ISO TC20/SC14 WG4 “Space Environment”

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Space Environment Technologies

WG4: *space environment (natural and artificial)*

- **ISO/TC20** works on the standardization of materials, components and equipment for construction and operation of *aircraft and space systems*...
- **Within TC20, SubCommittee 14** is specially dedicated to developing standards for *space systems and their operations*
- **Within SubCommittee 14, Working Group 4** develops standards for the *space environment (natural and artificial)*

ISO/TC20/SC14 WG4

Main Scope: Develop International Standards for space systems users that characterize the natural and artificial space environment

International harmonized stage codes

STAGE	SUB-STAGE						
	00	**20**	**60**	**90** Decision			
	Registration	**Start of main action**	**Completion of main action**	**92** Repeat an earlier phase	**93** Repeat current phase	**98** Abandon	**99** Proceed
00 Preliminary stage	**00.00** Proposal for new project received	**00.20** Proposal for new project under review	**00.60** Review summary circulated			**00.98** Proposal for new project abandoned	**00.99** Approval to ballot proposal for new project
10 Proposal stage	**10.00** Proposal for new project registered	**10.20** New project ballot initiated	**10.60** Voting summary circulated	**10.92** Proposal returned to submitter for further definition		**10.98** New project rejected	**10.99** New project approved
20 Preparatory stage	**20.00** New project registered in TC/SC work programme	**20.20** Working draft (WD) study initiated	**20.60** Comments summary circulated			**20.98** Project deleted	**20.99** WD approved for registration as CD
30 Committee stage	**30.00** Committee draft (CD) registered	**30.20** CD study/ballot initiated	**30.60** Comments/ voting summary circulated	**30.92** CD referred back to Working Group		**30.98** Project deleted	**30.99** CD approved for registration as DIS
40 Enquiry stage	**40.00** DIS registered	**40.20** DIS ballot initiated: *5 months*	**40.60** Voting summary dispatched	**40.92** Full report circulated: DIS referred back to TC or SC	**40.93** Full report circulated: decision for new DIS ballot	**40.98** Project deleted	**40.99** Full report circulated: DIS approved for registration as FDIS
50 Approval stage	**50.00** FDIS registered for formal approval	**50.20** FDIS ballot initiated: *2 months*. Proof sent to secretariat	**50.60** Voting summary dispatched. Proof returned by secretariat	**50.92** FDIS referred back to TC or SC		**50.98** Project deleted	**50.99** FDIS approved for publication
60 Publication stage	**60.00** International Standard under publication		**60.60** International Standard published				

WD

CD

DIS

FDIS

IS

ISO standard process

- Working Group 4

– Sub-stage 10.00 – New Work Item (NWI)

– Sub-stage 20.00 – Working Draft (WD)

– Technical Specification (TS)

- Sub-Committee 14

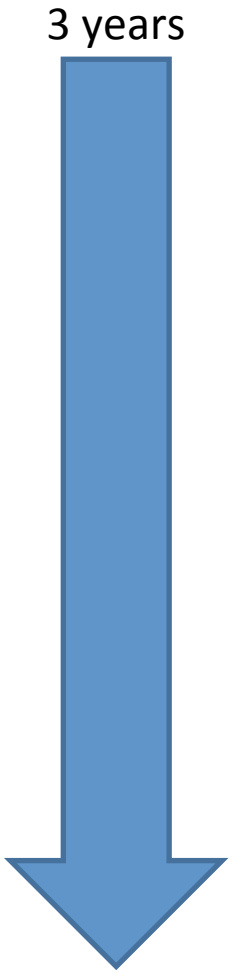
– Sub-stage 30.00 – Committee Draft (CD)

– Sub-stage 40.00 – Draft International Standard (DIS)

- ISO (Geneva)

– Sub-stage 50.00 –Final Draft International Standard (FDIS)

– Sub-stage 60.00 –International Standard



WG4 Structure

WG4 Members:

- France
- Germany
- Japan
- Russia
- UK
- US
- ……

Organizations:

