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**Committee on the Peaceful  
Uses of Outer Space**

**Legal Subcommittee**

**Fifty-third session**

Vienna, 24 March-4 April 2014

Agenda item 11 of the provisional agenda\*

**General exchange of information and views on legal  
mechanisms relating to space debris mitigation measures,  
taking into account the work of the Scientific and  
Technical Subcommittee**

**Compendium of space debris mitigation standards adopted  
by States and international organizations**

**Document submitted by Canada, the Czech Republic and  
Germany**

The present document contains a Compendium of space debris mitigation standards, as a contribution of Canada, the Czech Republic and Germany to the Committee on the Peaceful Uses of Outer Space, and in reference to the agenda item of its Legal Subcommittee on “General exchange of information and views on legal mechanisms relating to space debris mitigation measures, taking into account the work of the Scientific and Technical Subcommittee”. The aim of the compendium is to inform States of the current instruments and measures that have been implemented by States and international organizations.

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\* A/AC.105/C.2/L.292.



# COMPENDIUM

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**SPACE DEBRIS MITIGATION STANDARDS ADOPTED BY  
STATES AND INTERNATIONAL ORGANIZATIONS**

12 MARCH 2014

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## INTRODUCTION

As a contribution of Canada, the Czech Republic and Germany to the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS), and in reference to the agenda item on “General exchange of information and views on legal mechanisms relating to space debris mitigation measures, taking into account the work of the Scientific and Technical Subcommittee” of the UN COPUOS Legal Subcommittee (LSC), this report provides a compendium of standards adopted by States and international organizations to mitigate space debris. The aim of this Compendium is to inform States of the current instruments and measures that have been implemented by States and international organizations, and to assist those who wish to enact or develop similar standards in relation to this important topic.

This document is organized in the following manner: Part 1 contains an alphabetical list of States’ profiles, followed by Part 2 which contains a list of international mechanisms. Each profile focuses on debris mitigation mechanisms developed and implemented by the respective State and / or international organization.

The present edition of the Compendium is considered to be a first step of an evolving process. It does therefore not represent an exhaustive source of information on this topic. Members of UN COPUOS and international organizations are invited to provide information on their mechanism they have adopted, based on the template developed, or to update their profile if necessary. The editors are prepared to integrate new profiles or adjustments after the first distribution of the Compendium in the LSC. Ultimately, it is hoped that this document will provide a comprehensive reference to support UN COPUOS Members in their coordinated efforts towards space debris mitigation.

### **Acknowledgment**

The editors of this Compendium on Space Debris Mitigation Standards would like to thank the Legal Services Department of the European Space Agency (ESA) for their editorial support in the frame of compiling and finalizing this documentation.

**ALGERIA****National mechanism:**

Throughout its recent activity in the space field and the number of national satellites in orbit (currently there are two), the People's Democratic Republic of Algeria has not adopted at present a national mechanism for the reduction of space debris. However, reflections are initiated aiming at the implementation of appropriate national solutions to this issue as well as the choice of a site that can accommodate a space debris observatory.

**Description:**

None.

**Applicability:**

None.

**Relation with international mechanisms:**

As a permanent member of the Committee on the Peaceful Uses of Outer Space, Algeria attaches a big importance to the issue of space debris and is pleased about the work carried out during several years within COPUOS, and resulting in the adoption by consensus of the "space debris mitigation guidelines." In this respect, Algeria fully supports the principle of voluntary use of such guidelines.

Furthermore, as a member of the International Telecommunication Union, Algeria considers that the ITU (ITU-R S.1003-1) recommendations on "the protection of environment of the geostationary satellites orbit" are appropriate measures to reduce space debris.

**Link to other national mechanisms:**

None.

**References:**

None.

**ARGENTINA****National mechanism:**

Argentine Republic has not adopted yet any national mechanism on space debris mitigation. Low profile discussions are in progress with a view to develop national space-related legislation in the near future.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

As a UN COPUOS Member State the Argentine Republic fully adheres to the UN COPUOS Space Debris Mitigation Guidelines. Furthermore it supports IADC Space Debris Mitigation Guidelines.

**Link to other national mechanisms:**

None.

**References:**

None.

## AUSTRALIA

### National mechanisms:

As of November 2013, Australia has not adopted yet any national mechanism to fully implement the United Nations COPUOS or IADC Space Debris Mitigation Guidelines into binding legislation. Space debris mitigation policy is confirmed in:

1. Australia's Satellite Utilisation Policy – 2013
2. Guidelines for Applicants seeking to apply for an Overseas Launch Certificate

Legal Framework:

– *Space Activities Act, 1998*

### 1. Australia's Satellite Utilisation Policy

#### Description:

In April 2013, the (then) Australian Government released its new space policy, formally known as *Australia's Satellite Utilisation Policy*, principle four of which confirms that, in contributing to a stable space environment, the Australian Government will *inter alia*:

“Adhere to the UN Space Debris Mitigation Guidelines in undertaking its space activities.”

and

“Actively participate in the negotiation of an International Code of Conduct for Outer Space Activities, as an important and necessary step in the development of international norms for good behaviour in space.”

Australia's Satellite Utilisation Policy, which closely follows, but replaces, the previously released (September 2011) *Principles for a National Space Policy*, is a statement of Australia's objectives and direction for civilian space activities.

#### Applicability:

Australia's Satellite Utilisation Policy, which closely follows, but replaces, the previously released (September 2011) *Principles for a National Space Policy*, is a statement of Australia's objectives and direction for civilian space activities. It is not a legal document.



## **2. Guidelines for Applicants seeking to apply for an Overseas Launch Certificate**

### **Description:**

The *Guidelines for Applicants seeking to apply for an Overseas Launch Certificate* pursuant to the *Space Activities Act 1998* specify that an applicant for an overseas launch certificate should provide *inter alia* the following:

“a debris mitigation strategy that addresses the Space Debris Mitigation Guidelines of the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS).”

The launch from outside Australia of a payload or launch vehicle in which an Australian national has an ownership interest, including an ownership interest in any part of the payload or launch vehicle, requires an overseas launch certificate. An Australian national must also obtain an overseas launch certificate to carry out a launch overseas. The Guidelines for Applicants seeking to apply for an Overseas Launch Certificate is issued by the relevant Government regulatory authority, the Space Licensing and Safety Office (SLASO), to advise potential applicants of the administrative requirements for the issue of this certificate.

### **Applicability:**

The *Space Activities Act 1998* is binding Australian legislation. The requirements under the Act and the *Space Activities Regulations 2001* for applicants seeking an overseas launch certificate, as they are reflected in the Guidelines for Applicants seeking to apply for an Overseas Launch Certificate, are binding on all Australian nationals, with certain exemptions for Commonwealth entities.

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### **Relation to international mechanisms:**

The *Space Activities Act 1998* reflects obligations set out under the Outer Space Treaty, the Rescue Agreement, the Liability Convention, the Registration Convention and the Moon Agreement. These treaties are incorporated as schedules to the Act.

### **Link to other national mechanisms:**

None.

### **References:**

- Satellite Utilisation Policy – <http://www.space.gov.au/Documents/Australia's%20satellite%20utilisation%20policy%20-%20version%201.1p%20-%202016%20April%202013.pdf>
- Space Activities Act 1998 (Cth) – <http://www.comlaw.gov.au/Details/C2004C01013>

- Space Activities Regulations 2001 – <http://www.comlaw.gov.au/Details/F2004C00906>
- Guidelines for Applicants seeking to apply for an Overseas Launch Certificate – [http://www.space.gov.au/SpaceLicensingSafetyOffice/Documents/OLC\\_Guidelines\\_08\\_05\\_2013.pdf](http://www.space.gov.au/SpaceLicensingSafetyOffice/Documents/OLC_Guidelines_08_05_2013.pdf)

## AUSTRIA

### **National mechanism:**

Austrian Outer Space Act of 2011 (Bundesgesetz über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters - Weltraumgesetz) – entered into force on 28 December 2011 (Bundesgesetzblatt I Nr. 132/2011 of 27 December 2011).

