

## UNITED STATES OF AMERICA

### National mechanisms:

- Federal Aviation Administration Authorities:
  - Space Launch Act of 1984, as codified and amended, Title 51 United States Code (U.S.C.), Commercial Space Transportation, chapter 509; Title 51 U.S.C., Commercial Space Launch Activities, Sections 50901-50923
  - National and Commercial Space Programs Act (NCSPA) of 2010, Title 51 U.S.C., Subtitle VI
  - Federal Aviation Administration (FAA) Regulations, Title 14, Code of Federal Regulations (CFR), Parts 415.39, 417.129, 431.43
  
- National Oceanic and Atmospheric Administration Authorities:
  - Title 51, U.S.C., National and Commercial Space Programs, Subtitle VI, Earth Observations, Section 60122
  - National Oceanic and Atmospheric Administration, Department of Commerce Regulations, Title 15, CFR, Part 960, Licensing of Private Land Remote-Sensing Space Systems; Final Rule
  - NOAA Satellites: Per National Environmental Satellite, Data, and Information Service (NESDIS) Policy NQP-0304, NOAA follows NASA policy and best practices for decommissioning and disposal for the fleet of U.S. meteorological satellites NOAA operates.
  
- National Aeronautics and Space Administration Authorities:
  - National Aeronautics and Space Act, Title 51 United States Code Sec. 10101, *et seq.*
  - NASA Procedural Requirements for Limiting Orbital Debris, NPR 8715.6A, 2007; revised 2009
  - NASA Process for Limiting Orbital Debris, NS 8719.14A, 2007; revised 2011
  
- Federal Communications Commission Authorities:
  - Communications Act of 1934, as amended, Title 47 U.S.C., Section 301 *et. seq.*
  - Federal Communications Commission (FCC) Regulations, Title 47, CFR, Parts 5, 25, and 97; initial publication at 69 Federal Register 54586 (September 9, 2004)
  
- Department of Defense Authorities:
  - Title 10 United States Code

- DoD Directive 3100.10 (Space Policy), 2012; DoD Instruction 3100.12 (Space Support), 2000
- U.S. Geological Survey:
  - The U.S. Geological Survey follows the U.S. best practices for operations and end of life disposal for the Landsat land remote sensing satellites.
- National Policies:
  - U.S. National Space Policy, Presidential Policy Directive 4 (PPD-4), 2010
  - U.S. Government Orbital Debris Mitigation Standard Practices, 2001

**Description:**

- **National Space Policy**

Presidential Policy Directive 4 (PPD-4), the National Space Policy of 2010, directs the United States to continue to follow the United States Government Orbital Debris Mitigation Standard Practices, consistent with mission requirements and cost effectiveness, in the procurement and operation of spacecraft, launch services, and the conduct of test and experiments in space. Additionally, PPD-4 requires the head of the sponsoring department or agency to approve exceptions to the Standard Practices and notify the Secretary of State.

- **United States Government Orbital Debris Mitigation Standard Practices**

The United States Government Orbital Debris Mitigation Standard Practices were drafted in 1997 and presented to U.S. industry in 1998. After further consultation with industry, the standard practices were adopted in February 2001. The standard practices encompass all program phases, from initial concept development to space hardware disposal, focusing on: the minimization of intentional debris releases and the occurrence of accidental explosions; the avoidance of hazardous collisions; and, responsible disposal of space hardware. The U.S. Government Orbital Debris Mitigation Standard Practices serve as the overall U.S. Government space debris mitigation technical guidance and as the foundation for specific orbital debris mitigation requirements issued by individual U.S. Government departments and agencies.

- **NASA Procedural Requirements (NPR) for Limiting Orbital Debris**

The current NPR 8715.6A represents the culmination of more than 20 years of orbital debris mitigation policy at NASA, which originated with NASA Management Instruction 1700.8 (1993) and NASA Policy Directive 8710.3 (1997). The NPR establishes (1) the organizations and personnel responsible for orbital debris mitigation within NASA, (2) specific program and project responsibilities from development through end-of-operations, and (3) the report structure necessary to document compliance with the NPR.

