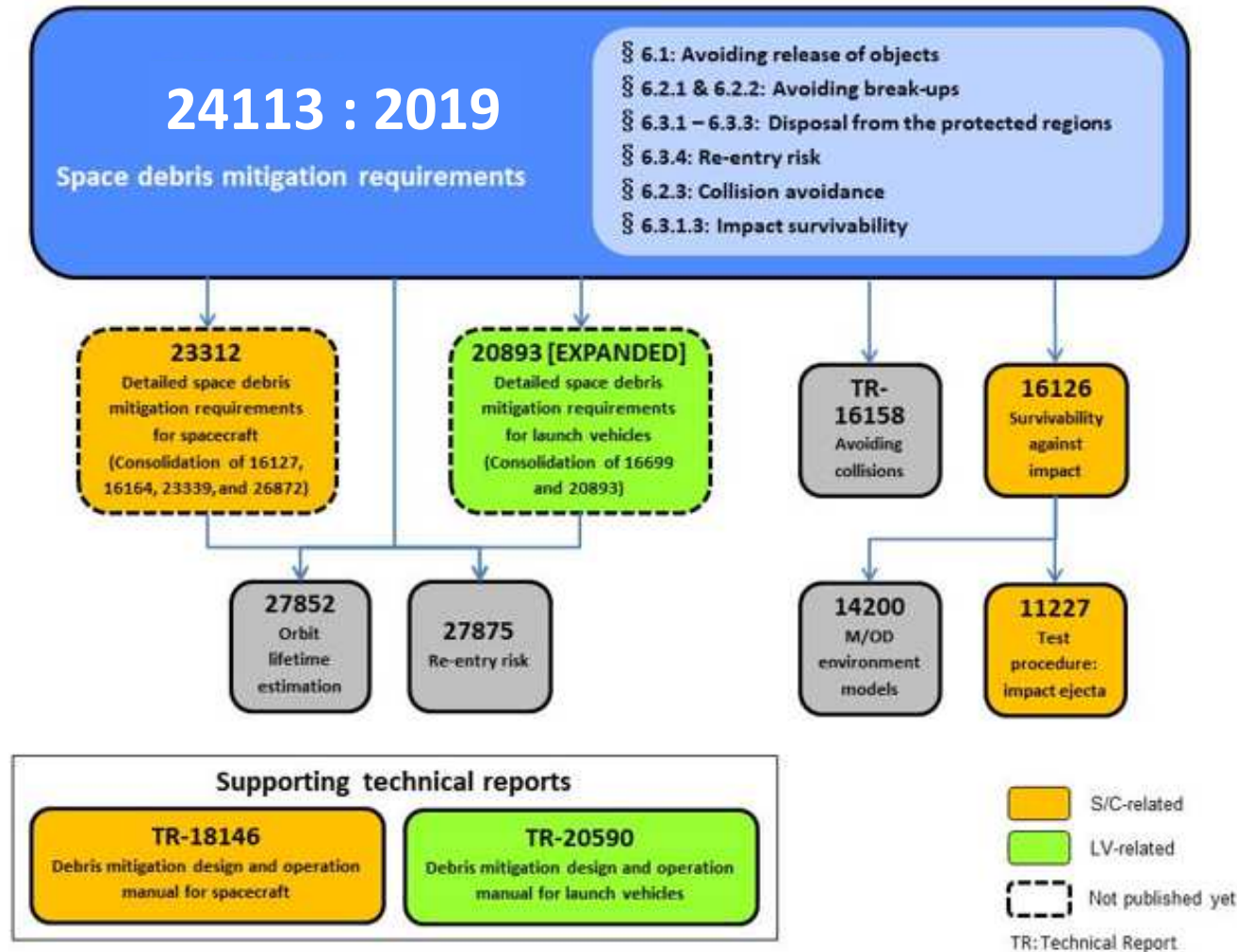




Status of the evolutions of the ISO standards 2019

Structure of the ISO Space Debris Mitigation Work Items



Published Work Items

†

ISO Number	Title	Publication dates
11227	Test Procedure to Evaluate Spacecraft Material Ejecta upon Hypervelocity Impact	2012
14200	Process-based Implementation of Meteoroid and Debris Environment Models	2012
16126	Survivability of Unmanned Spacecraft against Space Debris and Meteoroid Impacts	2014
16127	Prevention of Break-up of Unmanned Spacecraft	2014
16158	TR: Avoiding Collisions with Orbiting Objects	2013
16164	Disposal of Satellites Operating in or Crossing Low Earth Orbit	2015
16699	Disposal of Orbital Launch Stages	2015
18146	TR: Space Debris Mitigation Design and Operation Guidelines for Spacecraft	2015
20590	TR: Debris Mitigation Design and Operation Manual for Launch Vehicle Orbital Stages	2017
23339	Estimating the Mass of Remaining Usable Propellant	2010
24113	Space Systems – Space Debris Mitigation Requirements	2010, 2011, 2019
26872	Disposal of Satellites Operating at Geosynchronous Altitude	2010
27852	Orbit Lifetime Estimation	2011, 2016
27875	Re-entry Risk Management for Unmanned Spacecraft and Launch Vehicle Orbital Stages	2010, <u>Amd 1:2016</u>