### **Description:**

The Austrian Outer Space Act is the legal basis for Austrian space activities. In its Article 4, para. 1, letter 4, the Act provides that one of the conditions for authorisation of a space activity is that “appropriate provision has been made for the mitigation of space debris according to [Article] 5.”

Article 5 of the Austrian Outer Space Act is entitled “Mitigation of Space debris” and provides that: “The operator has to make provision for the mitigation of space debris in accordance with the state of the art and in due consideration of the internationally recognised guidelines for the mitigation of space debris. Especially measures limiting debris released during normal operations have to be taken.”

The Explanatory Report to the Austrian Outer Space Act explains the meaning and scope of Article 4, para 4, letter 4 and Article 5, as follows:

As to Article 4, para. 1, letter 4:

“The avoidance of space debris is an important concern of all States and all operators of space activities. Therefore, a separate Art., [Article] 5 (see below), has been formulated on the mitigation of space debris which emphasises this particular importance. The condition of letter 4 has therefore to be read and applied in combination with [Article] 5.”

As to Article 5 (Mitigation of Space Debris):

“The mitigation of space debris is an important concern of all States and operators of space activities. Therefore, the obligation to mitigate space debris plays an important role already in the conditions for authorisation in respect to [Article] 4 letter 4. In this sense, [Article] 5 and [Article] 4 letter 4 have to be read and applied in conjunction. Furthermore, the obligation to mitigate space debris represents an ongoing obligation of the operator also after the authorisation.

The ‘internationally recognised guidelines for the mitigation of space debris’ mentioned are first and foremost the Space Debris Mitigation Guidelines 2002 of the Inter-Agency Space Debris Mitigation Committee (IADC), as the Austrian government stresses in the “Explanatory Report”

to the Austrian Outer Space Act. Furthermore, it is noted that the ESA has aligned its ‘Requirements on Space Debris Mitigation for ESA Projects’ of 2008 with them [ESA/ADMIN/IPOL(2008)2, Annex 1] and that the UN COPUOS Space Debris Mitigation Guidelines of 2007 are also oriented towards them (see [http://www.oosa.unvienna.org/pdf/publications/st\\_space\\_49E.pdf](http://www.oosa.unvienna.org/pdf/publications/st_space_49E.pdf)).

‘Debris released during normal operations’ refers to debris created during normal operation of the space activity. This concerns solid and fluid residue that, as space debris, can cause severe damage to other space objects.”

### **Applicability:**

The scope of application of the Austrian Outer Space Act is regulated in its Article 1:

“(1) This Federal Law is applicable to space activities carried out

1. on Austrian territory,
2. on board of vessels or airplanes, registered in Austria or
3. by a natural person with Austrian citizenship or legal persons seated in Austria.

(2) Entitlements under private law are covered by this Federal Law only if Austrian law is applicable according to the rules of private international law. ”

### **Relation to international mechanisms:**

The UN COPUOS Space Debris Mitigation Guidelines and the IADC Space Debris Mitigation Guidelines are explicitly referred to in the “Explanatory Report” to the Austrian Outer Space Act in order to explain more specifically what is meant by “internationally recognised guidelines for the mitigation of space debris” in Article 5. This means that, in the authorisation process, particular attention will be paid to these guidelines by the authorising body. Operators not complying with those guidelines risk not getting the authorisation.

ITU Recommendations are only mentioned with respect to frequency allocation (see Article 4, para. 1, letter 6 according to which the authorizing body has to make sure that “the operator fulfils the requirements of the ITU concerning orbital positions and frequency assignments”).

The European Code of Conduct for Space Debris Mitigation and the ISO Standards (24113: Space Systems – Space Debris Mitigation Requirements; and others) are not explicitly mentioned but nevertheless may be taken into consideration as “internationally recognised guidelines for the mitigation of space debris” in the application of Article 5.

### **Link to other national mechanisms:**

None.

**References:**

- The Austrian Outer Space Act (English translation):  
<http://www.oosa.unvienna.org/pdf/spacelaw/national/austria/austrian-outer-space-actE.pdf>  
[http://www.spacelaw.at/documents/2012/Austrian\\_Outer\\_Space\\_Act.pdf](http://www.spacelaw.at/documents/2012/Austrian_Outer_Space_Act.pdf)
- German original as published in the official gazette of 27 December 2011: Bundesgesetz über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters (Weltraumgesetz)  
<http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007598&FassungVom=2011-12-28>
- The English translation of the Explanatory Report can be accessed at the website of the European Centre for Space Law (ECSL) National Point Of Contact (NPOC) Space Law Austria: [http://www.spacelaw.at/documents/2012/Explanatory\\_Report.pdf](http://www.spacelaw.at/documents/2012/Explanatory_Report.pdf) (page 6/7 Space Debris Mitigation)

## BELGIUM

### **National mechanisms:**

1. Law of 17 September 2005 on Activities of Launching, Flight Operation or Guidance of Space Objects (revised by the Belgian Parliament on 1 December 2013)
2. Royal Decree of 19 March 2008

### **Description:**

In Belgian Law, Space Debris issue is addressed under the provisions of the Law of 17 September 2005 on Activities of Launching, Flight Operation or Guidance of Space Objects (cf. article 4, §3, article 5, §1, and article 8, in particular §2, of the Law), as well as under the provisions of the Royal Decree of 19 March 2008 implementing some provisions of the Law (cf. article 7, §1, 3° and 4°, §2 and §4 on Nuclear Power Sources, of the Decree).

Neither the Law nor the Decree actually provides for technical space debris mitigation standards or norms to be complied with by the Operator, but it leaves to the Minister the possibility to impose to the Operator the compliance with standards and norms adopted by intergovernmental bodies and/or relevant non-governmental organizations. Such standards and norms are for instance the Space Debris Mitigation Guidelines adopted by UN COPUOS, technical standards adopted by IADC, ESA norms & standards, ISO norms, national space agencies' norms, etc. (see below).

Technical compliance with those standards and norms may, if applicable, be supervised and checked by a technical expert designated by the Minister. For that purpose, a specific agreement has been concluded between the national authority (BELSPO) and ESA.

### **Applicability:**

The Law applies to any activity which is carried on by an Operator from the Belgian territorial jurisdiction. The Operator is now defined (in the revised text) as he who exercises the ultimate authority over the activity (that is, the maneuvering of the space object). In the case of non-maneuverable space objects, the Operator is identified by the Law as he who orders the launch of the object according to specific parameters.

The Law doesn't make any distinction in its application whether the Operator is of Belgian nationality or foreign nationality.

**Relation to international mechanisms:**

Without prejudice to the Minister's decision on a case by case basis, it is likely that the conditions imposed to the Operator will refer to all the following instruments, standards and norms, provided that this doesn't result in any contradiction or redundancy: UN COPUOS Space Debris Mitigation Guidelines, IADC Space Debris Mitigation Guidelines, ITU Recommendation ITU-R S.1003, European Code of Conduct for Space Debris Mitigation, and ISO Standards (24113: Space Systems – Space Debris Mitigation Requirements. Priority should be given to UN COPUOS Space Debris Mitigation Guidelines complemented by IADC Space Debris Mitigation Guidelines.

The possibility also exists for the King to impose compliance with those instruments, standards and norms to all Operators. This is likely to happen once the first implementing cases of the Law will be reviewed. For the moment, the Law has not yet been implemented and the impact of the application of those instruments, standards and norms on the Belgian space operations sector has still to be assessed. This is why a case by case approach has been adopted so far.

**Link to other national mechanisms:**

So far, there is none. Although, it is explicitly provided by the Law and the Royal Decree that the Minister may call upon the expertise of foreign organisations before taking his/her decision on the application for authorisation.

**References:**

- [http://www.belspo.be/belspo/space/beLaw\\_en.stm](http://www.belspo.be/belspo/space/beLaw_en.stm)

## CANADA

**National mechanisms:**

1. Canadian Remote Sensing Space Systems Regulations – 2007

Legal Framework:

- *Canadian Remote Sensing Space Systems Act, 2005 (amended 2007)*

2. Canadian Space Agency adoption of the IADC Space Debris Mitigation Guidelines – 2012
3. Canadian Client Procedures Circular (CPC) for Licensing of Space Stations – 2014

**1. Canadian Remote Sensing Space Systems Regulations****Description:**

The Canadian Remote Sensing Space Systems Act is a national law adopted by Parliament. The Canadian Remote Sensing Space Systems Regulations are made by the Governor-in-Council upon the recommendation of the Minister of Department of Foreign Affairs, Trade and Development.

