U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Informed Consent Requirements for Crew and Space Flight Participants

Date: D R A F T

Initiated By: AST-1

AC No: 460.45-1

This Advisory Circular (AC) provides guidance on meeting informed consent requirements for crew and space flight participants in accordance with Title 14 of the Code of Federal Regulations (CFR) § 460.9, *Informing crew of risk*, and § 460.45, *Operator informing space flight participant of risk*. An operator must inform, in writing, each space flight participant and any individual serving as crew, that the United States Government has not certified the launch vehicle and/or any reentry vehicle as safe for carrying flight crew or space flight participants in accordance with §§ 460.9 and 460.45.

An operator must inform each space flight participant, in writing, about the risks of the launch and reentry, including the safety record of the launch or reentry vehicle type. The operator must also provide the space flight participant with an opportunity to ask questions orally to acquire a better understanding of the hazards and risks of the mission. In return, each space flight participant must then provide consent, in writing, to participate in a launch and/or reentry of a commercial space vehicle in accordance with § 460.45.

The Federal Aviation Administration (FAA) considers this AC an accepted means of compliance (MOC) for complying with the regulatory requirements of §§ 460.9 and 460.45.

This is a guidance document. Its content is not legally binding in its own right and will not be relied upon by the Department as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with the guidance document is voluntary only. Nonconformity will not affect rights and obligations under existing statutes and regulations.

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback Form at the end of this AC.

Executive Director, Office of Operational Safety
Commercial Space Transportation

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1 PURPOSE.

1.1 This Advisory Circular (AC) details the Federal Aviation Administration's (FAA's) guidance on informed consent for crew and space flight participants. This document informs holders of a license or permit under Title 51 U.S.C. Subtitle V, chapter 509, *Commercial Space Launch Activities*, as well as applicants and prospective applicants for such licenses and permits, on an acceptable means of complying with the commercial space informed consent requirements, including the *Commercial Space Launch Amendments Act of 2004*, and its implementing regulations, namely 14 CFR §§ 460.9 and 460.45.

Note: This AC provides guidance for two regulations. It provides guidance for an operator to meet the requirements defined by Title 14, Code of Federal Regulations (CFR), § 460.9, *Informing crew of risk* as well as § 460.45, *Operator informing space flight participant of risk.* Since there is no AC yet published numbered AC 460.9-1, please refer to the paragraphs contained within this AC regarding guidance for informing crew of risk.

1.2 **Background**.

Section 50905 of Title 51 of the United States Code and part 460 of Title 14 of the Code of Federal Regulations require an informed consent regime for commercial human space flight. Sections 460.9 and 460.45 of Title 14 CFR require an operator to notify, in writing, any individual serving as crew or a space flight participant that the United States Government has not certified any launch or reentry vehicle as safe for carrying flight crew or space flight participants ("non-certification statement"). Section 460.45 also requires an operator to notify space flight participants of the hazards and risks of the launch or reentry in which they wish to participate.

1.3 **Level of Imperatives**.

This AC presents one, but not the only, acceptable means of compliance (MOC) with the associated regulatory requirements. The FAA will consider other MOC that an applicant may elect to present. In addition, an operator may tailor the provisions of this AC to meet its unique needs, provided the changes are accepted as an MOC by the FAA during review of the application for a license. Throughout this document, the word "must" characterizes statements that directly follow from regulatory text and therefore reflect regulatory mandates. The word "should" describes an option that, if used, would constitute a means to comply with the regulation. Variation from these provisions of this AC is possible but must satisfy the regulation to constitute an MOC. The word "may" describes variations or alternatives allowed within the accepted MOC set forth in this AC.

1.4 **Cancellation**.

This AC 460.45-1 cancels *Guidance on Informing Crew and Space Flight Participants of Risk, Version 1.1*, dated April 4, 2017.

1.5 **Principal Changes**.

This AC 460.45-1 replaces *Guidance on Informing Crew and Space Flight Participants of Risk Version 1.1*, dated April 4, 2017. This replacement includes the following principal changes:

This AC outlines regulations and guidelines for operators who transport humans in launch or reentry vehicles, specifically those with a license or permit for such activities. The document delineates the roles of NASA, the FAA, and operators in ensuring the safety and performance requirements for transporting government astronauts. It emphasizes that operators must provide a non-certification statement to crew members employed before the company receives a license or before they are identified as crew in accordance with § 460.9 and 460.45(b).