ESA
NASA
JAXA
ONERA
Roscosmos
MSU

Liason organisations:
COSPAR

WG4 Chairman – Prof. Mikhail Panasyuk, MSU, Russia

CURRENT STATUS

17 published documents

1) **IS 10788** Lunar simulants
2) **TR 11225** Guideline to reference and standard atmosphere models
3) **TS 12208** Observed proton fluences over long duration at GEO and guideline for selection of confidence level in statistical model of solar proton fluences
4) **IS 14200** Guide to process-based implementation of meteoroid and debris environmental models (orbital altitudes below GEO+2000km)
5) **IS 14222** Earth upper atmosphere
6) **IS 15390** Models of galactic cosmic rays
7) **IS 15856** Simulation guidelines for radiation exposure of non-metallic materials
8) **IS 16457** The Earth's ionosphere model — International reference ionosphere (IRI) model and extensions to the plasmasphere
9) **IS 16695** Earth's internal magnetic reference field models
10) **IS 16698** Methods for estimation of future geomagnetic activity
11) **TR 18147** The method of the solar energetic protons fluences and peak fluxes determination
12) **IS 21348** Solar irradiance determinations
13) **IS 22009** Model of Earth's magnetospheric magnetic field
14) **IS 17520** Cosmic ray and solar energetic particle penetration inside the magnetosphere: Method of the effective vertical cut-off determination
15) **IS 17761** Model of high energy radiation at low altitudes (300-600 km)
16) **IS 17851** Space environment simulation for material tests. General principles and criteria
17) **IS 19923** Spacecraft potential estimation in worst case environment

CURRENT STATUS

5 active documents

- **CD 20584** Spacecraft Charging Standard-Earth orbit (Ferguson, Dale; Goka, Tateo)
- **NWI** Modeling of space environment impact on nanostructured materials — General principles
- **CDC 21980** Radiation Effects Evaluation for Low-Cost (COTS) Satellites Radiation Hardness
- **DTS 21979** Procedure for obtaining worst case and confidence level of fluence using the quasi-dynamic model of earth's radiation belts
- **NWI** Space weather information for use in space systems operations

CURRENT STATUS

New proposal concepts

1. *electrostatics and dust (lunar)*
2. *worst case solar events*
3. *protection of materials from MMOD impact*
4. *solar wind data in the OMNI database*
5. *compilation of radiation environments and transport codes*
6. *AE9/AP9 radiation belt model*
7. *Terrestrial environment guideline*
8. *Solar wind*
9. *Satellite drag*
10. *Atomic oxygen*
11. *PC geomagnetic index*
12. *KP geomagnetic index*

WG4 Roadmap

Space Systems and Operations Orbital Domains

Space Environment Domains

Published, In process, To be initiated	LEO	PEO	MEO	GEO	>GEO
Testing	15856, 17851	15856, 17851	15856, 17851	15856, 17851	15856, 17851
Cosmic Rays	15390, 17520, N0764	15390, 17520, N0764	15390, 17520, N0764	15390, 17520, N0764	15390, 17520, N0764
Solar photons	21348	21348	21348, 19923	21348, 19923	21348, 19923
Solar particles	16698, 17520, 18147, N0764 (solar wind)	16698, 17520, 18147, N0764 (solar wind)	16698, 17520, 18147, N0764 (solar wind)	16698, 17520, 18147, N0764 (solar wind)	16698, 17520, 18147, N0764 (solar wind)
Solar fields	16698 (solar wind)	16698 (solar wind)	16698 (solar wind)	16698 (solar wind)	16698 (solar wind)
Main magnetic field	16695, 16698	16695, 16698	16695, 16698	16695, 16698	16695, 16698
Magnetosphere	16695, 16698, 20584, N0764	16695, 16698, 19923, 20584, N0764	16695, 16698, 22009, 19923, 20584, N0764	16695, 16698, 22009, 19923, 20584, N0764	16695, 16698, 22009, 19923, 20584, N0764
Radiation Belts	17761, 20584, N0764 (AEP9, internal chrg)	17761, 20584, N0764 (AEP9, internal chrg)	20584, N0764 (AEP9, internal chrg)	20584, N0764 (AEP9, internal chrg)	20584, N0764 (AEP9, internal chrg)
Plasmasphere	16457, 20584	16457, 19923, 20584	16457, 19923, 20584	16457, 19923, 20584	16457, 19923, 20584
Ionosphere	16457, 16698, 20584	16457, 16698, 20584			
Neutral atmosphere	14222, 11225, 16698, (AO, sat drag)	14222, 11225, 16698, (AO, sat drag)			
Micrometeoroids	14200	14200	14200	14200	14200
Debris	14200	14200	14200	14200	14200
Lunar					10788

CONTACTS

WG4 – good place to publish space weather related documents on user and stakeholder requirements, model testing etc.

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COSPAR C0.1

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