A remote sensing satellite disposal plan must be provided in order to obtain a Remote Sensing Satellite License in Canada. Under the Canadian Remote Sensing Space Systems Act, no person in Canada shall operate a remote sensing space system in any manner, directly or indirectly, except under the authority of a License. The Act mentions that a License may not be issued without a “system disposal plan” that, among other things, provides for the protection of the environment, public health, and the safety of persons and property. The Acts also sets out licensees’ requirements and obligations in regard to the disposal plan.

The Canadian Remote Sensing Space Systems Regulations provides information on the implementation of the Act. Under the section *Remote Sensing Satellite Disposal* in Schedule 1, the Regulations set out the requirements to be identified in the Disposal Plan, including the space debris mitigation standards. Those requirements are:

- a) method of disposal that is proposed for each satellite and the reliability of that method;
- b) estimated duration of the satellite disposal operation;
- c) probability of loss of human life and how it was calculated;
- d) amount of debris expected to reach the surface of the Earth, the size of the impact area expressed in square metres, and how they were calculated;



- e) confidence level of the determination of the boundaries and how the boundaries and confidence level were calculated;
- f) identity and quantity of hazardous material and dangerous goods contained in each satellite at the end of its mission life, the quantity expected to reach the surface of the Earth on re-entry and how the quantities were calculated;
- g) orbital elements and epochs of the proposed disposal orbits for each satellite;
- h) an assessment of space debris expected to be released from each satellite during normal operations by explosions, by intentional break-ups and by on-orbit collisions, and the measures proposed to mitigate the production of space debris.

**Applicability:**

The Act and its regulations are mandatory in Canada, and also apply to the following persons with respect to their activities outside Canada:

- (A) Canadian citizens;
- (B) permanent residents;
- (C) corporations that are incorporated or continued under the laws of Canada or a province;
- (D) members of any prescribed class of persons having a substantial connection to Canada related to remote sensing space systems.

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**2. Canadian Space Agency adoption of the IADC Space Debris Mitigation Guidelines**

**Description:**

The Canadian Space Agency (CSA) adopted the Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines in 2012 to mitigate the potential creation of space debris generated from its projects, missions and activities. It is intended to apply the IADC guidelines in the planning, design, construction, operation and end of life of CSA projects, missions and activities for which a Space Debris Mitigation Plan will be established as required in the guidelines.

**Applicability:**

The IADC Space Debris Mitigation Guidelines will apply to all CSA projects, missions and activities.

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**3. Canadian Client Procedures Circular (CPC) for Licensing of Space Stations**

**Description:**

Industry Canada, a Department of the Government of Canada, implemented a licensing regime for space stations (satellites) in 2014. The document *Client Procedures Circular (CPC) 2-6-02 – Licensing of Space Stations* sets out general licensing procedures for all Canadian space stations (satellites), including application requirements and post-authorization procedures related to licenses that use radio spectrum.

Section 3.3.3 Space Debris Mitigation Plan of CPC-2-6-02 requires that applicants for space station spectrum and radio licences submit a Space Debris Mitigation Plan as part of their applications.

Industry Canada distinguishes between geostationary satellites and non-geostationary satellites. The following is an excerpt from section 3.3.3 of the CPC 2-6-02 describing the policy requirement:

- For geostationary satellites, the applicant must submit a plan for de-orbiting their satellite(s) in compliance with Recommendation ITU–R S.1003-2, *Environmental Protection of the Geostationary Satellite Orbit*.
- For non-geostationary satellites, the applicant must submit a plan for de-orbiting their satellite(s) in accordance with best industry practices.

**Applicability:**

Use of radio frequencies in Canada requires the regulatory approval that is provided through a Radio Licence issued by Industry Canada. The space debris mitigation requirement is applicable to all space stations (satellites) licensed in Canada. The licensee must agree to comply with all the conditions of licence prior to being granted the licence.

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**Relation to international mechanisms:**

Canada contributed to and supported the development of the UN COPUOS Space Debris Mitigation Guidelines.

The space debris mitigation requirements of the Canadian Remote Sensing Space Systems Regulations are consistent with the UN COPUOS Space Debris Mitigation Guidelines and the IADC Space Debris Mitigation Guidelines.

The IADC Space Debris Mitigation Guidelines adopted by the CSA are consistent with the UN COPUOS Space Debris Mitigation Guidelines. They are also in compliance with the ISO 24113:

Space Systems – Space Debris Mitigation Requirements, and the ITU recommendations ITU-R S.1003.

The Canadian Client Procedures Circular (CPC) for Licensing of Space Stations is in compliance with the ITU Recommendation ITU-R S.1003 and the UN COPUOS Space Debris Mitigation Guidelines.

**Link to other national mechanisms:**

None.

**References:**

- Canadian Remote Sensing Space Systems Act:  
<http://laws-lois.justice.gc.ca/eng/acts/R-5.4/index.html>
- Remote Sensing Space Systems Regulations:  
<http://laws-lois.justice.gc.ca/PDF/SOR-2007-66.pdf>
- CPC-2-6-02-Licensing of Space Stations:  
<https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01385.html#s3.3>

**CHILE****National mechanism:**

Chile has not adopted yet any national mechanism on space debris mitigation.

Low profile discussions are in progress with a view to develop national space-related legislation in the near future.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

As a UN COPUOS Member State Chile fully adheres to the UN COPUOS Space Debris Mitigation Guidelines. Furthermore it supports IADC Space Debris Mitigation Guidelines, ISO Space Systems – Space Debris Mitigation Requirements (ISO 24113:2011) and ITU Recommendation ITU-R S.1003.

**Link to other national mechanisms:**

None.

**References:**

None.

**CZECH REPUBLIC****National mechanism:**

The Czech Republic has not adopted yet any national mechanism on space debris mitigation. Low profile discussions are in progress with a view to develop national space-related legislation in the near future.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

As a UN COPUOS Member State the Czech Republic fully adheres to the UN COPUOS Space Debris Mitigation Guidelines. Furthermore it supports IADC Space Debris Mitigation Guidelines, European Code of Conduct for Space Debris Mitigation, ISO Space Systems – Space Debris Mitigation Requirements (ISO 24113:2011) and ITU Recommendation ITU-R S.1003.

**Link to other national mechanisms:**

None.

**References:**

None.

## FRANCE

**National mechanism:**

Decree on Technical Regulation issued pursuant to Act n°2008-518 of 3rd June 2008, 31 March 2011

Legal framework:

- *French Space Operations Act n°2008-518 of 3rd June 2008*

**Description:**French Space Operations Act n°2008-518 of 3rd June 2008

The French Space Operations Act (FSOA) was adopted in 2008. It has established a national regime of authorization and supervision of national space activities.

Systems and procedures implemented by the operator in the frame of the operation shall be compliant with the national technical regulation. Authorizations are issued by the Minister in charge of space affairs, on the basis of a technical assessment carried out by the French space agency, CNES.

It is foreseen by the FSOA that the authorizations granted may include specific requirements set forth for the safety of persons and property, protection of public health and the environment, in particular in order to limit risks related to space debris (art. 5 FSOA).

Decree on Technical Regulation issued pursuant to Act n°2008-518 of 3rd June 2008, 31 March 2011

The Technical Regulation issued in 2011 pursuant to the FSOA contains the technical requirements that any operator shall comply with. The Technical Regulation is composed of a first part dedicated to launch systems and of a second part dedicated to orbital systems. Both parts contain provisions related to the mitigation of space debris.

