



FAA Commercial Space Transportation

14 CFR Part 460 Human Space Flight - Checklist

Purpose of Checklist The following checklist is for the use of an applicant proposing to conduct a launch or reentry with an operator or remote operator who has flight crew or a space flight participant(s) on board. The checklist also assists in the application process as an organizational guide. It specifically addresses 14 CFR Part 460.

Prospective applicant must read, understand and cross-reference the complete regulations when completing the application package. Some of the regulatory text has been rephrased in this checklist for the sake of brevity. Where the checklist text differs from regulatory text, the regulatory text takes precedence. The regulations can be found at AST's website (<http://ast.faa.gov>).

Some application requirements include the submittal of information that may have been previously submitted to meet an earlier requirement – for simplicity, the applicant may reference the previously submitted information where applicable.

Checklist Sections The Human Space Flight checklist has two parts: Application checklist and Licensee and Permittee checklist.

Application checklist describes which sections of §460 you must demonstrate compliance with based on whether you are applying for a license or permit. As well as describes the sections that you must address in the application.

Responsibilities of the Licensee and Permittee checklist describes the responsibilities of the license or permit holder.

Other Tools Use this checklist in conjunction with other tools, such as the Advisory Circulars, and other guidance documents that the FAA Office of Commercial Space Transportation also provides.

APPLICATION CHECKLIST

14 CFR Part 460
Human Space Flight – Application Checklist

Item #	✓	Section Number	Application Requirement	Detailed Requirements
<i>Sections from License or Experimental Permit Application</i>				
1		415.8	Human Space Flight (Launch License)	To obtain a launch license, an applicant proposing to conduct a launch with flight crew or a space flight participant on board must demonstrate compliance with 460.5, 460.7, 460.11, 460.13, 460.15, 460.17, 460.51, and 460.53.
		431.8	Human Space Flight [Reusable Launch Vehicle (RLV)]	To obtain a license, an applicant proposing to conduct a reusable launch vehicle mission with flight crew or a space flight participant on board must demonstrate compliance with 460.5, 460.7, 460.11, 460.13, 460.15, 460.17, 460.51, and 460.53.
		435.8	Human Space Flight (Reentry Vehicle Other than an RLV)	An applicant for a license to conduct a reentry of a reentry vehicle other than an RLV with flight crew or a space flight participant on board the vehicle must demonstrate compliance with 460.5, 460.7, 460.11, 460.13, 460.15, 460.17, 460.51, and 460.53.
		437.21 (b)(3)	Human Space Flight (Experimental Permit)	To obtain a permit, an applicant proposing launch or reentry with flight crew or a space flight participant on board a reusable suborbital rocket must demonstrate compliance with 460.5, 460.7, 460.11, 460.13, 460.15, 460.17, 460.51, and 460.53.
Crew Qualifications and Training				
2		460.5 (a)(1)	Crew training for public safety	Each Crew Member must: <ul style="list-style-type: none"> ▪ Complete training on their role on board or on the ground so vehicle will not harm public.
3		460.5 (a)(2)	Crew training in nominal and non-nominal conditions	Each crew member must train for their role in nominal and off-nominal conditions including: <ul style="list-style-type: none"> ▪ Abort scenarios ▪ Emergency Operations
4		460.5(b)	Crew ability to withstand stresses of space flight	Each member of the flight crew must show their ability to withstand stresses of space flight (e.g. accelerating or deceleration, microgravity, and vibration) and still be able to carry out their duties so the vehicle will not harm the public.