- **NASA Process for Limiting Orbital Debris**

NASA Standard 8719.14A sets forth the specific orbital debris mitigation technical requirements for all NASA space programs and projects. These requirements cover the basic four elements of the U.S. Government Orbital Debris Mitigation Standard Practices, as well as other specific areas, such as the use of space tethers. The standard also defines the structure and content of related documentation, as well as their required milestone submittal dates. The predecessor to NS 8719.14A was NSS 1740.14 (1995), which served as the baseline for the development of the U.S. Government Orbital Debris Mitigation Standard Practices.

- **DoD Directive 3100.10 (Space Policy) and DoD Instruction 3100.12 (Space Support)**

The DoD Space Policy directs all DoD components to promote the responsible, peaceful, and safe use of space, including following the U.S. Government Orbital Debris Mitigation Standard Practices, in accordance with direction in the U.S. National Space Policy. The implementing Space Support Instruction contains procedures DoD will follow to limit debris and responsibilities for implementing these guidelines.

- **Regulation of United States Commercial Space Transportation**

The Federal Aviation Administration (FAA), under the purview of the U.S. Department of Transportation, regulates U.S. commercial space transportation. All U.S. persons launching from U.S. launch sites, reentering to U.S. sites, or conducting launch or reentry operations outside the United States, must adhere to these requirements for commercial launch and reentry vehicles. The FAA does not issue licenses for activities the U.S. Government carries out for the U.S. Government.

The FAA issues licenses to commercial launch vehicles after a rigorous evaluation of the safety of the launch system. If at any time the license holder does not comply with the regulations, the FAA may revoke the license or impose a fine.

The current FAA orbital debris mitigation regulations focus on safety at the end of launch. End of launch is defined by the FAA as the last exercise of control over the launch vehicle. The relevant regulations are as follows:

- §415.39 Safety at end of launch -- To obtain safety approval, an applicant must demonstrate compliance with §417.129 of this chapter, for any proposed launch of a launch vehicle with a stage or component that will reach Earth orbit.
- §417.129 Safety at end of launch -- A launch operator must ensure for any proposed launch that for all launch vehicle stages or components that reach Earth orbit—
  - a) There is no unplanned physical contact between the vehicle or any of its components and the payload after payload separation;

- b) Debris generation does not result from the conversion of energy sources into energy that fragments the vehicle or its components. Energy sources include chemical, pressure, and kinetic energy; and
- c) Stored energy is removed by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy.
  - o §431.43(c)(3) Reusable launch vehicle (RLV) mission operational requirements and restrictions for an RLV mission -- There will be no unplanned physical contact between the vehicle or its components and payload after payload separation and debris generation will not result from conversion of energy sources into energy that fragments the vehicle or its payload. Energy sources include, but are not limited to, chemical, pneumatic, and kinetic energy.

- **Federal Communications Commission (FCC) Regulations**

The FCC regulations apply to radiofrequency licensing of satellite communications, other than communications using U.S. Federal Government stations. (47 U.S.C. 301, 305). The regulations require applicants to provide information concerning use of orbits and plans for mitigation of orbital debris (47 C.F.R. 5.64, 25.114, 97.207). The information is analyzed to determine whether a grant serves the public interest. The FCC must find that the “public interest, convenience, and necessity” will be served in order to grant a license. (47 U.S.C. 308).

FCC regulations also require that geostationary satellites be relocated at end-of-mission in accordance with the IADC guideline, and all satellites must discharge stored energy sources at end-of-mission. 47 CFR 25.283.

An FCC Order (FCC 04-130) articulates additional policies and practices.

- **National Oceanic and Atmospheric Administration (NOAA): Regulation of Private Remote Sensing**

- o **Title 51, U.S.C., National and Commercial Space Programs, Subtitle VI, Earth Observations, Section 60122, Conditions for Operations:**

Defines specific guidelines and policy for private remote sensing spacecraft. This statute contains a specific requirement that operators shall, upon termination of operations under the license, make disposition of any satellites in space in a manner satisfactory to the President.

- o **National and Commercial Space Programs Act (NCSPA) of 2010 (Title 51 U.S.C., Subtitle VI):**

This Act applies to all U.S. operators of commercial remote sensing satellites. Written compliance with U.S. orbital debris and disposal policies and best practices is a prerequisite for obtaining a license.

