of mathematical models for dynamic and static analysis
16781	Simulation requirements for control system
General test methods	
15864	General test methods for spacecraft, subsystems, and units
24917	General test requirements for launch vehicles
17566	General test documentation
19933	Format for spacecraft launch environmental test report
19924	Acoustic testing
23670	Vibration testing
24411	Space systems — Micro-vibration testing
21494	Space systems — Magnetic testing
24412	Space systems — Thermal vacuum environmental testing
17400	Launch and integration site general test requirements
17540	Liquid rocket engines and test stands - Terms and definitions
19683	Design qualification and acceptance tests of lean satellites and units
16694	The measured parameters at firing bench and flight tests of liquid rocket engines
14953	Structural design — Determination of loading levels for a static qualification test of launch vehicles
24637	EMI test reporting requirements
23569	Space systems — Spacecraft system level radiating frequency (RF) performance test in compact range
5879	LV/SC separation ground test requirements for combined separation test, horizontal separation test and individual falling separation test
Testing for solar cells, etc.	
11221	Space solar panels — Spacecraft charging induced electrostatic discharge test methods
23038	Space solar cells — Electron and proton irradiation test methods
23020	Determination of test methods to characterize material or component properties required for break-up models used for Earth re-entry

Testing for propellants and other fluids	
15859-1 15859-13	Fluid sampling and test methods — Part 1: Oxygen Part 2: Hydrogen propellant, Part 3: Nitrogen, Part 4: Helium propellant, Part 5: Nitrogen tetroxide propellant, Part 6: Monomethylhydrazine propellant, Part 7: Hydrazine propellant, Part 8: Kerosene propellant, Part 9: Argon, Part 10: Water, Part 11: Ammonia, Part 12: Carbon dioxide, Part 13: Breathing air



- WG-1
- WG-2
- WG-3
- WG-4
- WG-5
- WG-6
- WG-7
- WG-8

Management (Programme, Produc Ass, etc.)	
Programme management	
16404	Programme management — Requirements management
14300-1	Program management — Part 1: Structuring of a project
14300-2	Program management — Part 2: Product assurance
21886	Configuration management
21351	Functional and technical specifications
27026	Programme management — Project breakdown structures
11893	Programme management — Project organization
21349	Project reviews
17255	Program management — Statement of work
17666	Program Management — Risk management
10789	Programme management — Information and documentation management
10794	Programme management — Material, mechanical parts and processes
10795	Programme management and quality — Vocabulary
11231	Probabilistic Risk Assessment (PRA)
15865	Qualification assessment
27025	Programme management — Quality assurance requirements
23460	Programme management — Dependability assurance requirements
18667	Capability-based Safety, Dependability, and Quality Assurance (SD&QA) programme management [Tech Spec]
20188	Product assurance requirements for commercial satellites
16091	Integrated logistic support
22893	Space systems — Software Product Assurance (SPA)
16192	Experience gained in space projects (Lessons Learned) — Principles and guidelines
18238	Closed loop problem solving management
19826	Programme management — Management of product characteristics
21350	Off-the-shelf item utilization
22137	Programme management — Test reviews
23461	Programme management — Non conformance control system
23462	Defining the management framework for a space project
16159	Launch pad and integration site — Analysis of failures

Safety control	
14620-1	Safety requirements — Part 1: System safety
14620-2	Safety requirements — Part 2: Launch site operations
14620-3	Safety requirements — Part 3: Flight safety systems
27875	Re-entry risk management for unmanned spacecraft and launch vehicle orbital stages

Material Safety and compatibility	
16697	Safety and compatibility of materials — Method to determine the flammability thresholds of materials
22538-1 22538-6	Oxygen safety — 1) Part 1: Hazards analysis for oxygen components and systems 2) Part 2: Selection of metallic materials for oxygen components and systems 3) Part 3: Selection of non-metallic materials for oxygen components and systems 4) Part 4: Design of oxygen components and system 5) Part 5: Operational and emergency procedures 6) Part 6: Facility planning and implementation
14624-1 14624-7	Safety and compatibility of materials — 1) Part 1: Test method for upward flammability of materials 2) Part 2: Test method for electrical wires and accessories 3) Part 3: Test method for off-gassed products from materials and assembled articles 4) Part 4: Test method for flammability of materials in gaseous oxygen 5) Part 5: Test method for determination of the reactivity of materials with aerospace hypergolic propellants 6) Part 6: Test method for determining the reactivity of processing materials with aerospace fluids 7) Part 7: Test method for determining the permeability and penetration of materials to aerospace fluids