- For launch systems, article 21 ('Space Debris limitation'):

*The launch system implemented by the launch operator must be designed, produced and implemented such as to comply with the following requirements for the elements operating in outer space:*

*1. The launcher must be designed, produced and implemented in such a way as to minimise the production of debris during nominal operations, including after the end-of-life of the launcher and its component parts. The launch operator in particular takes the following measures in this respect:*

- for launch of a single space object, a single launcher element (for example a stage) may be placed in orbit;
- for launch of several space objects, a maximum of two launcher elements (for example a stage or the adapter structure) may be placed in orbit.

The above requirements do not apply:

- to pyrotechnic systems. The largest dimension of any products generated must be less than 1 mm;
- to solid propellant boosters. The size of any combustion debris generated in protected region B must be less than 1 mm. With regard to the design and operation of solid propellant boosters, the launch operator takes steps to avoid placing solid combustion products in long term orbit which could contaminate protected region A.

2. The launcher must be designed, produced and implemented so that the debris produced in compliance with the requirements of the first paragraph above and which do manage to reach the surface of the Earth, constitute no excessive risk for individuals, property, public health or the environment, in particular as a result of environmental pollution by hazardous substances.

3. The probability of occurrence of accidental break-up must be less than  $10^{-3}$  until the end-of-life of the space object. This calculation must include failure modes of propulsion and power systems, mechanisms and structures but does not take account of any external impacts.

Intentional fragmentations of launcher elements are prohibited.

4. The launcher must be designed, produced and implemented so that, following the disposal phase:

- all the on-board energy reserves are permanently depleted or placed in a state such that depletion of the on-board energy reserves is inevitable, or in such a condition that they entail no risk of generating debris;
- all the means for producing energy production means are permanently deactivated.

5. The launcher must be designed, produced and implemented so that, after the end of the launch phase, its components placed in orbits passing through protected region A are de-orbited by controlled atmospheric re-entry.

If the impossibility of meeting this requirement can be duly proven, the launcher must be designed, produced and implemented so that its components are no longer present in protected region A twenty-five years after the end of the launch phase. This result is preferably achieved by uncontrolled atmospheric re-entry or, failing that by placing them to an orbit for which the perigee remains above protected region A for one hundred years following the end of the operation.

6. The launcher must be designed, produced and implemented so that, after the end of the launch phase, its components stationed in an orbit in or passing through protected region B, are placed in an orbit which does not interfere with this region for more than one year. This orbit must be such that, under the effect of natural disturbances, the launcher or its components do not return to protected region B within one hundred years following the end of the operation.

7. The probability of successfully completing the disposal manoeuvres mentioned in paragraphs 4, 5 and 6 above must be at least 0.9. This probability is evaluated for the total duration of the operation. Its calculation, carried out before the beginning of the space operation, must take account of all the systems, subsystems and equipment usable for these manoeuvres, their redundancy levels as applicable and their reliability, taking account of the effects of the ageing reached at the time for which their use is scheduled, along with the availability of the means and energy resources necessary for these manoeuvres.

- For orbital systems, article 40:

*The systems implemented by the operator must be designed, produced and implemented such as to comply with the following requirements:*

*1. The systems must be designed, produced and implemented so as to avoid generating debris during nominal operations of the space object.*

*The above requirement does not apply:*

- *to pyrotechnic systems. The largest dimension of any products they generate must however be less than 1 mm;*
- *to solid propellant boosters. The size of any combustion debris they generate in protected region B must however be less than 1 mm. With regard to the design and operation of solid propellant boosters, the operator implements measures allowing to avoid placing durably in orbit solid combustion products which could contaminate protected region A.*

*2. The probability of occurrence of accidental break-up must be less than  $10^{-3}$  until the end of life of the space object. This calculation must include failure modes of propulsion and power systems, mechanisms and structures, but does not take into account external impacts.*

*If a situation leading to such a failure is detected, the operator must be able to schedule and implement corrective measures to prevent any break-up.*

*3. The systems must be designed, produced and implemented so that, following the disposal phase:*

- *all the on-board energy reserves are permanently depleted or placed in such a condition that they entail no risk of generating debris,*
- *all the means for producing energy on-board are permanently deactivated.*

*4. The systems must be designed, produced and implemented so that, once the space object has completed its operational phase in an orbit passing through protected region A, the space object is deorbited with controlled atmospheric re-entry.*

*If the impossibility of meeting this requirement can be duly proven, it must be designed, produced and implemented so that it is no longer present in protected region A twenty-five years after the end of the operational phase. This result is preferably achieved by uncontrolled atmospheric re-entry or, failing that, by placing in a stable orbit for which the perigee remains above protected region A for one hundred years following the end of the operation.*

*5. The space object must be designed, produced and implemented so that, once it has completed its operational phase in an orbit in or passing through protected region B, it is placed in an orbit which does not interfere with this region. This orbit must be such that, under the effect of natural disturbances, the object does not return to protected region B within one hundred years following the end of the operation.*

*6. The probability of having sufficient energy resources to successfully carry out the disposal manoeuvres mentioned in paragraphs 3, 4 and 5 above must be at least 0.9.*

*7. The operator must evaluate the probability of being able to successfully carry out the disposal manoeuvres mentioned in paragraphs 3, 4 and 5 above. This evaluation, which does not include the availability of energy resources, must be made by the operator for the total duration of the operation and take account of all systems, subsystems and equipment usable for these manoeuvres, their level of redundancy, if any, and their reliability, taking account of the effects of the ageing reached at the time they are scheduled to be carried out.*



It has to be mentioned that interim provisions are foreseen by the Technical Regulation, in order to adapt the application of the provisions related to space debris for existing space systems (art. 55 of the Technical Regulation).

**Applicability:**

French Space Operations Act n°2008-518 of 3rd June 2008

The scope of the FSOA covers:

- Launch and return operations carried out from the French territory
- Launch and return operations carried out by a French operator from a foreign country
- Procurement of a launch by a French entity
- Control of space objects in outer space by a French operator

As a law, it is mandatory for concerned space operators.

Decree on Technical Regulation issued pursuant to Act n°2008-518 of 3 June 2008, 31 March 2011

As a decree, the Technical Regulation is mandatory for concerned space operators.

**Relation to international mechanisms:**

France has contributed to the development of UN COPUOS Space Debris Mitigation Guidelines, the European Code of Conduct for Space Debris Mitigation and, through CNES, to the IADC Space Debris Mitigation Guidelines. The French Technical Regulation is consistent with these guidelines, as well as with the ISO 24113 standard.

**Link to other national mechanisms:**

None.

**References:**

French Space Operations Act n°2008-518 of 3rd June 2008

<http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000018931380&fastPos=9&fastReqId=1846263462&categorieLien=cid&oldAction=rechTexte>

Decree on Technical Regulation issued pursuant to Act n°2008-518 of 3rd June 2008, 31 March 2011

<http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000024095828&fastPos=5&fastReqId=289170871&categorieLien=cid&oldAction=rechTexte>

## GERMANY

**National mechanism:**

Product Assurance and Safety Requirements for DLR Space Projects: April 2012 (Issue 7.0)

Legal framework:

- *Raumfahrtaufgabenübertragungsgesetz* 22 August 1998, BGBl. I, 2510 (Delegation of Space Activities Act)
- *Telekommunikationsgesetz*, 22 June 2004, BGBl. I, 1190 (Telecommunications Act), as amended 7 August 2013, BGBl. I, 3154

**Description:**

The Space Administration of the German Aerospace Centre (DLR) implements the German national space program. It is the policy of DLR that each contractor involved in the implementation of a particular space mission applies product assurance and safety requirements, including space debris mitigation, throughout all project phases.

For space projects of the Space Administration of DLR, space debris mitigation requirements are mandatory as part of the *Product Assurance and Safety Requirements for DLR Space Projects (DLR Requirements)*. This catalogue provides the core from which project-specific product assurance and safety requirements are prepared and tailored. The document includes space debris mitigation measures and specifies these requirements.

In implementing a particular space mission, the requirements contained in the *DLR Requirements* are tailored to the respective project according to the mission characteristics. The aim is to ensure the application of the relevant requirements, their verifiability and their practicability during the development, production and operation phases of a space project. The tailored requirements form part of the project requirements in the invitation of tenders as well as of the contractual agreements with the respective contractors. In the course of the implementation of the space mission, non-compliance with any of the tailored requirements may be possible on the basis of a waiver. The waiver shall provide the rationale and justification for the deviation and requires formal approval by DLR.

