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Title 14 —Aeronautics and Space

Chapter I —Federal Aviation Administration, Department of Transportation

Subchapter F —Air Traffic and General Operating Rules

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PART 101—MOORED BALLOONS, KITES, AMATEUR ROCKETS, AND UNMANNED FREE BALLOONS

Authority: 49 U.S.C. 106(f), 106(g), 40101 note, 40103, 40113-40114, 45302, 44502, 44514, 44701-44702, 44721, 46308.

Subpart A—General

§ 101.1 Applicability.

- (a) This part prescribes rules governing the operation in the United States, of the following:
 - (1) Except as provided for in § 101.7, any balloon that is moored to the surface of the earth or an object thereon and that has a diameter of more than 6 feet or a gas capacity of more than 115 cubic feet.
 - (2) Except as provided for in § 101.7, any kite that weighs more than 5 pounds and is intended to be flown at the end of a rope or cable.
 - (3) Any amateur rocket except aerial firework displays.
 - (4) Except as provided for in § 101.7, any unmanned free balloon that—
 - (i) Carries a payload package that weighs more than four pounds and has a weight/size ratio of more than three ounces per square inch on any surface of the package, determined by dividing the total weight in ounces of the payload package by the area in square inches of its smallest surface;
 - (ii) Carries a payload package that weighs more than six pounds;
 - (iii) Carries a payload, of two or more packages, that weighs more than 12 pounds; or
 - (iv) Uses a rope or other device for suspension of the payload that requires an impact force of more than 50 pounds to separate the suspended payload from the balloon.
- (b) For the purposes of this part, a *gyroglider* attached to a vehicle on the surface of the earth is considered to be a kite.

[Doc. No. 1580, 28 FR 6721, June 29, 1963, as amended by Amdt. 101-1, 29 FR 46, Jan. 3, 1964; Amdt. 101-3, 35 FR 8213, May 26, 1970; Amdt. 101-8, 73 FR 73781, Dec. 4, 2008; 74 FR 38092, July 31, 2009; Amdt. 101-9, 81 FR 42208, June 28, 2016; Amdt. Nos. 101-10, 85 FR 79826, Dec. 11, 2020]

§ 101.3 Waivers.

No person may conduct operations that require a deviation from this part except under a certificate of waiver issued by the Administrator.

[Doc. No. 1580, 28 FR 6721, June 29, 1963]

§ 101.5 Operations in prohibited or restricted areas.

No person may operate a moored balloon, kite, amateur rocket, or unmanned free balloon in a prohibited or restricted area unless he has permission from the using or controlling agency, as appropriate.

[Doc. No. 1457, 29 FR 46, Jan. 3, 1964, as amended at 74 FR 38092, July 31, 2009]

§ 101.7 Hazardous operations.

- (a) No person may operate any moored balloon, kite, amateur rocket, or unmanned free balloon in a manner that creates a hazard to other persons, or their property.

- (b) No person operating any moored balloon, kite, amateur rocket, or unmanned free balloon may allow an object to be dropped therefrom, if such action creates a hazard to other persons or their property.

(Sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 12800, 39 FR 22252, June 21, 1974, as amended at 74 FR 38092, July 31, 2009]

Subpart B—Moored Balloons and Kites

Source: Docket No. 1580, 28 FR 6722, June 29, 1963, unless otherwise noted.

§ 101.11 Applicability.

This subpart applies to the operation of moored balloons and kites. However, a person operating a moored balloon or kite within a restricted area must comply only with § 101.19 and with additional limitations imposed by the using or controlling agency, as appropriate.

§ 101.13 Operating limitations.

- (a) Except as provided in paragraph (b) of this section, no person may operate a moored balloon or kite—
 - (1) Less than 500 feet from the base of any cloud;
 - (2) More than 500 feet above the surface of the earth;
 - (3) From an area where the ground visibility is less than three miles; or
 - (4) Within five miles of the boundary of any airport.
- (b) Paragraph (a) of this section does not apply to the operation of a balloon or kite below the top of any structure and within 250 feet of it, if that shielded operation does not obscure any lighting on the structure.

§ 101.15 Notice requirements.