Design (LV, SC, Ground system, Components, Materials) Manufacturing	
Spacecraft systems, Structure and other mechanical design	
22010	Mass properties control
14622	Structural design — Loads and induced environment
16454	Structural design — Stress analysis requirements
21347	Structural design — Fracture and damage control for spaceflight structures
10786	Structural components and assemblies
14623	Pressure vessels and pressurized structures — Design and operation
24638	Pressure components and pressure system integration
21648	Flywheel module design and test
10785	Bellows — Design and operation
26871	Explosive systems and devices
22639	Design guidelines for multi-GEO spacecraft collocation [Tech Rpt]
23835	Space systems — Mechanism design and verification
21442	Space systems — General requirements for control engineering
Electric and electrical design	
18197	Space based services requirements for centimeter class positioning
14302	Electromagnetic compatibility requirements
15387	Single-junction solar cells — Measurements and calibration procedures
17546	Lithium ion battery for space vehicles — Design and verification requirements
20891	Space batteries — Guidelines for in-flight health assessment of Li-ion batteries [Tech Rpt]
20780	Fiber optic components — Design and verification requirements
20930	Calibration requirements for satellite-based passive microwave sensors
22591	Space-based services for a high accuracy positioning system with safety requirements [Tech Spec]
Parts	
14621-1	Electrical, electronic, and electromagnetic (EEE) parts — Parts management
14621-2	EEE parts — Control program requirements
18257	Semiconductor integrated circuits for space applications — Design req.
Small satellites design	
20991	Requirements for small spacecraft [Tec. Spec.]
17770	Cube satellites (CubeSats)

Ground facilities & equipment, and ground transportation	
14625	Ground support equipment for use at launch, landing, or retrieval sites — General requirements
15389	Flight to ground umbilicals
16458	Unmanned spacecraft transportation — General requirements
20892	Launch complex — Modernization process: General requirements
18322	General quality and safety requirements for space test centers

Space unique materials and evaluation technology	
10830	Non-destructive testing — Method of automatic ultrasonic inspection of graphite ingot for solid rocket motor
16378	Measurements of thermo-optical properties of thermal control materials
16691	Thermal control coatings for spacecraft — General requirements
23129	Thermal control coatings for spacecraft — Atomic oxygen protective coatings on polyimide film
24564	Space systems — Adhesives — General requirements
23230	Space systems — Paints and varnishes — Processes, procedures, and requirements for coating materials and coatings

Human-life	
16157	Space systems — Human-life activity support systems and equipment integration in space flight — Techno-medical requirements for space vehicle human habitation environments
16726	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
17763	Human-life activity support systems and equipment integration in space flight

Contamination and cleanliness control	
14952-1 14952-6	Surface cleanliness of fluid systems — Part 1: Vocabulary Part 2: Cleanliness levels Part 3: Analytical procedures for the determination of non volatile residues and particulate contamination Part 4: Rough cleaning processes Part 5: Processes for drying equipment Part 6: Precision cleaning processes
15388	Contamination and cleanliness control
15860	Gas contamination — Measurements methods for field tests

Interface Control (SC – LV – Ground)	
Interface Control	
14303	Launch-vehicle-to-spacecraft interfaces
17401	Spacecraft interface requirements document for launch services
15862	LV-SC flight environment requirements for telemetry data processing
15863	Spacecraft to launch vehicle interface control document
19971	Spacecraft and launch vehicle Combined Operation Plan (COP) at launch site — General format
26869	Small auxiliary spacecraft (SASC) to launch vehicle interface control document
17689	Interface control documents between ground technological equipment, launch site systems and launch vehicle with payload
The	Subsystems/units to spacecraft interface control document
22772	Requirements of launch vehicle (LV) to electrical ground support equipment (EGSE) interfaces