The *DLR Requirements* comprise various requirements that aim to implement a comprehensive system of space debris mitigation. Their general objective is to limit the creation of new space debris and thus to limit the risk to other current and future space missions and the risk to human life. The measures to be adopted in order to achieve this objective include the following categories of requirements:

### 5.7.7 Space Debris Mitigation Assessments

#### 5.7.10 Space Debris Mitigation Assessment Reports

in respect to: the release mission-related objects, accidental breakups and potential explosions, potential for on-orbit collisions, post-mission disposal plans and procedures and re-entry hazards

#### 5.7.11 Design Measures

in respect to: prevention of mission-related objects, solid propellants and pyrotechnics, materials and technologies, fragmentation prevention, malfunctioning prevention, on-orbit collisions prevention, limitation of consequences from impact of existing debris/meteorites

#### 5.7.12 Passivation

#### 5.7.13 Disposal Maneuvers

in respect to: LEO and GEO protected regions as well as MEO

#### 5.7.14 Re-entry Safety Measures

in respect to: type of re-entry, methods of compliance assessment, notification

#### 5.7.15 Project Reviews

### **Applicability:**

The *Product Assurance and Safety Requirements for DLR Space Projects* are mandatory throughout all phases of all space missions of the DLR Space Administration.

### **Relation to international mechanisms:**

The space debris mitigation requirements of the *Product Assurance and Safety Requirements for DLR Space Projects* are consistent with the COPUOS Space Debris Mitigation Guidelines, the IADC Space Debris Mitigation Guidelines and the European Code of Conduct for Space Debris Mitigation. They furthermore refer to relevant ISO standards, including ISO 24113, and standards adopted by the European Cooperation for Space Standardization ECSS. The recommendations of the ITU Radiocommunication Assembly in respect to space debris mitigation (ITU-R S.1003-2, Environmental protection of the geostationary-satellite orbit) are among the conditions which the users of German orbit and frequency rights have to fulfill (on the basis of § 56 *Telekommunikationsgesetz*).

Germany has contributed to the development of the IADC Space Debris Mitigation Guidelines in the scope of the IADC and participated in the elaboration of the European Code of Conduct for Space Debris Mitigation in the European Network of Competencies. Germany regards the UN

COPUOS Space Debris Mitigation Guidelines as providing generally accepted guidance for the adoption of national mechanisms governing space debris mitigation.<sup>1</sup>

**Link to other national mechanisms:**

The mechanisms NASA STD 8719.14 “Process for Limiting Orbital Debris” and NASA-NPR-8715.6A “Procedural Requirements for Limiting Orbital Debris” represent informative references for the *DLR Requirements*.

**References:**

- [http://www.gesetze-im-internet.de/ra\\_g/BJNR010140990.html](http://www.gesetze-im-internet.de/ra_g/BJNR010140990.html)
- [http://www.gesetze-im-internet.de/tkg\\_2004/BJNR119000004.html](http://www.gesetze-im-internet.de/tkg_2004/BJNR119000004.html)

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<sup>1</sup> German Statement under Agenda Item 11 of the 49<sup>th</sup> session of the Legal Subcommittee (22 March-1 April 2010).

## ITALY

**National mechanism:**

Discussions are in progress with a view to develop national space-related legislation in the near future including provisions covering space debris mitigation measures. Pending the approval of a national space law, implementation of measures relevant to space debris mitigation are currently limited to the Italian Space Agency's (ASI) standard contracts provisions. ASI has the institutional task of defining, coordinating and managing national space programs.

**Description:**

None.

**Applicability:**

ASI applies the European Code of Conduct for Space Debris Mitigation, which it has signed on 14 February 2005, through its standard contract provisions, by making the the European Code of Conduct an ASI standard contracts applicable mandatory document.

**Relation to international mechanisms:**

The primary objectives of the European Code of Conduct for Space Debris Mitigation is to implement the following measures:

- prevention of on-orbit break-ups and collisions,
- removal and subsequent disposal of spacecraft and orbital stages that have reached the end of mission operations from the useful densely populated orbit regions,
- limitation of objects released during normal operations.

The above measures are applicable to the Italian Space Agency projects as follows: for space missions developed before 2005 or already in orbit, ASI has tried to implement the provisions of the European Code to the maximum possible extent, mainly in terms of end of life space debris mitigation procedures, in particular, the disposal phase of the satellites. After 2005, the Space Debris Mitigation European Code of Conduct is an applicable document to ASI space programs and projects, that is from the design, the development and the operational phase of satellites.

The European Code of Conduct for ASI Space Projects is mandatory throughout all phases of all space missions.

Through the application of the European Code of Conduct for Space Debris Mitigation, ASI is also consistent with a number of international mechanisms such as: UN COPUOS Space Debris

Mitigation Guidelines, IADC Space Debris Mitigation Guidelines; ITU Recommendation ITU-R S.1003 relevant to Environmental Protection of Geostationary satellite orbit; ISO Standards (24113 and following deriving standards), that have been developed afterwards. In this framework, ASI is going to update its current contractual provisions in line with the above updated space debris mitigation measures.

ASI is a member of the IADC and contributed to the IADC drafting and relevant updating of the IADC Space Debris Mitigation Guidelines; at UN COPUOS level, Italy fully contributed to the developing of the UN COPUOS Space Debris Mitigation Guidelines.

**Link to other national mechanisms:**

None.

**References:**

None.

## JAPAN

### **National mechanism:**

JAXA-Management Requirements (JMR-003B), revised in 2011

The NASDA “Space Debris Mitigation Standard” (NASDA-STD-18)<sup>2</sup> was adopted in 1996. In view of the integration of NASDA with other space related organizations and its transformation to JAXA in 2003, NASDA-STD-18 was changed to the “JAXA-Management Requirements 003 (JMR-003)”. It was revised to version B in 2011 to be equivalent to ISO-24113 “Space Debris Mitigation Requirements”.

### **Description:**

JMR-003B includes the following requirements:

- Preventing the on-orbit break-up of a space system after the end of its mission, which could generate a large amount of debris
- Transferring a spacecraft that has completed its mission in the Geostationary Earth Orbit (GEO) into a higher orbit in order to preserve the GEO environment
- Reducing the orbital lifetime during which the orbital stage left in the Geostationary Transfer Orbit (GTO) can interfere with the GEO region, in order to preserve the GEO environment
- Minimizing the number of objects released in orbit during the operation of a space system
- Reducing the orbital lifetime during which a space system that had completed operation can interfere with the useful Low Earth Orbit (LEO) region.
- Preventing human casualties on the ground caused by impact of space systems removed from the orbit as well as in the orbit caused by collision with a manned system during space systems launch.
- Minimizing damage caused by on-orbit collision

JMR-003B is an internal document of JAXA, but other Japanese government administrations respect it and apply it in procurement of their spacecraft. This standard is available only in Japanese language.

JAXA standard was among the world first space debris mitigation guidelines developed. It provides in-depth technical procedures for multiple debris mitigation areas involving reentry

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<sup>2</sup> Also referred to as Standard 18.

risks and specifies detailed requirements to be met by contractors. The technical requirements of Standard 18 are similar to those of NASA Safety Standard 1740.14 “Guidelines and Assessment Procedures for Limiting Orbital Debris” but different points are it includes management requirements including the assignment of responsible manager and its organization, documentation of the debris mitigation plan, and technical review during lifecycle to ensure the compliance. However it doesn’t mention complex requirements as NASA standard, such as guidelines limiting released objects with the product of cross sectional area and orbital lifetime, or that of number of objects and orbital lifetime, which would not be easy to verify the compliances.