Also, operators are required to obtain informed consent from space flight participants before receiving compensation or making flight agreements in accordance with § 460.45(f)(3). However, informed consent is not needed for refundable deposit arrangements. For paying participants, written informed consent must be secured before finalizing any agreement in accordance with § 460.45(f)(3), while for non-paying participants, it must be obtained once they are identified and before concluding any flight agreement in accordance with § 460.45(a). Operators cannot delegate the responsibility of informing participants about the risks of space travel to third parties; they must do so personally, using their complete and current knowledge of potential hazards, in accordance with § 460.45 (see paragraph 6.3.1.5 of this AC).

Informed consent documents must detail the scope of risks, whether mitigated or unmitigated, and the operator's process for reviewing and updating these documents in accordance with §460.45(a). In accordance with §460.45(c), operators must inform participants about the safety record of all human-carrying vehicles, including the number of fatalities or serious injuries, the total number of flights, and any catastrophic failures. The vehicle history must include all flights, even those without occupants, and the number of accidents or incidents as defined by regulations in accordance with §460.45(d).

Finally, in accordance with §460.45(d), operators must present this safety information in a comprehensible manner for participants without specialized training and inform them of their right to request further details about any incidents. In accordance with § 460.45(f)(3), informed consent must be signed and dated by each participant, with the stipulation that minors under 18 cannot provide such consent.

1.6 **Where You Can Find This AC**.

You can find this AC on the FAA's website at https://www.faa.gov/regulations_policies/advisory_circulars and the Dynamic Regulatory System (DRS) at https://drs.faa.gov.

2 APPLICABILITY.

2.1 The guidance in this AC is for launch and reentry license and permit applicants and operators required to comply with part 460. The guidance in this AC is for those seeking a launch or reentry vehicle operator license or permit, licensed or permitted operators seeking to renew or modify an existing vehicle operator license or permit, and FAA commercial space transportation evaluators.

2.2 The material in this AC is advisory in nature and does not constitute a regulation. This guidance is not legally binding in its own right, and the FAA will not rely upon this guidance as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with this guidance document (as distinct from existing statutes and regulations) is voluntary only, and nonconformity will not affect rights and obligations under existing statutes and regulations. This AC describes acceptable means, but not the only means, for demonstrating compliance with the applicable regulations.

2.3 The material in this AC does not change or create any additional regulatory requirements, nor does it authorize changes to, or deviations from, existing regulatory requirements.

3 APPLICABLE REGULATIONS AND RELATED DOCUMENTS.

3.1 Applicable United States Code (U.S.C.) Statute.

- Title 51 U.S.C. Subtitle V, Chapter 509, Commercial Space Launch Activities. https://uscode.house.gov/.

3.2 Related Code of Federal Regulations.

The following Title 14 CFR regulations must be accounted for when showing compliance with 14 CFR § 460.9 and § 460.45. You can download the full text of these regulations from the U.S. Government Printing Office e-CFR. You can order a paper copy from the Government Printing Office, Superintendent of Documents, Attn: New Orders, P.O. Box 371954, Pittsburgh, PA, 15250-7954.

- Section 401.5, *Definitions.*
- Section 401.7, *Definitions.*
- Section 405.1, *Monitoring of licensed, permitted, and other activities.*
- Section 413.5, *Pre-application consultation.*
- Section 417.15, *Records*.
- Section 431.77, *Records*.
- Section 437.87, *Records.*
- Section 450.35, *Means of compliance.*
- Section 450.207, *Human spaceflight requirements.*
- Section 450.219, *Records*.
- Section 460.9, *Informing crew of risk.*
- Section 460.17, *Verification program*.
- Section 460.45, *Operator informing space flight participant of risk.*

3.3 Related FAA Advisory Circulars.

- AC 413.13-1 *Guide to Complete Application*.
- AC 431.35-2A *Reusable Launch and Reentry Vehicle System Safety Process*.
- AC 437.55-1 *Hazard Analysis for the Launch or Reentry of a Reusable Suborbital Rocket Under an Experimental Permit*.
- AC 440.17-1 *Reciprocal Waiver of Claims Requirements.*
- AC 450.103-1 *System Safety Plan*.

Note: FAA Advisory Circulars are available through the FAA website, http://www.faa.gov/.