No person may operate an unshielded moored balloon or kite more than 150 feet above the surface of the earth unless, at least 24 hours before beginning the operation, he gives the following information to the FAA ATC facility that is nearest to the place of intended operation:

- (a) The names and addresses of the owners and operators.
- (b) The size of the balloon or the size and weight of the kite.
- (c) The location of the operation.
- (d) The height above the surface of the earth at which the balloon or kite is to be operated.
- (e) The date, time, and duration of the operation.

§ 101.17 Lighting and marking requirements.

- (a) No person may operate a moored balloon or kite, between sunset and sunrise unless the balloon or kite, and its mooring lines, are lighted so as to give a visual warning equal to that required for obstructions to air navigation in the FAA publication “Obstruction Marking and Lighting”.

- (b) No person may operate a moored balloon or kite between sunrise and sunset unless its mooring lines have colored pennants or streamers attached at not more than 50 foot intervals beginning at 150 feet above the surface of the earth and visible for at least one mile.

(Sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 1580, 28 FR 6722, June 29, 1963, as amended by Amdt. 101-4, 39 FR 22252, June 21, 1974]

§ 101.19 Rapid deflation device.

No person may operate a moored balloon unless it has a device that will automatically and rapidly deflate the balloon if it escapes from its moorings. If the device does not function properly, the operator shall immediately notify the nearest ATC facility of the location and time of the escape and the estimated flight path of the balloon.

Subpart C— Amateur Rockets

§ 101.21 Applicability.

- (a) This subpart applies to operating unmanned rockets. However, a person operating an unmanned rocket within a restricted area must comply with § 101.25(g)(2)) and with any additional limitations imposed by the using or controlling agency.
- (b) A person operating an unmanned rocket other than an amateur rocket as defined in § 1.1 of this chapter must comply with 14 CFR Chapter III.

[Doc. No. FAA-2007-27390, 73 FR 73781, Dec. 4, 2008, as amended by Docket No. FAA-2022-1355, Amdt. No. 101-11, 87 FR 75846, Dec. 9, 2022]

§ 101.22 Definitions.

The following definitions apply to this subpart:

- (a) **Class 1—Model Rocket** means an amateur rocket that:
 - (1) Uses no more than 125 grams (4.4 ounces) of propellant;
 - (2) Uses a slow-burning propellant;
 - (3) Is made of paper, wood, or breakable plastic;
 - (4) Contains no substantial metal parts; and
 - (5) Weighs no more than 1,500 grams (53 ounces), including the propellant.
- (b) **Class 2—High-Power Rocket** means an amateur rocket other than a model rocket that is propelled by a motor or motors having a combined total impulse of 40,960 Newton-seconds (9,208 pound-seconds) or less.
- (c) **Class 3—Advanced High-Power Rocket** means an amateur rocket other than a model rocket or high-power rocket.

[Doc. No. FAA-2007-27390, 73 FR 73781, Dec. 4, 2008]

§ 101.23 General operating limitations.

- (a) You must operate an amateur rocket in such a manner that it:
 - (1) Is launched on a suborbital trajectory;
 - (2) When launched, must not cross into the territory of a foreign country unless an agreement is in place between the United States and the country of concern;
 - (3) Is unmanned; and
 - (4) Does not create a hazard to persons, property, or other aircraft.
- (b) The FAA may specify additional operating limitations necessary to ensure that air traffic is not adversely affected, and public safety is not jeopardized.

[Doc. No. FAA-2007-27390, 73 FR 73781, Dec. 4, 2008]

§ 101.25 Operating limitations for Class 2-High Power Rockets and Class 3-Advanced High Power Rockets.

When operating *Class 2-High Power Rockets* or *Class 3-Advanced High Power Rockets*, you must comply with the General Operating Limitations of § 101.23. In addition, you must not operate *Class 2-High Power Rockets* or *Class 3-Advanced High Power Rockets*—

- (a) At any altitude where clouds or obscuring phenomena of more than five-tenths coverage prevails;
- (b) At any altitude where the horizontal visibility is less than five miles;
- (c) Into any cloud;
- (d) Between sunset and sunrise without prior authorization from the FAA;
- (e) Within 9.26 kilometers (5 nautical miles) of any airport boundary without prior authorization from the FAA;
- (f) In controlled airspace without prior authorization from the FAA;
- (g) Unless you observe the greater of the following separation distances from any person or property that is not associated with the operations:
 - (1) Not less than one-quarter the maximum expected altitude;
 - (2) 457 meters (1,500 ft.);
- (h) Unless a person at least eighteen years old is present, is charged with ensuring the safety of the operation, and has final approval authority for initiating high-power rocket flight; and
- (i) Unless reasonable precautions are provided to report and control a fire caused by rocket activities.

