

(1) Proof of physical limits on the ability of the reusable suborbital rocket to leave the operating area; or

(2) Abort procedures and other safety measures derived from a system safety engineering process.

(b) An applicant must identify, describe, and provide verification evidence of the methods and systems used to meet the requirements of § 437.59 to conduct any key flight-safety event so that the reusable suborbital rocket's instantaneous impact point, including its expected dispersions, is over unpopulated or sparsely populated areas, and to conduct each reusable suborbital rocket flight so that the re-entry impact point does not loiter over a populated area.

§ 437.33 Landing and impact locations.

An applicant must demonstrate that each location for nominal landing or any contingency abort landing of the reusable suborbital rocket, and each location for any nominal or contingency impact or landing of a component of that rocket, satisfies § 437.61.

§ 437.35 Agreements.

An applicant must enter into the agreements required by § 437.63, and provide a copy to the FAA.

§ 437.37 Tracking.

An applicant must identify and describe each method or system used to meet the tracking requirements of § 437.67.

§ 437.39 Flight rules.

An applicant must provide flight rules as required by § 437.71.

§ 437.41 Mishap response plan.

An applicant must provide a mishap response plan that meets the requirements of § 437.75(b).

Subpart C—Safety Requirements

§ 437.51 Rest rules for vehicle safety operations personnel.

A permittee must ensure that all vehicle safety operations personnel adhere to the work and rest standards in this section during permitted activities.

(a) No vehicle safety operations personnel may work more than:

(1) 12 consecutive hours,

(2) 60 hours in the 7 days preceding a permitted activity, or

(3) 14 consecutive work days.

(b) All vehicle safety operations personnel must have at least 8 hours of rest after 12 hours of work.

(c) All vehicle safety operations personnel must receive a minimum 48-hour rest period after 5 consecutive days of 12-hour shifts.

§ 437.53 Pre-flight and post-flight operations.

A permittee must protect the public from adverse effects of hazardous operations and systems in preparing a reusable suborbital rocket for flight at a launch site in the United States and returning the reusable suborbital rocket and any support equipment to a safe condition after flight. At a minimum, a permittee must—

(a) Establish a safety clear zone that will contain the adverse effects of each operation involving a hazard; and

(b) Verify that the public is outside of the safety clear zone before and during any hazardous operation.

§ 437.55 Hazard analysis.

(a) A permittee must identify and characterize each of the hazards and assess the risk to public health and safety and the safety of property resulting from each permitted flight. This hazard analysis must—

(1) Identify and describe hazards, including but not limited to each of those that result from—

(i) Component, subsystem, or system failures or faults;

(ii) Software errors;

(iii) Environmental conditions;

(iv) Human errors;

(v) Design inadequacies; or

(vi) Procedural deficiencies.

(2) Determine the likelihood of occurrence and consequence for each hazard before risk elimination or mitigation.

(3) Ensure that the likelihood and consequence of each hazard meet the following criteria through risk elimination and mitigation measures:

§ 437.57

(i) The likelihood of any hazardous condition that may cause death or serious injury to the public must be extremely remote.

(ii) The likelihood of any hazardous condition that may cause major property damage to the public, major safety-critical system damage or reduced capability, a significant reduction in safety margins, or a significant increase in crew workload must be remote.

(4) Identify and describe the risk elimination and mitigation measures required to satisfy paragraph (a)(3) of this section. The measures must include one or more of the following:

- (i) Designing for minimum risk,
- (ii) Incorporating safety devices,
- (iii) Providing warning devices, or
- (iv) Implementing procedures and training.

(5) Demonstrate that the risk elimination and mitigation measures achieve the risk levels of paragraph (a)(3)(i) of this section through validation and verification. Verification includes:

- (i) Test data,
- (ii) Inspection results, or
- (iii) Analysis.

(b) A permittee must carry out the risk elimination and mitigation measures derived from its hazard analysis.

(c) A permittee must ensure the continued accuracy and validity of its hazard analysis throughout the term of its permit.

§ 437.57 Operating area containment.

(a) During each permitted flight, a permittee must contain its reusable suborbital rocket's instantaneous impact point within an operating area determined in accordance with paragraph (b) and outside any exclusion area defined by the FAA in accordance with paragraph (c) of this section.

(b) An operating area—

(1) Must be large enough to contain each planned trajectory and all expected vehicle dispersions;

(2) Must contain enough unpopulated or sparsely populated area to perform key flight-safety events as required by § 437.59;

(3) May not contain or be adjacent to a densely populated area or large con-

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centrations of members of the public; and

(4) May not contain or be adjacent to significant automobile traffic, railway traffic, or waterborne vessel traffic.

(c) The FAA may prohibit a reusable suborbital rocket's instantaneous impact point from traversing certain areas within an operating area by designating one or more areas as exclusion areas, if necessary to protect public health and safety, safety of property, or foreign policy or national security interests of the United States. An exclusion area may be confined to a specific phase of flight.

§ 437.59 Key flight-safety event limitations.

(a) A permittee must conduct any key flight-safety event so that the reusable suborbital rocket's instantaneous impact point, including its expected dispersion, is over an unpopulated or sparsely populated area. At a minimum, a key flight-safety event includes:

- (1) Ignition of any primary rocket engine,
- (2) Any staging event, or
- (3) Any envelope expansion.

(b) A permittee must conduct each reusable suborbital rocket flight so that the reentry impact point does not loiter over a populated area.

§ 437.61 Landing and impact locations.

For a nominal or any contingency abort landing of a reusable suborbital rocket, or for any nominal or contingency impact or landing of a component of that rocket, a permittee must use a location that—

(a) Is big enough to contain an impact, including debris dispersion upon impact; and

(b) At the time of landing or impact, does not contain any members of the public.

§ 437.63 Agreements with other entities involved in a launch or reentry.

A permittee must comply with the agreements required by this section.

(a) A permittee must have an agreement in writing with a Federal launch range operator, a licensed launch site operator, or any other party that provides access to or use of property and