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Item #	✓	Section Number	Application Requirement	Detailed Requirements
5		460.5 (c)(1-2)	Pilot and remote operator qualifications	Pilot and Remote Operators must possess the following items and knowledge: <ol style="list-style-type: none"> 1) Possess and carry an FAA pilot certification with an instrument rating 2) Possess aeronautical knowledge and experience necessary to pilot and control the launch and reentry vehicle that will operate in the National Airspace System (NAS)
		460.5(d)e	Remote operator equivalent level of safety	Remote operator may demonstrate an equivalent level of safety to §460.5(c)(1) through the license of permit process
6		460.5 (c)(3)	Pilot and remote operator training	Pilot and remote operator must receive vehicle and mission specific training for each specific phase of flight by one or more of the following methods: <ul style="list-style-type: none"> ▪ A method of device that simulates the flight ▪ An aircraft whose characteristics are similar to the vehicle or that has similar phases of flight to the vehicle ▪ Flight testing ▪ An equivalent method of training approved by the FAA through the license or permit process
		460.5 (c)(4)	Pilot and remote operator training	Must train in procedures that direct the vehicle away from the public in the event the flight crew abandons the vehicle during flight
		460.5 (c)(5)	Pilot and remote operator training	Must 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
7		460.5(e)e	Medical requirements for crew member	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
Operator Training of Crew				
8		460.7(a)	Implementation of training	Operator must train each member of its crew and define standards for successful completion in accordance with §460.5
9		460.7(b)	Training device fidelity	Operator must: <ul style="list-style-type: none"> ▪ Ensure that any crew-training device used to meet training requirements realistically represents the vehicle's configuration and mission, or ▪ Inform the crew member being trained of the differences between the two.

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Item #	✓	Section Number	Application Requirement	Detailed Requirements
10		460.7(c)	Maintenance of training records	Operator must: <ul style="list-style-type: none"> ▪ Continually update the crew training to ensure that it incorporates lessons learned from training and operational missions ▪ Track each revision and update in writing ▪ Document the completed training for each crew member and maintain the documentation for each active crew member
11		460.7(d)	Current qualifications and training	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
Environmental Control and Life Support Systems				
12		460.11(a)	Environmental Control and Life Support System (ECLSS) pertaining to the vehicle	Operator must provide atmospheric conditions adequate to sustain life and consciousness for all inhabited areas within a vehicle. 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. <ul style="list-style-type: none"> ▪ Composition of the atmosphere, which includes oxygen and carbon dioxide, and any revitalization ▪ Pressure, temperature and humidity ▪ Contaminants that include particulates and any harmful or hazardous concentrations of gases, or vapors ▪ Ventilation and circulation
13		460.11(b)	Redundant oxygen supply	Operator must provide an adequate redundant or secondary oxygen supply for the flight crew.
14		460.11(c)	Preventing cabin depressurization	Operator must: <ul style="list-style-type: none"> ▪ Provide a redundant means of preventing cabin depressurization or ▪ Prevent incapacitation of any of the flight crew in the event of loss of cabin pressure
15		460.13	Smoke detection and fire suppression	Operator or crew must have ability to detect smoke and suppress a cabin fire to prevent incapacitation of flight crew

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Item #	✓	Section Number	Application Requirement	Detailed Requirements
16		460.15	Human factors	<p>Operator must take precautions necessary to account for human factors that can affect a crew's ability to perform safety-critical areas by:</p> <ul style="list-style-type: none"> ▪ Design and layout of displays and controls ▪ Mission planning (including analyzing tasks and allocating functions between humans and equipment) ▪ Restraint or stowage of all individuals and objects in a vehicle, and ▪ Vehicle operation, so that vehicle will be operated in a manner that flight crew can withstand any physical stress factors, such as acceleration, vibration, and noise
17		460.17	Verification program	<p>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.</p>
18		460.51	Space flight participant training	<p>Operator must train each space flight participant before flight on how to respond to emergency situations, including smoke, fire, loss of cabin pressure, and emergency exit.</p>
19		460.53	Security	<p>Operator must implement security requirements to prevent any space flight participant from jeopardizing the safety of the flight crew or the public. A space flight participant may not carry on board any explosives, firearms, knives, or other weapons.</p>