Supporting documents: To support the project teams following document and analysis tools are being provided:

- a) JERG-2-144-HB001: Space Debris Protection Design Manual
- b) JERG-0-002: Handbook for Space Debris Mitigation Standard
- c) Debris mitigation assessment tool,
- d) Re-entry survivability analysis tool,
- e) Orbital lifetime estimation tool,
- f) Debris impact damage assessment tool

**Applicability:**

JAXA applies the standard to all of its space projects. JAXA requires the compliance with the standard to the contractors who design its spacecraft and launch vehicles, and recommend other users who apply to launch their spacecraft with the launch vehicles that JAXA has responsibility for their launch and flight safety. To show the compliance, contractors are requested to develop a “Space Debris Mitigation Management Plan” to be authorized by JAXA.

**Relation to international mechanisms:**

JMR-003B makes no reference to other international guidelines, but its requirements are well consistent with ITU-R S.1003, UN COPUOS Guidelines and ISO standards (ISO-24113 and other debris related standards).

**Link to other national mechanisms:**

None.

**References:**

None.



**MEXICO****National mechanism:**

Mexico has not yet adopted a national regulatory framework on space debris mitigation. However, high level discussions within the competent bodies are taking place to develop mechanisms arising in a national legislation in the short term.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

Mexico, as one of the 18 founding members of the UN COPUOS and having signed and ratified the five United Nations Treaties on outer space is aligned with the UN COPUOS Space Debris Mitigation Guidelines. Moreover, Mexico supports the IADC Guidelines on Space Debris Mitigation and agrees with the ITU Recommendations ITU-R.S 1003 on the environmental protection of the geostationary satellite orbit, the standards of the European Code of Conduct for Space Debris Mitigation as well as the ISO 24113 for space systems: Space Debris Mitigation Requirements.

**Link to other national mechanisms:**

None.

**References:**

None.

## THE NETHERLANDS

**National mechanism:**

Space policy in the Netherlands is primarily focused on international cooperation in European contexts within ESA, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and the EU. This means that the Netherlands has no national space debris mitigation mechanism.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

As a UN COPUOS Member State the Netherlands fully adheres to the UN COPUOS Space Debris Mitigation Guidelines, IADC Space Debris Mitigation Guidelines, ITU Recommendation ITU-R S.1003, the European Code of Conduct for Space Debris Mitigation and the ISO Standards. The Netherlands supports ESA- and EU-initiatives.

**Link to other national mechanisms:**

None.

**References:**

None.

## NIGERIA

### **National mechanism:**

National Space Research and Development Agency Act 2010 No.9 A 1255

### **Description:**

The National Space Research and Development Agency Act 2010 (NASRDA ACT) established formally the National Space Research and Development Agency, empowering the National Space Council as the regulating and supervisory entity for space activities in Nigeria.

By virtue of the Act, the National Space Council authorizes licences for all space activities in Nigeria. License condition under this Act includes permitting inspection and testing of the licensee's facilities and equipment. License may also be issued on the condition that the licensee provides information to the Council concerning the nature, conduct, location and results of the licensee's activities.

An advance approval of the Council must be obtained for any intended deviation from orbital parameters and it is obligatory to inform the Council immediately of any unintended deviation.

In the Act, particular emphasis is placed on the mitigation of space debris, a licensee is required to conduct its operations in such a way as to prevent the contamination of outer space or cause any adverse changes in the environment of the Earth, to avoid interference with the activities of others states involved in the peaceful exploration of outer space and, to govern the disposal of the pay load in outer space on the termination of operations.

A comprehensive amendment of the Act is planned.

### **Applicability:**

The National Space Research and Development Agency Act 2010, is applicable to all space activities within Nigeria by both citizens and non-citizens.

### **Relation to international mechanisms:**

Nigeria is an active member of UN COPUOS, with participation in Legal and Scientific and Technical Subcommittees. It supports in totality the UN COPUOS Space Debris Mitigation Guidelines and the IADC Space Debris Mitigation Guidelines.

Disposal of payload as a condition to obtain a licence as contained in the NASRDA Act is in compliance with UN COPUOS Space Debris Mitigation Guidelines.

**Link to other national mechanisms:**

None.

**References:**

None.

**POLAND****National mechanism:**

The Republic of Poland has not yet adopted any national legally binding mechanism on space debris mitigation, but it aligns itself with the guidelines of the United Nations.

Since the process of preparing a national space-related law has been started, an ongoing discussion is taking place regarding potential inclusion of specific requirements of debris mitigation standards in the basic act.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

The Republic of Poland fully adheres to such mechanisms as UN COPUOS Space Debris Mitigation Guidelines, IADC Space Debris Mitigation Guidelines, ITU Recommendation ITU-R S.1003, European Code of Conduct for Space Debris Mitigation, ISO Standards (24113: Space Systems – Space Debris Mitigation Requirements; and others).

**Link to other national mechanisms:**

None.

**References:**

None.

**SLOVAK REPUBLIC****National mechanism:**

The Slovak Republic didn't implement into its legislation any restrictions or rules concerning space debris mitigation policy. The Slovak Republic is currently negotiating its membership into the European Space Agency. This attempt can later lead to the adoption of national mechanism on space debris mitigation.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

Slovak Republic is a member of UN COPUOS, that is why it fully supports the UN COPUOS Space Debris Mitigation Guidelines. Furthermore it supports IADC Space Debris Mitigation Guidelines, European Code of Conduct for Space Debris Mitigation, ISO Space Systems – Space Debris Mitigation Requirements (ISO 24113:2011) and ITU Recommendation ITU-R S.1003.

**Link to other national mechanisms:**

None.

**References:**

None.

**SPAIN****National mechanism:**

Spain has not yet adopted a specific legal mechanism on space debris mitigation.

**Description:**

None.

**Applicability:**

None.

**Relations to international mechanisms:**

Spain, being a member of UN COPUOS, supports the initiatives aimed at mitigating the impact of space debris, and in particular adheres to the UN COPUOS Space Mitigation Guidelines. Similarly it supports the guidelines already developed in other international fora, such as the European Code of Conduct for Space Debris Mitigation, the IADC Space Debris Mitigation Guidelines, the ISO Space Debris Mitigation Requirements ISO 24113:2011 and the ITU Recommendation ITU-R S.1003. In addition, Spain supports the adoption of the International Code of Conduct for Outer Space Activities, whose draft is currently under discussion.

**Link to other national mechanisms:**

None.

**References:**

None.

**SWITZERLAND****National mechanism:**

Switzerland has for now no national mechanism on space debris mitigation.

**Description:**

None.

**Applicability:**

None.

**Relation to international mechanisms:**

As a UN COPUOS Member State, Switzerland fully adheres to the UN COPUOS Space Debris Mitigation Guidelines. Furthermore it actively participates to the UN COPUOS Working Group on Long Term Sustainability for Space Activities (LTSSA). Alongside the COPUOS Space Debris Mitigation Guidelines, Switzerland shares the view that the IADC Space Debris Mitigation Guidelines, the European Code of Conduct for Space Debris Mitigation, the ISO Space Systems - Space Debris Mitigation Requirements (ISO 24113:2011) and the ITU Recommendation ITU-R S.1003 should achieve the best possible acceptance within the international space community.

Moreover, Switzerland is conducting the majority of its space activities through the European Space Agency (ESA).<sup>3</sup>

**Link to other national mechanisms:**

None.

**References:**

None.

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<sup>3</sup> Please refer to the ESA profile (p.45) for a comprehensive description of the relevant space debris mitigation mechanisms and policy applicable to the Agency's missions and activities.



## UKRAINE

**National mechanism:**

Industrial standard URKT-11.03 “Limitation of the Near-Earth Orbital Debris Making at Operation of Space Technical Equipment”, entered into force in on 19 July 2006

**Description:**

The main technical activities on limitation of space debris generation stated in the industrial standard URKT-11.03 are as follows:

1. Elimination or minimization of space debris generation during standard operations.
2. Minimization of the possibility of space objects breaking in orbit (including their passivation after mission’s completion or in case of failure).
3. Removal of spacecraft and launch vehicles from orbit after mission’s completion.
4. Prevention of space objects collisions in near-Earth space.

**Applicability:**

The requirements of the standard are compulsory for all subjects of space activity. They extend to launch vehicles and spacecraft, including the ones that are developed for foreign organizations, if the contract does not specify other space debris limitation activity.