- **15 CFR Part 960 Licensing of Private Land Remote-Sensing Space Systems; Final Rule**

The National Oceanic and Atmospheric Administration (NOAA) issues regulations establishing the agency's requirements for the licensing, monitoring and compliance of operators of private Earth remote sensing space systems under Title 51, U.S.C., National and Commercial Space Programs, Subtitle VI, Earth Observations (the Act) (formerly Title II of the Land Remote Sensing Policy Act of 1992, 15 U.S.C. § 5601, *et seq.*). These regulations implement the provisions of the Act and the 2003 U.S. Commercial Remote Sensing Policy. They are also derived from experience gained with respect to the licensing of private remote sensing space systems. They are intended to facilitate the development of the U.S. commercial remote sensing industry and promote the collection and widespread availability of Earth remote sensing data, while preserving essential U.S. national security interests, meeting foreign policy objectives and complying with international obligations. The regulations contain a specific requirement that operators shall, upon termination of operations under the license, make disposition of any satellites in space in a manner satisfactory to the President. The measures required to meet this requirement are specified in each license issued by NOAA.

NOAA: Operation of U.S. Meteorological Satellites

NOAA NESDIS directs and manages the operations of the U.S. fleet of meteorological satellites, including command and control activities, health and safety monitoring, anomaly investigation and corrective actions. The fleet is comprised of three major systems: the Geostationary Operational Environmental Satellite System (GOES), the Polar-orbiting Operational Environmental Satellite (POES), and the Suomi National Polar-orbiting Partnership. In addition to being responsible for the health and safety of the spacecraft, NOAA NESDIS is also responsible for their decommissioning and disposal.

**Applicability:**

- **National Space Policy**

The National Space Policy provides guidance to all U.S. Government Departments and Agencies.

- **U.S. Government Orbital Debris Mitigation Standard Practices**

These government orbital debris mitigation standard practices apply to all U.S. Government Departments and Agencies involved in space operations, including regulatory authorities. The implementation of these standard practices is executed through Department/Agency specific requirements or regulations, as applicable. The National Space Policy requires the head of the department or agency sponsoring a launch to approve exceptions to the Standard Practices and notify the Secretary of State.

- **NASA Procedural Requirements for Limiting Orbital Debris**

The processes defined within NPR 8715.6A are mandatory without exception.

- **NASA Process for Limiting Orbital Debris**

NASA orbital debris mitigation requirements are mandatory for each NASA space program and project, although individual requirements can be waived by senior NASA management on a case-by-case basis with justification.

- **DoD Directive 3100.10 (Space Policy) and DoD Instruction 3100.12 (Space Support)**

All DoD components are required to follow DoDD 3100.10 and DoDI 3100.12.

- **Regulations for Commercial Launch Vehicles**

The 14 CFR part 400 regulations are applicable to commercial launch vehicles launched in the United States and to commercial launch vehicles launched by United States citizens or companies.

- **FCC Regulations**

FCC regulations and radio station licensing provisions apply to operations of earth stations in the United States and mobile stations (including space stations) under the jurisdiction of the United States, except for U.S. Federal Government stations. (47 U.S.C. 301, 305). Compliance with regulations is mandatory.

- **NOAA Regulations: Licensing of Private Land Remote-Sensing Space Systems, 15 CFR Part 960**

These Regulations apply to all U.S. operators of commercial remote sensing satellites. Written compliance with U.S. orbital debris and disposal policies and best practices is a prerequisite for obtaining a license.

**Relation to other international mechanism(s):**

The U.S. Government Orbital Debris Mitigation Standard Practices served as one of the primary sources for the development of the IADC Space Debris Mitigation Guidelines and the later Space Debris Mitigation Guidelines of the Committee. NASA is a founding member of the IADC and has played a leading role in discussions of space debris mitigation in the IADC, and in the Scientific and Technical Subcommittee (STSC) of the Committee on the Peaceful Uses of Outer Space since the topic became a standing agenda item in 1994. In the IADC, NASA continues to play a lead role in researching and developing relevant technical standards; this work will continue to inform the STSC so that the Space Debris Mitigation Guidelines of the Committee can be updated as appropriate.

**Link to other national mechanisms:**

The FCC regulations apply to a request for a license for an earth station to communicate with a satellite licensed by another country. (47 C.F.R. 25.137(b)). The applicant must provide information concerning the debris mitigation plans for the satellite. Alternatively,

the applicant can seek a determination that the satellite operations will be subject to “direct and effective” regulation by another country. The FCC determined in several specific cases that satellites are subject to direct and effective regulation. The cases involved satellites that operate under launch and space operations authorizations issued under national mechanisms by the United Kingdom or France.