**RESPONSIBILITIES OF
LICENSEE and PERMITTEE
CHECKLIST**

14 CFR Part 460
Human Space Flight – Responsibilities of Licensee and Permittee

Item #	✓	Section Number	Application Requirement	Detailed Requirements
1		460.9	Informing crew of risk	<p>Operator must inform in writing any individual serving as crew that the U. S. Government has not certified the launch vehicle and any reentry vehicle as safe for carrying flight crew or space flight participants. Operator must provide this information:</p> <ul style="list-style-type: none"> ■e Before entering into any contract ore other arrangement to employ thate individual ore ■e For any crew member employed as ofe December 23, 2004, as early as possiblee and prior to any launch in which that individual will participate as crew
2		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 FAA of the DOT in accordance with part 440. (Financial Responsibility)
Operator Informing Space Flight Participant of Risk				
3		460.45(a)	Informing space flight participant of risk	<p>Before receiving compensation or making an agreement to fly a space flight participant, an operator must:</p> <ul style="list-style-type: none"> ■e Inform each space flight participant ine writing about the risks of the launch and reentry including the safety recorde of the launch or reentry vehicle typee ■e Information must be presented in ae manner that can be readily understoode by a space flight participant with noe specialized education or traininge
4		460.45 (a)(1-3)	Risk disclosure in writing	<p>The written disclosure must include:</p> <ul style="list-style-type: none"> ■e For each mission, each known hazarde and risk that could result in a seriouse injury, death, disability, or totale partial loss of physical and mentale functione ■e That there are hazards not known ande ■e That participation in space flight maye result in death, serious injury, or totale partial loss of physical or mentale functione
5		460.45(b)	U.S. Government has not certified vehicle as safe	Operator must inform each space flight participant that the U.S. Government has not certified the launch vehicle and any reentry vehicle as safe for carrying crew or space flight participants

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Item #	✓	Section Number	Application Requirement	Detailed Requirements
6		460.45(c)	Safety record of all vehicles that have carried humans	<p>Operator must inform space flight participant of the safety record of all launch or reentry vehicles that have carried one or more persons on board, including both U.S. government and private sector vehicles. This information must include:</p> <ul style="list-style-type: none"> ▪ Total number of people who have been on a suborbital or orbital space flight and total number of people who have died or been seriously injured on these flights, and ▪ Total number of launches and reentries conducted with people on board and number of catastrophic failures of those launches and reentries
7		460.45(d)	Safety record of operator's vehicle	<p>Operator must describe the safety record of its vehicle to each space flight participant. Operator's safety record must cover launch and reentry accidents and human space flight incidents that occurred during and after vehicle verification performed in accordance with 460.17 and include:</p> <ul style="list-style-type: none"> ▪ Number of vehicle flights ▪ Number of accidents and human space flight incidents as defined by section 460.15 and ▪ Whether any corrective actions were taken to resolve these accidents and human space flight incidents
8		460.45(e)	Space flight participant requesting additional information	Operator must inform a space flight participant that he or she may request additional information regarding any accidents and human space flight incidents reported
9		460.45(f)	Opportunity for space flight participant to ask questions	Before flight an operator must provide each space flight participant an opportunity to ask questions orally to acquire a better understanding of the hazards and risk of the mission

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Item #	✓	Section Number	Application Requirement	Detailed Requirements
10		460.45 (f)(1-3)	Space flight participant written consent	Each space flight participant must provide consent in writing to participate in a launch or reentry. Written consent must: <ul style="list-style-type: none"> ▪ Identify the specific launch vehicle the consent covers ▪ State that the space flight participant understands the risk, and his or her presence on board the launch vehicle is voluntary ▪ Be signed and dated by the space flight participant
11		460.49	Space flight participant waiver of claims against U.S. Government	Each space flight participant must execute a reciprocal waiver of claims with the FAA of the DOT in accordance with the requirements of part 440 (Financial Responsibility)