Operation:(Launch Site, Orbital, Tracking)

Operations	
10784-1 10784-3	Early operations — 1) Part 1: Spacecraft initialization and commissioning 2) Part 2: Initialization plan 3) Part 3: Commissioning report
14711	Unmanned mission operations concepts - Guidelines
14950	Unmanned spacecraft operability
23041	Unmanned spacecraft operational procedures — Documentation
14619	Space experiments — General requirements
24330	Space systems — Rendezvous and Proximity Operations (RPO) and On Orbit Servicing (OOS) — Programmatic principles and practices
Orbit determination, data transfer	
26900	Space data and information transfer systems — Orbit data messages
11233	Orbit determination and estimation — Process for describing techniques [Tech Rpt]
Launch site operation, L/V mission operation	
26870	Launch pad and integration site operational documents
22108	Non-flight items in flight hardware — Identification and control
16679	Space systems — Relative motion analysis elements after LV/SC separation
19473	Best practices for orbit elements at payload — LV separation [Tech Rpt]

Cross Cutting Issue:(Debris)

Space Debris Mitigation & Protection	
24113	Space debris mitigation requirements
23312	Detailed space debris mitigation requirements for S/C
20893	Detailed space debris mitigation requirements for launch vehicle orbital stage
18146	Space debris mitigation design and operation manual for spacecraft [Tech Rpt]
20590	Space debris mitigation design and operation manual for launch vehicle orbital stages [Tech Rpt]
Debris related assessment, testing, other methodologies	
27852	Estimation of orbit lifetime
16158	Avoiding collisions with orbiting objects [Tech Rep]
16126	Assessment of survivability of unmanned spacecraft against space debris and meteoroid impacts to ensure successful post-mission disposal
11227	Test procedures to evaluate spacecraft material ejecta upon hypervelocity impact

Fig.-1 ISO Standards and Technical Reports, etc. (1/2)
(Based on SC14 Work Program @ October 2023)
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Space environment (natural and artificial)	
19923	Spacecraft potential estimation in worst case environment
17851	Space systems – Space environment simulation for material tests – General principles and criteria
Earth's field	
14222	Space environment (natural and artificial) — Earth upper atmosphere
16695	Earth's internal magnetic reference field models
11225	Guideline to reference and standard atmosphere models [Tech Rpt]
16698	Methods for estimation of future geomagnetic activity
22009	Model of Earth's magnetospheric magnetic field
16457	The Earth's ionosphere model — International reference ionosphere (IRI) model and extensions to the plasmasphere
14200	Guide to process-based implementation of meteoroid and debris environmental models (orbital altitudes below GEO + 2000 km)
17761	Model of high energy radiation at low altitudes (300-600 km)
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 [Tech Spec]
21980	Evaluation of radiation effects on Commercial-Off-The-Shelf (COTS) parts for use on low-orbit satellites
Solar activities	
21348	Solar irradiance determinations
18147	The method of the solar energetic protons fluences and peak fluxes determination [Tech Rpt]
15856	Simulation guidelines for radiation exposure of non-metallic materials
12208	Observed proton fluences over long duration at GEO and guideline for selection of confidence level in statistical model of solar proton fluences
23989	Operational estimation of the solar wind energy input into the Earth's magnetosphere by means of the ground-based magnetic Polar Cap (PC) index [Tech Rpt]
Cosmic ray	
15390	Models of galactic cosmic rays
17520	Cosmic ray and solar energetic particle penetration inside the magnetosphere – Method of the effective vertical cut-off determination
Lunar	
10788	Space systems – Lunar simulants
Nanostructured materials	
22295	Space environment (natural and artificial) —Modeling of space environment impact on nanostructured materials — General principles [Tech Spec]

Downstream Space Services	
24245	Space systems — Global Navigation Satellite System (GNSS) receiver class codes
24246	Space systems — Requirements for Global Navigation Satellite System (GNSS) positioning augmentation centers

Fig.-1 ISO Standards and Technical Reports, etc. (2/2)
 (based on SC14 Work Program @ October 2023)
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