[74 FR 38092, July 31, 2009, as amended by Amdt. 101-8, 74 FR 47435, Sept. 16, 2009]

§ 101.27 ATC notification for all launches.

No person may operate an unmanned rocket other than a Class 1—Model Rocket unless that person gives the following information to the FAA ATC facility nearest to the place of intended operation no less than 24 hours before and no more than three days before beginning the operation:

- (a) The name and address of the operator; except when there are multiple participants at a single event, the name and address of the person so designated as the event launch coordinator, whose duties include coordination of the required launch data estimates and coordinating the launch event;
- (b) Date and time the activity will begin;
- (c) Radius of the affected area on the ground in nautical miles;
- (d) Location of the center of the affected area in latitude and longitude coordinates;
- (e) Highest affected altitude;
- (f) Duration of the activity;
- (g) Any other pertinent information requested by the ATC facility.

[Doc. No. FAA-2007-27390, 73 FR 73781, Dec. 4, 2008, as amended at Doc. No. FAA-2007-27390, 74 FR 31843, July 6, 2009]

§ 101.29 Information requirements.

- (a) **Class 2—High-Power Rockets.** When a Class 2—High-Power Rocket requires a certificate of waiver or authorization, the person planning the operation must provide the information below on each type of rocket to the FAA at least 45 days before the proposed operation. The FAA may request additional information if necessary to ensure the proposed operations can be safely conducted. The information shall include for each type of Class 2 rocket expected to be flown:
 - (1) Estimated number of rockets,
 - (2) Type of propulsion (liquid or solid), fuel(s) and oxidizer(s),
 - (3) Description of the launcher(s) planned to be used, including any airborne platform(s),
 - (4) Description of recovery system,
 - (5) Highest altitude, above ground level, expected to be reached,
 - (6) Launch site latitude, longitude, and elevation, and
 - (7) Any additional safety procedures that will be followed.
- (b) **Class 3—Advanced High-Power Rockets.** When a Class 3—Advanced High-Power Rocket requires a certificate of waiver or authorization the person planning the operation must provide the information below for each type of rocket to the FAA at least 45 days before the proposed operation. The FAA may request additional information if necessary to ensure the proposed operations can be safely conducted. The information shall include for each type of Class 3 rocket expected to be flown:
 - (1) The information requirements of paragraph (a) of this section,
 - (2) Maximum possible range,
 - (3) The dynamic stability characteristics for the entire flight profile,
 - (4) A description of all major rocket systems, including structural, pneumatic, propellant, propulsion, ignition, electrical, avionics, recovery, wind-weighting, flight control, and tracking,
 - (5) A description of other support equipment necessary for a safe operation,

- (6) The planned flight profile and sequence of events,
- (7) All nominal impact areas, including those for any spent motors and other discarded hardware, within three standard deviations of the mean impact point,
- (8) Launch commit criteria,
- (9) Countdown procedures, and
- (10) Mishap procedures.

[Doc. No. FAA-2007-27390, 73 FR 73781, Dec. 4, 2008, as amended at Doc. No. FAA-2007-27390, 74 FR 31843, July 6, 2009]

Subpart D—Unmanned Free Balloons

Source: Docket No. 1457, 29 FR 47, Jan. 3, 1964, unless otherwise noted.

§ 101.31 Applicability.

This subpart applies to the operation of unmanned free balloons. However, a person operating an unmanned free balloon within a restricted area must comply only with § 101.33 (d) and (e) and with any additional limitations that are imposed by the using or controlling agency, as appropriate.

§ 101.33 Operating limitations.

No person may operate an unmanned free balloon—

- (a) Unless otherwise authorized by ATC, below 2,000 feet above the surface within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport;
- (b) At any altitude where there are clouds or obscuring phenomena of more than five-tenths coverage;
- (c) At any altitude below 60,000 feet standard pressure altitude where the horizontal visibility is less than five miles;
- (d) During the first 1,000 feet of ascent, over a congested area of a city, town, or settlement or an open-air assembly of persons not associated with the operation; or
- (e) In such a manner that impact of the balloon, or part thereof including its payload, with the surface creates a hazard to persons or property not associated with the operation.