3.4 **Related Government Documents**.

- Federal Aviation Administration (FAA), *Recommended Practices for Human Space Flight Occupant Safety, Version 2.0* (September 2023), https://www.faa.gov/media/71481.
- FAA, *U.S. Human Space Flight Safety Record* (updated periodically), https://www.faa.gov/space/humanspaceflight/us-human-space-flight-safety-record.
- *Human Space Flight Requirements for Crew and Space Flight Participants*, Final Rule, 71 FR 75616 (Dec. 15, 2006) ("Human Space Flight Rule"), https://www.federalregister.gov.

Note: The government documents referenced in this chapter refer to the current revisions or regulatory authorities' accepted revisions.

4 DEFINITION OF TERMS.

For this AC, the definitions from § 401.7 and this list apply. These definitions are repeated here for the convenience of the audience of this AC.

4.1 Crew

Crew means any employee or independent contractor of a licensee, transferee, or permittee, or of a contractor or subcontractor of a licensee, transferee, or permittee, who performs activities in the course of that employment or contract directly relating to the launch, reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human beings. A crew consists of flight crew and any remote operator.

4.2 Flight crew

Flight crew means crew that is on board a vehicle during a launch or reentry.

4.3 Government astronaut

Government astronaut means an individual who—

1. Is designated by the National Aeronautics and Space Administration under Title 51, United States Code, Section 20113(n);
2. Is carried within a launch vehicle or reentry vehicle in the course of their employment, which may include performance of activities directly relating to the launch, reentry, or other operation of the launch vehicle or reentry vehicle; and
3. Is either—
    i. An employee of the United States Government, including the uniformed services, engaged in the performance of a Federal function under authority of law or an Executive act; or
    ii. An international partner astronaut.

4.4 Mishap

Mishap means any event, or series of events associated with a licensed or permitted activity resulting in any of the following:

1. A fatality or serious injury (as defined in 49 CFR 830.2);
2. A malfunction of a safety-critical system;
3. A failure of the licensee's or permittee's safety organization, safety operations, safety procedures;
4. High risk, as determined by the FAA, of causing a serious or fatal injury to any space flight participant, crew, government astronaut, or member of the public;
5. Substantial damage, as determined by the FAA, to property not associated with licensed or permitted activity;
6. Unplanned substantial damage, as determined by the FAA, to property associated with licensed or permitted activity;

7. Unplanned permanent loss of a launch or reentry vehicle during licensed activity or permitted activity;
8. The impact of hazardous debris outside the planned landing site or designated hazard area; or
9. Failure to complete a launch or reentry as planned as reported in § 450.213(b).

4.5 **Occupant**

Occupant means flight crew, government astronaut, or space flight participant on board a launch or reentry vehicle.

4.6 **Operator**

Operator means a holder of a license or permit under 51 U.S.C. Subtitle V, chapter 509.

4.7 **Space flight participant**

An individual, who is not crew or a government astronaut, carried on board a launch or reentry vehicle.

5 ACRONYMS.

AC – Advisory Circular

AST – Office of Commercial Space Transportation

CFR – Code of Federal Regulations

FAA – Federal Aviation Administration

MOC – Means of Compliance

MPL – Maximum Probable Loss

NASA – National Aeronautics and Space Administration

OMB – Office of Management and Budget

U.S.C. – United States Code

U.S. – United States

6 INFORMED CONSENT REQUIREMENTS.

6.1 Overview.

The informed consent requirements in §§ 460.9 and 460.45 apply only to operators who have a human on board a vehicle. An applicant does not need to demonstrate compliance to §§ 460.9 and 460.45 as part of its application because these regulations are not identified in the requirements of §§ 415.8, 431.8, 435.8, 437.21(b)(3), and 450.45(e)(5). However, the operator is subject to compliance monitoring for informed consent regulations by the FAA. Applicants may use the guidance provided in this AC to gain insight into the regulatory and statutory requirements with which they must comply once they receive a license or permit.

6.2 Informing Crew of Risk.

6.2.1 In accordance with § 460.9, an 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. In accordance with § 460.9, an operator must provide this information—before entering into any contract or other arrangement to employ that individual; or 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. The FAA recognizes that there may be a case in which a crew member is employed prior to the company being issued a license or prior to that employee being identified as crew. In these cases, an operator must always provide the non-certification statement to crew prior to any launch or reentry where that individual will serve as crew. In instances where the employer executes a contract or other written agreement to document that employee's role as crew after the employee has been employed, the employer must provide the non-certification statement to the crew member prior to that crew member signing the additional contract or written agreement. In instances where the employer does not execute any additional contract identifying the individual as crew, the employer should provide the non-certification statement as soon as possible.