**Relation to international mechanisms:**

The industrial standard URKT 11.03 is consistent with the UN COPUOS Space Debris Mitigation Guidelines and IADC Space Debris Mitigation Guidelines.

**Link to other national mechanisms:**

None.

**References:**

None.

## UNITED KINGDOM

### **National mechanism:**

Outer Space Act 1986 (OSA)

### **Description:**

The Outer Space Act is the legal basis for the regulation of activities in outer space (including the launch and operation of space objects) carried out by persons connected with the United Kingdom. The Act confers licensing and other powers on the Secretary of State acting through the UK Space Agency. The Act ensures compliance with UK obligations under the international conventions covering the use of outer space to which the UK is a signatory.

Under the legislation of the OSA, the Secretary of State shall not grant a licence unless he is satisfied that the activities authorised by the licence will not jeopardise public health or the safety of persons or property, will be consistent with the international obligations of the United Kingdom, and will not impair the national security of the United Kingdom. Further the Secretary of State requires the licensee to conduct his operations in such a way as to prevent the contamination of outer space or adverse changes in the environment of the Earth, and to avoid interference with activities of others in the peaceful exploration and use of outer space.

The Secretary of State requires the licensee to insure himself against liability incurred in respect of damage or loss suffered by third parties, in the United Kingdom or elsewhere, as a result of the activities authorised by the licence. Further the licensee shall indemnify Her Majesty's government in the United Kingdom against any claims brought against the government in respect of damage or loss arising out of activities carried on by him to which this Act applies.

The OSA provides the necessary regulatory oversight to: consider public health and safety, and the safety of property; to evaluate the environmental impact of proposed activities; to assess the implications for national security and foreign policy interests; and to determine financial responsibilities and international obligations.

Within the OSA framework, safety evaluation aims to determine whether an applicant can safely conduct the launch of the proposed launch vehicle(s) and any payload. Because the licensee is responsible for public safety, it is important that the applicant demonstrate an understanding of the hazards involved and discuss how the operations will be performed safely. There are a number of technical analyses, some quantitative and some qualitative, that the applicant must perform in order to demonstrate that their commercial launch operations will pose no unacceptable threat to the public. The quantitative analyses tend to focus on the reliability and

functions of critical safety systems, and the hazards associated with the hardware, and the risk those hazards pose to public property and individuals near the launch site and along the flight path, to satellites and other on-orbit spacecraft. The qualitative analyses focus on the organisational attributes of the applicant such as launch safety policies and procedures, communications, qualifications of key individuals, and critical internal and external interfaces.

Under the legislation of the OSA, the Secretary of State shall not grant a licence unless he is satisfied that the activities authorised by the licence will not jeopardise public health or the safety of persons or property, will be consistent with the international obligations of the United Kingdom, and will not impair the national security of the United Kingdom. Further the Secretary of State requires the licensee to conduct his operations in such a way as to prevent the contamination of outer space or adverse changes in the environment of the Earth, and to avoid interference with activities of others in the peaceful exploration and use of outer space.

The OSA provides the necessary regulatory oversight to: consider public health and safety, and the safety of property; to evaluate the environmental impact of proposed activities; to assess the implications for national security and foreign policy interests; and to determine financial responsibilities and international obligations.

In assessing a mission proposed by a licence applicant, UK Space Agency assessors exploit references to the protection of public health or the safety of persons or property, the prevention of the contamination of outer space or adverse changes to the environment of the Earth, and the avoidance of interference with activities of others in order to reflect current best practices relating to space debris mitigation. Accordingly, during the safety review, applicants will be obliged to demonstrate compliance/conformance with existing norms/best practices in relation to measures such as the IADC Space Debris Mitigation Guidelines, UN COPUOS Space Debris Mitigation Guidelines, and the growing body of international standards relating to debris.

### **Applicability:**

OSA is a mandatory, statutory instrument applying to UK nationals (i.e. personal rather than territorial).

### **Relation to international mechanisms:**

In performing analysis of licence applications, compliance with the requirements identified in the following documents are evaluated and will determine whether a licence will be issued or otherwise:

- UN COPUOS Space Debris Mitigation Guidelines
- IADC Space Debris Mitigation Guidelines
- ITU Recommendation ITU-R S.1003

- ISO Standards (24113: Space Systems – Space Debris Mitigation Requirements; and others)

**Link to other national mechanisms:**

None.

**References:**

- <http://www.bis.gov.uk/ukspaceagency/what-we-do/space-and-the-growth-agenda/uk-capabilities-for-overseas-markets/the-outer-space-act-1986>

## EUROPEAN CODE OF CONDUCT FOR SPACE DEBRIS MITIGATION

### **International mechanism:**

European Code of Conduct for Space Debris Mitigation, Issue 1.0, 28 June 2004

### **Description:**

The European Code of Conduct for Space Debris Mitigation (in the following: the Code) has been developed and formally adopted, upon signature by their Directors General, by the Italian Space Agency (ASI), the British National Space Centre (BNSC<sup>4</sup>), the French Space Agency (CNES), the German Aerospace Agency (DLR) and the European Space Agency (ESA).

The primary objectives of the Code are a) to help preventing on-orbit break-ups and collisions of spacecraft, b) to facilitate the removal from useful densely populated orbit regions and subsequent disposal of spacecraft and orbital stages that have reached the end of mission operations and c) to help limiting objects released during normal spacecraft operations. To reach these goals, the Code presents fundamental mitigation, safety and protection measures for the design and operation of space systems. These measures are grouped into 1) management measures, 2) design measures including end-of-life measures, 3) operational measures including end-of-life measures, 4) impact protection measures and 5) re-entry safety measures. It does not cover the launch phase safety.

The Code is accompanied by a “Support to Implementation” document aiming at providing appropriate sources of information and tools to individuals involved in the management, design, operation and mission control of spacecraft.

### **Applicability:**

The application of the Code is on voluntary basis. The agencies having adopted it recommend its application “by any other space project conducted in Europe, or by a European entity acting outside Europe, including operators” (Article 2.2 of the Code). The Code contains provisions that “may be given binding effect by means of legal instruments between contracting parties”.

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<sup>4</sup> now UK Space Agency

**Relation to international mechanisms:**

The Code is consistent with the IADC Space Debris Mitigation Guidelines (which, in turn, were used as a foundation for the development of the UN COPUOS Space Debris Mitigation Guidelines), while providing greater (technical) detail and explanations. The Code, in its introduction, furthermore makes reference to Articles I and IX of the Outer Space Treaty of 1967 and to the Liability Convention of 1972.

**References:**

None.

## ESA SPACE DEBRIS MITIGATION FOR AGENCY PROJECTS

### **International mechanism:**

“Space Debris Mitigation for Agency Projects”, administrative instruction of the European Space Agency (ESA) Director General, entered into force on 01 April 2008.

Note: Currently, an update of the administrative instruction of 2008 is being finalised, with the goal of fully aligning ESA’s space debris mitigation policy to ISO Standard 24113 “Space Systems – Space Debris Mitigation Requirements” issued in May 2011 and adopted by the European Coordination on Space Standardisation (ECSS) as the ECSS-U-AS-10C standard in 2012.

### **Description:**

The administrative instruction “Space Debris Mitigation for Agency Projects” of the ESA Director General shall be used as ESA-applicable standard for the procurement of space systems (started after the entry into force of the instruction) and for the procurement of launch services for ESA programmes. Compliance with a set of operational requirements is requested where ESA is responsible for the operation of any given space system. The instruction contains two annexes listing a) requirements on space debris mitigation for ESA projects (see below) and b) terms and definitions.

The “Requirements on Space Debris Mitigation for ESA Projects”, annexed to the administrative instruction “Space Debris Mitigation for Agency Projects” of the ESA Director General, define a minimum set of requirements (management requirements, design requirements and operational requirements) for the limitation of space debris, in particular in the Low Earth Orbit (LEO) and Geosynchronous Earth Orbit (GEO) protected areas, and a minimum set of risk reduction measures in the case of re-entries of space systems (or their components) into the Earth’s atmosphere.

