

Subpart B—Launch and Reentry with a Space Flight Participant

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Subpart A—Launch and Reentry with Crew

§ 460.1 Scope.

This subpart establishes requirements for crew of a vehicle whose operator is licensed or permitted under this chapter.

§ 460.3 Applicability.

(a) This subpart applies to:

- (1) An applicant for a license or permit under this chapter who proposes to have flight crew on board a vehicle or proposes to employ a remote operator of a vehicle with a human on board.
- (2) An operator licensed or permitted under this chapter who has flight crew on board a vehicle or who employs a remote operator of a vehicle with a human on board.
- (3) A crew member participating in an activity authorized under this chapter.

(b) Each member of the crew must comply with all requirements of the laws of the United States that apply to crew.

§ 460.5 Crew qualifications and training.

(a) Each crew member must—

- (1) Complete training on how to carry out his or her role on board or on the ground so that the vehicle will not harm the public; and
- (2) Train for his or her role in nominal and non-nominal conditions. The conditions must include—
 - (i) Abort scenarios; and
 - (ii) Emergency operations.
- (b) Each member of a flight crew must demonstrate an ability to withstand the stresses of space flight,

which may include high acceleration or deceleration, microgravity, and vibration, in sufficient condition to safely carry out his or her duties so that the vehicle will not harm the public.

(c) A pilot and a remote operator must—

- (1) Possess and carry an FAA pilot certificate with an instrument rating.
- (2) Possess aeronautical knowledge, experience, and skills necessary to pilot and control the launch or reentry vehicle that will operate in the National Airspace System (NAS). Aeronautical experience may include hours in flight, ratings, and training.
- (3) Receive vehicle and mission-specific training for each phase of flight by using one or more of the following—
 - (i) A method or device that simulates the flight;
 - (ii) An aircraft whose characteristics are similar to the vehicle or that has similar phases of flight to the vehicle ;
 - (iii) Flight testing; or
 - (iv) An equivalent method of training approved by the FAA through the license or permit process.
- (4) Train in procedures that direct the vehicle away from the public in the event the flight crew abandons the vehicle during flight; and
- (5) Train for each mode of control or propulsion, including any transition between modes, such that the pilot or remote operator is able to control the vehicle.

(d) A remote operator may demonstrate an equivalent level of safety to paragraph (c)(1) of this section through the license or permit process.

(e) Each crew member with a safety-critical role must possess and carry an FAA second-class airman medical certificate issued in accordance with 14 CFR part 67, no more than 12 months prior to the month of launch and reentry.

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§ 460.7 Operator training of crew.

(a) *Implementation of training.* An operator must train each member of its crew and define standards for successful completion in accordance with § 460.5.

(b) *Training device fidelity.* An operator must

(1) Ensure that any crew-training device used to meet the training requirements realistically represents the vehicle's configuration and mission, or

(2) Inform the crew member being trained of the differences between the two.

(c) *Maintenance of training records.* An operator must continually update the crew training to ensure that it incorporates lessons learned from training and operational missions. An operator must—

(1) Track each revision and update in writing; and

(2) Document the completed training for each crew member and maintain the documentation for each active crew member.

(d) *Current qualifications and training.* An operator must establish a recurrent training schedule and ensure that all crew qualifications and training required by §460.5 are current before launch and reentry.

§ 460.9 Informing crew of risk.

An operator must inform in writing any individual serving as crew that the United States Government has not certified the launch vehicle and any reentry vehicle as safe for carrying flight crew or space flight participants. An operator must provide this information—

(a) Before entering into any contract or other arrangement to employ that individual; or

(b) For any crew member employed as of December 23, 2004, as early as possible and prior to any launch in which that individual will participate as crew.

§ 460.11 Environmental control and life support systems.

(a) An operator must provide atmospheric conditions adequate to sustain life and consciousness for all inhabited areas within a vehicle. The operator or flight crew must monitor and control the following atmospheric conditions in the inhabited areas or demonstrate through the license or permit process that an alternate means provides an equivalent level of safety—

(1) Composition of the atmosphere, which includes oxygen and carbon dioxide, and any revitalization;

(2) Pressure, temperature and humidity;

(3) Contaminants that include particulates and any harmful or hazardous concentrations of gases, or vapors; and

(4) Ventilation and circulation.

(b) An operator must provide an adequate redundant or secondary oxygen supply for the flight crew.

(c) An operator must

(1) Provide a redundant means of preventing cabin depressurization; or

(2) Prevent incapacitation of any of the flight crew in the event of loss of cabin pressure.

§ 460.13 Smoke detection and fire suppression.

An operator or crew must have the ability to detect smoke and suppress a cabin fire to prevent incapacitation of the flight crew.

§ 460.15 Human factors.

An operator must take the precautions necessary to account for human factors that can affect a crew's ability to perform safety-critical roles, including in the following safety critical areas—

(a) Design and layout of displays and controls;

(b) Mission planning, which includes analyzing tasks and allocating functions between humans and equipment;

(c) Restraint or stowage of all individuals and objects in a vehicle; and

(d) Vehicle operation, so that the vehicle will be operated in a manner that flight crew can withstand any physical stress factors, such as acceleration, vibration, and noise.

§ 460.17 Verification program.

An operator must successfully verify the integrated performance of a vehicle's hardware and any software in an operational flight environment before allowing any space flight participant on board during a flight. Verification must include flight testing.

§ 460.19 Crew waiver of claims against U.S. Government.

Each member of a flight crew and any remote operator must execute a reciprocal waiver of claims with the Federal Aviation Administration of the