#### References:

- **National Space Policy**

[http://www.whitehouse.gov/sites/default/files/national\\_space\\_policy\\_6-28-10.pdf](http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf)

- **United States Government Orbital Debris Mitigation**

[http://orbitaldebris.jsc.nasa.gov/library/USG\\_OD\\_Standard\\_Practices.pdf](http://orbitaldebris.jsc.nasa.gov/library/USG_OD_Standard_Practices.pdf)

[http://orbitaldebris.jsc.nasa.gov/library/NPR\\_8715\\_006A.pdf](http://orbitaldebris.jsc.nasa.gov/library/NPR_8715_006A.pdf)

[http://orbitaldebris.jsc.nasa.gov/library/NPR\\_8715\\_006A.pdf](http://orbitaldebris.jsc.nasa.gov/library/NPR_8715_006A.pdf)

<http://www.hq.nasa.gov/office/codeq/doctree/871914.pdf>

- **DoD Materials**

- DoD Directive 3100.10 (Space Policy):

<http://www.dtic.mil/whs/directives/corres/pdf/310010p.pdf>

- DoD Instruction 3100.12 (Space Support):

<http://www.dtic.mil/whs/directives/corres/pdf/310012p.pdf>

- **FCC Materials**

- Communications Act of 1934, as amended:

[http://www.house.gov/legcoun/Comps/FCC\\_CMD.PDF](http://www.house.gov/legcoun/Comps/FCC_CMD.PDF)

- Code of Federal Regulations (Link for General Browsing of Title 47):

[http://www.ecfr.gov/cgi-bin/text-idx?SID=685669905c05d232fc85ebb36583d4d5&tpl=/ecfrbrowse/Title47/47tab\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?SID=685669905c05d232fc85ebb36583d4d5&tpl=/ecfrbrowse/Title47/47tab_02.tpl)

- Code of Federal Regulations (Links for Specific Provisions Related to Debris Mitigation):

Part 5 (Experimental Licensing):

<http://www.ecfr.gov/cgi-bin/text-idx?SID=685669905c05d232fc85ebb36583d4d5&node=47:1.0.1.1.6.2.233.9&rqn=div8>

Part 25 (Most Satellite Communications):

47 C.F.R. 25.114 (d)

<http://www.ecfr.gov/cgi-bin/text-idx?SID=685669905c05d232fc85ebb36583d4d5&node=47:2.0.1.1.4.2.36.5&rgn=div8>

47 C.F.R. 25.283

<http://www.ecfr.gov/cgi-bin/text-idx?SID=f4d4bb0aa0761d43a831765407965cd7&node=47:2.0.1.1.4.4.41.13&rgn=div8>

Part 97 (Amateur Satellite):

<http://www.ecfr.gov/cgi-bin/text-idx?SID=9c5e6e34eb0f19a977ff59724fd441b2&node=47:5.0.1.1.6&rgn=div5#47:5.0.1.1.6.3.159.4>

- Order, FCC 04-130, and Explanatory Materials:

<http://transition.fcc.gov/ib/sd/ssr/mod.html>

Federal Register publication of rules adopted in FCC 04-130:

<http://www.gpo.gov/fdsys/pkg/FR-2004-09-09/html/04-20362.htm>

- Other Explanatory Materials:

Licensing Guidance for Small Satellites:

[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DA-13-445A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-13-445A1.pdf)

Licensing Guidance for Commercial Space Launches:

[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DA-13-446A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-13-446A1.pdf)

- **NOAA Materials:**

- National and Commercial Space Programs Act (NCSPA) of 2010 (Title 51 U.S.C., Subtitle VI) (Commercial Remote Sensing Satellites):

<http://www.gpo.gov/fdsys/pkg/USCODE-2011-title51/pdf/USCODE-2011-title51-subtitleVI.pdf>

- Licensing of Private Land Remote-Sensing Space Systems, 15 CFR Part 960 (Commercial Remote Sensing Satellites):

<http://www.nesdis.noaa.gov/CRSRA/files/15%20CFR%20Part%20960%20Regs%202006.pdf>