### **Applicability:**

The European Space Agency is an international intergovernmental organisation with international legal personality (Art. 15 ESA Convention) and thus a subject of public international law. The ESA Director General is its executive organ (Art. 10, 12 ESA Convention). Within the ESA legal system, the Director General’s administrative instructions and policies are binding for all ESA staff, who, in applicable cases, have to ensure the correct implementation of such acts in ESA’s relation with third parties.

**Relation to international mechanisms:**

The European Code of Conduct for Space Debris Mitigation, the Inter-Agency Space Debris Coordination Committee (IADC) Guidelines for Space Debris Mitigation, the UN COPUOS Space Debris Mitigation Guidelines and the United Nations Treaties and Principles on Outer Space are referenced in the administrative instruction “Space Debris Mitigation for Agency Projects” of the ESA Director General; the technical requirements in the administrative instruction are similar, yet more specific, and meet the same intent of the requirements that are listed in the ISO Standard 24113 of 2011. Therefore, ESA’s space debris mitigation policy is fully in line with the non-binding guidelines listed above. It shall be reminded that ESA has taken an active role in the elaboration of some of these instruments, in particular through its involvement in the IADC and through its endorsement of the European Code of Conduct for Space Debris Mitigation of 2004.

**Link to national mechanisms:**

There is no legal relation between the administrative instruction “Space Debris Mitigation for Agency Projects” of the ESA Director General and national space debris mitigation mechanisms of ESA Member States or non-Member States. However, the administrative instruction specifies that all reasonable efforts shall be made to ensure that, whenever relevant, ESA programmes comply with re-entry regulations and procedures of launching states [cf. Art.VII Outer Space Treaty].

**References:**

- ESA’s space debris mitigation mechanism and ESA activities regarding space debris mitigation are described on the website of ESA under

[http://www.esa.int/Our\\_Activities/Operations/Space\\_Debris](http://www.esa.int/Our_Activities/Operations/Space_Debris)



## IADC SPACE DEBRIS MITIGATION GUIDELINES

### **International mechanism:**

Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines, 2002; revised 2007

### **Description:**

At the 17<sup>th</sup> meeting of the IADC in Darmstadt, Germany, during 11-13 October 1999, Working Group 4 undertook the challenge to develop the first set of consensus international space debris mitigation guidelines. This effort was designated IADC Action Item 17.2. Together, Working Group 4 and the Steering Group during 2001-2002 developed and refined a draft set of mitigation guidelines. The IADC Space Debris Mitigation Guidelines were adopted by consensus of the Steering Group in October 2002 and were presented to the Scientific and Technical Committee of the United Nations' Committee on the Peaceful Uses of Outer Space in February, 2003. A minor revision to the guidelines was accepted by the Steering Group in September, 2007.

The IADC Space Debris Mitigation Guidelines describe existing practices which have been identified and evaluated for limiting the generation of space debris in the environment. The guidelines cover the overall environmental impact of space missions with a focus on (1) limitation of debris released during normal operations, (2) minimisation of the potential for on-orbit break-ups, (3) post-mission disposal, and (4) prevention of on-orbit collisions.

### **Applicability:**

The IADC Space Debris Mitigation Guidelines are non-binding and as such applicable to mission planning and the design and operation of spacecraft and orbital stages that will be injected into Earth orbit. Organizations are encouraged to use these guidelines in identifying the standard that they will apply when establishing the mission requirements for planned spacecraft and orbital stages. Operators of existing spacecraft and orbital stages are encouraged to apply these guidelines to the greatest extent possible.

### **Relation to international mechanisms:**

The IADC Space Debris Mitigation Guidelines were used as a foundation for the development of the UN COPUOS Space Debris Mitigation Guidelines, which were adopted by COPUOS and later endorsed by the UN General Assembly in 2007, as well as the basis of the ISO standard 24113 "space systems – space debris mitigation".

**References:**

- [http://www.iadc-online.org/index.cgi?item=docs\\_pub](http://www.iadc-online.org/index.cgi?item=docs_pub)

**ITU RECOMMENDATION ITU-R S.1003.2****International mechanism:**

International Telecommunications Union (ITU) Recommendation ITU-R S.1003.2 (12/2010)  
Environmental protection of the geostationary-satellite orbit

**Description:**

ITU-R S.1003.2 provides guidance about disposal orbits for satellites in the geostationary-satellite orbit (GSO). In this orbit, there is an increase in debris due to fragments resulting from increased numbers of satellites and their associated launches.

Given the current limitations (primarily specific impulse) of space propulsion systems, it is impractical to retrieve objects from GSO altitudes or to return them to Earth at the end of their operational life. A protected region must therefore be established above, below and around the GSO which defines the nominal orbital regime within which operational satellites will reside and manoeuvre. To avoid an accumulation of non-functional objects in this region, and the associated increase in population density and potential collision risk that this would lead to, satellites should be manoeuvred out of this region at the end of their operational life. In order to ensure that these objects do not present a collision hazard to satellites being injected into GSO, they should be manoeuvred to altitudes higher than the GSO region, rather than lower.

The recommendations embodied in ITU-R S.1003.2 are:

- Recommendation 1: As little debris as possible should be released into the GSO region during the placement of a satellite in orbit.
- Recommendation 2: Every reasonable effort should be made to shorten the lifetime of debris in elliptical transfer orbits with the apogees at or near GSO altitude.
- Recommendation 3: Before complete exhaustion of its propellant, a geostationary satellite at the end of its life should be removed from the GSO region such that under the influence of perturbing forces on its trajectory, it would subsequently remain in an orbit with a perigee no less than 200 km above the geostationary altitude.
- Recommendation 4: The transfer to the graveyard orbit removal should be carried out with particular caution in order to avoid radio frequency interference with active satellites.

**Applicability:**

ITU-R S.1003.2 is addressed to member states of the ITU and applies to the operation of satellites in the GSO. Due to its character as a recommendation of the ITU Radiocommunication Assembly, it is not legally binding.

**Relation to international mechanisms:**

None.

**References:**

[http://www.itu.int/rec/R-REC-S.1003/\\_page.print](http://www.itu.int/rec/R-REC-S.1003/_page.print)

## UN COPUOS SPACE DEBRIS MITIGATION GUIDELINES

### **International mechanism:**

Space Debris Mitigation Guidelines of the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS), endorsed by the United Nations General Assembly (UNGA) in its Resolution 62/217 of 22 December 2007

### **Description:**

The Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space (in the following: the Guidelines) are the result of more than a decade of work undertaken by the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee (STSC). After extensive preparatory work by the STSC Working Group on Space Debris, the Guidelines were adopted by the STSC at its 44<sup>th</sup> session in 2007 (A/AC.105/890, para.99), endorsed by the Committee at its 50<sup>th</sup> session in 2007 (A/62/20, para.118 and 119) and subsequently submitted to the 2007 session of the UNGA.

As agreed by the UNGA through resolution 62/217 of 22 December 2007, the Guidelines reflect the existing practices as developed by a number of national and international organizations. From a technical point of view, the guidelines are applicable to mission planning and the operation of newly designed spacecraft and orbital stages and, if possible, to existing ones. There is a total of seven guidelines: a) to limit debris released during nominal [spacecraft / orbital stages] operations, b) to minimize the potential for break-ups during operational phases, c) to limit the probability of accidental collision in orbit, d) to avoid intentional destruction and other harmful activities, e) to minimize the potential for post-mission break-ups resulting from stored energy, and f) / g) to limit the long-term presence of spacecraft and launch vehicle orbital stages in the low-Earth orbit (LEO) region / geosynchronous Earth orbit (GEO) region after the end of their mission.

The Guidelines are meant to be reviewed and revised in the future as necessary.

### **Applicability:**

The Guidelines are not legally binding under public international law. Through resolution 62/217, the UNGA invited UN Member States to implement those voluntary guidelines through relevant national mechanisms “to the greatest extent feasible”, through space debris mitigation practices and procedures.

**Relation to international mechanisms:**

The Guidelines are based on the technical content and the basic definitions of the IADC Space Debris Mitigation Guidelines, and taking into consideration the United Nations treaties and principles on outer space.

**References:**

[www.unoosa.org](http://www.unoosa.org)