Revision to be planned every 5 years

Published Work Items

ISO Number	Title	Publication dates
11227	Test Procedure to Evaluate Spacecraft Material Ejecta upon Hypervelocity Impact	2012
14200	Process-based Implementation of Meteoroid and Debris Environment Models	2012
16126	Sustainability of Unmanned Spacecraft against Space Debris and Meteoroid Impacts	2014
16127	Prevention of Break-up of Unmanned Spacecraft	2014
16158	TR: Avoiding Collisions	
16164	Disposal of Satellites Operating at Geosynchronous Altitude	
16699	Disposal of Orbital Launch Stages	2015
18146	TR: Space Debris Mitigation Design and Operation Guidelines for Spacecraft	2015
20590	TR: Debris Mitigation Design and Operation Manual for Launch Vehicle Orbital Stages	2017
23339	Estimating the Mass of Remaining Usable Propellant	2010
24113	Space Systems – Space Debris Mitigation Requirements	2010, 2011, 2019
26872	Disposal of Satellites Operating at Geosynchronous Altitude	2010
27852	Orbit Lifetime Estimation	2011, 2016
27875	Re-entry Risk Management for Unmanned Spacecraft and Launch Vehicle Orbital Stages	2010, Amd 1:2016

WG7 Convenor is proposing an amendment instead of a revision due to very minor changes to the document

Revision to be planned every 5 years

Published Work Items



ISO Number	Title	Publication dates
11227	Test Procedure to Evaluate Spacecraft Material Ejecta upon Hypervelocity Impact	2012
14200	Process-based Implementation of Meteoroid and Debris Environment Models	2012
16126	Survivability of Unmanned Spacecraft against Space Debris and Meteoroid Impacts	2014
16127	Prevention of Break-up of Unmanned Spacecraft	2014
16158	TR: Avoidance of Collisions with Orbiting Objects	2013
16164	Disposal of Satellites Operating in or Crossing Low Earth Orbit	2015
16699		
18146		
20590		
23339		
24113		
26872	Disposal of Satellites Operating at Geosynchronous Altitude	2010
27852	Orbit Lifetime Estimation	2011, 2016
27875	Re-entry Risk Management for Unmanned Spacecraft and Launch Vehicle Orbital Stages	2010, Amd 1:2016

WG7 should revise ISO 16126, expand its scope to include methods, procedures, and design rules relating to the implementation of debris impact protection in unmanned spacecraft, and change its title from “Space systems – Assessment of survivability of unmanned spacecraft against space debris and meteoroid impacts to ensure successful post-mission disposal” to “Space systems – Survivability of unmanned spacecraft against space debris and meteoroid impacts for the purpose of space debris mitigation.”

Revision to be planned every 5 years

Published Work Items

ISO Number	Title	Publication dates
11227	Test Procedure to Evaluate Spacecraft Material Ejecta upon Hypervelocity Impact	2012
14200	Process-based Implementation of Meteoroid and Debris Environment Models	2012
16126	Survivability of Unmanned Spacecraft against Space Debris and Meteoroid Impacts	2014
16127	Prevention of Break-up of Unmanned Spacecraft	2014
16158	TR: Avoidance of Collisions with Orbiting Objects	2013
16164	Disposal of Satellites Operating in or Crossing Low Earth Orbit	2015
16699		
18146		
20590		
23339		
24113		
26872	Disposal of Satellites Operating at Geosynchronous Altitude	2010
27852	Orbit Lifetime Estimation	2011, 2016
27875	Re-entry Risk Management for Unmanned Spacecraft and Launch Vehicle Orbital Stages	2010, Amd 1:2016

WG7 should revise ISO 16126, expand its scope to include methods, procedures, and design rules relating to the implementation of debris impact protection in unmanned spacecraft, and change its title from “Space systems – Assessment of survivability of unmanned spacecraft against space debris and meteoroid impacts to ensure successful post-mission disposal” to “Space systems – Survivability of unmanned spacecraft against space debris and meteoroid impacts for the purpose of space debris mitigation.”

Revision to be planned every 5 years

Published Work Items

ISO Number	Title	Publication dates
11227	Test Procedure to Evaluate Spacecraft Material Ejecta upon Hypervelocity Impact	2012
14200	Process-based Implementation of Meteoroid and Debris Environment Models	2012
16126	Survivability	
16127	Prevention	
16158	TR: Avoidance	
16164	Disposal	
16699	Disposal	
18146	TR: Space	
20590	TR: Debris	
23339	Estimating the mass of remaining usable Propellant	2010
24113	Space Systems – Space Debris Mitigation Requirements	2010, 2011, 2019
26872	Disposal of Satellites Operating at Geosynchronous Altitude	2010
27852	Orbit Lifetime Estimation	2011, 2016
27875	Re-entry Risk Management for Unmanned Spacecraft and Launch Vehicle Orbital Stages	2010, Amd 1:2016

Committee Draft for Comment (CDC) out for vote due by 2019-10-11 Comments received modifications are ongoing

Open point still in discussion : Tentative to add new topics that need to be adressed somewhere :

- Paint and surface materials that are exposed to the space environment, should be selected and processed applied properly, to avoid flaking off from the spacecraft during 25 years after its post mission disposal phase.
- MLIs should be chosen not to produce scales once the degradation process has begun

Revision to be planned every 5 years

ISO 20893: Detailed space debris mitigation requirements for launch vehicle orbital stages

- CDV due by 2019-12-04, national bodies ~2019-11-19 TBC)
- CDC (Committee_Draft_for_Comment) stage completed and comment dispositioned
 - Inclusion of requirement to “estimate the collision risk between an orbital stage and its payloads” (only China in favor of keeping this rqmt).
 - Requirement on determination of the critical pressure (questioned by Japan): wording and link with ISO24113 to be discussed.
 - Amount of requirements in 20893 (and 23312) to justify development as separate documents.
 - Wording of requirement on intentional break-up to aid controlled re-entry
 - Terminology definitions to be discussed (e.g., definition of “Deorbit maneuver”)