[Doc. No. 1457, 29 FR 47, Jan. 3, 1964, as amended by Amdt. 101-5, 56 FR 65662, Dec. 17, 1991]

§ 101.35 Equipment and marking requirements.

- (a) No person may operate an unmanned free balloon unless—
 - (1) It is equipped with at least two payload cut-down systems or devices that operate independently of each other;
 - (2) At least two methods, systems, devices, or combinations thereof, that function independently of each other, are employed for terminating the flight of the balloon envelope; and

- (3) The balloon envelope is equipped with a radar reflective device(s) or material that will present an echo to surface radar operating in the 200 MHz to 2700 MHz frequency range.

The operator shall activate the appropriate devices required by paragraphs (a) (1) and (2) of this section when weather conditions are less than those prescribed for operation under this subpart, or if a malfunction or any other reason makes the further operation hazardous to other air traffic or to persons and property on the surface.

- (b) No person may operate an unmanned free balloon below 60,000 feet standard pressure altitude between sunset and sunrise (as corrected to the altitude of operation) unless the balloon and its attachments and payload, whether or not they become separated during the operation, are equipped with lights that are visible for at least 5 miles and have a flash frequency of at least 40, and not more than 100, cycles per minute.
- (c) No person may operate an unmanned free balloon that is equipped with a trailing antenna that requires an impact force of more than 50 pounds to break it at any point, unless the antenna has colored pennants or streamers that are attached at not more than 50 foot intervals and that are visible for at least one mile.
- (d) No person may operate between sunrise and sunset an unmanned free balloon that is equipped with a suspension device (other than a highly conspicuously colored open parachute) more than 50 feet along, unless the suspension device is colored in alternate bands of high conspicuity colors or has colored pennants or streamers attached which are visible for at least one mile.

(Sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 1457, 29 FR 47, Jan. 3, 1964, as amended by Amdt. 101-2, 32 FR 5254, Mar. 29, 1967; Amdt. 101-4, 39 FR 22252, June 21, 1974]

§ 101.37 Notice requirements.

- (a) **Prelaunch notice:** Except as provided in paragraph (b) of this section, no person may operate an unmanned free balloon unless, within 6 to 24 hours before beginning the operation, he gives the following information to the FAA ATC facility that is nearest to the place of intended operation:
 - (1) The balloon identification.
 - (2) The estimated date and time of launching, amended as necessary to remain within plus or minus 30 minutes.
 - (3) The location of the launching site.
 - (4) The cruising altitude.
 - (5) The forecast trajectory and estimated time to cruising altitude or 60,000 feet standard pressure altitude, whichever is lower.
 - (6) The length and diameter of the balloon, length of the suspension device, weight of the payload, and length of the trailing antenna.
 - (7) The duration of flight.
 - (8) The forecast time and location of impact with the surface of the earth.
- (b) For solar or cosmic disturbance investigations involving a critical time element, the information in paragraph (a) of this section shall be given within 30 minutes to 24 hours before beginning the operation.

- (c) **Cancellation notice:** If the operation is canceled, the person who intended to conduct the operation shall immediately notify the nearest FAA ATC facility.
- (d) **Launch notice:** Each person operating an unmanned free balloon shall notify the nearest FAA or military ATC facility of the launch time immediately after the balloon is launched.

§ 101.39 Balloon position reports.

- (a) Each person operating an unmanned free balloon shall:
 - (1) Unless ATC requires otherwise, monitor the course of the balloon and record its position at least every two hours; and
 - (2) Forward any balloon position reports requested by ATC.
- (b) One hour before beginning descent, each person operating an unmanned free balloon shall forward to the nearest FAA ATC facility the following information regarding the balloon:
 - (1) The current geographical position.
 - (2) The altitude.
 - (3) The forecast time of penetration of 60,000 feet standard pressure altitude (if applicable).
 - (4) The forecast trajectory for the balance of the flight.
 - (5) The forecast time and location of impact with the surface of the earth.
- (c) If a balloon position report is not recorded for any two-hour period of flight, the person operating an unmanned free balloon shall immediately notify the nearest FAA ATC facility. The notice shall include the last recorded position and any revision of the forecast trajectory. The nearest FAA ATC facility shall be notified immediately when tracking of the balloon is re-established.
- (d) Each person operating an unmanned free balloon shall notify the nearest FAA ATC facility when the operation is ended.