6.2.2 To comply with the regulatory requirements of § 460.9, an operator can provide this example non-certification statement (or similar) to each crew member in writing:

> *"The United States Government has not certified the launch vehicle and any reentry vehicle as safe for carrying flight crew or space flight participants."*

6.2.3 The operator may modify the non-certification statement above to specifically call out the name(s) of its vehicle(s).

6.2.4 The FAA notes that, in some cases, the vehicle may have obtained NASA certification for flights with government astronauts. Through its certification efforts, NASA ensures the selected commercial transportation systems meet NASA's safety and performance requirements for transporting government astronauts only.

6.2.5 Although Congress has charged the FAA with certificating aircraft, it has not provided the agency with the authority to certificate launch or reentry vehicles. Congress has authorized the Department of Transportation to issue licenses or permits for the operation of launch and reentry vehicles. In accordance with § 450.45(a)[1], before the FAA can issue a safety approval, an applicant must demonstrate it is capable of launching (or reentering) without jeopardizing public health and safety and the safety of property. The non-certification statement is intended to notify the crew that the FAA's oversight responsibilities related to the licensing or permitting process are intended to protect the public and do not extend to the safety of crew or space flight participants. Examples of a non-certification statement for the crew are located in paragraph 6.2.2 and Appendix B of this AC. In addition to providing the non-certification statement, operators are encouraged to explain that the statement means that the U.S. Government does not ensure the safety of flight crew or space flight participants.

Note: Section 460.9 and the informed consent requirements do not apply to government astronauts because they are not considered to be crew or space flight participants. Regulations applying to government astronauts are covered in Subparts C and D of Part 460.

6.2.6 During the license or permit pre-application consultation, the FAA educates applicants about the informed consent regulations for crew and space flight participants. The FAA recommends that the non-certification statement used to verify compliance include the crew member signature block and the date signed. A sample is located in Appendix B of this AC.

6.3 **Informing Space Flight Participants of Risk**.

In accordance with § 460.45, an operator must inform each space flight participant of the risks of launch and reentry. Note, the regulations are silent about what language an operator must use in its discussions and documentation, but whatever language is used, the space flight participant must attest, in accordance with § 460.45(f)(2), they understand the risks. Appendix C of this AC provides an example of an acceptable *Informed Consent for Space Flight Participants*. It covers the minimum information required to comply with § 460.45. Paragraphs 6.3.1 through 6.3.13 of this AC offer guidance regarding information the operator could provide to space flight participants, including the compensation restrictions, the risk of launch and reentry, level of technical detail, non-certification statement, human space flight safety record, vehicle safety record, vehicle safety record description, request for additional information about accidents and incidents, oral questions, minimum age of a space flight participant,

[1] Some operators are still operating under legacy requirements, and the safety approval regulations are the same.

electronic signatures, and documentation. These paragraphs explain FAA reporting requirements for operator awareness.

6.3.1 Compensation Restrictions.

6.3.1.1 Understanding the Risk.

In accordance with § 460.45, an operator must obtain the space flight participant's informed consent before receiving compensation or making an agreement to fly. Satisfying the requirements of § 460.45 ensures that the space flight participant understands the hazards and risks of launch or reentry before committing to the flight. The guidance contained in this AC addresses what constitutes compensation for the purposes of § 460.45 and addresses when an operator should obtain written informed consent when there is no space flight participant identified at the time a customer provides payment to the operator.

6.3.1.2 Refundable Deposits.

Compensation for participating in a launch or reentry is not defined in any U.S. Department of Transportation regulation or statute. The FAA does not consider refundable deposits for a future space flight to be compensation or an agreement to fly. Refundable deposits allow for both operators and space flight participants to initiate a full refund of the amount deposited and for the funds to be returned to the space flight participant prior to launch should the space flight participant elect not to provide informed consent. An operator may also accept compensation for medical screening, training, and other space flight-related experiences before proceeding to make an agreement to fly, as long as the compensation does not exceed the cost of the screening, training, or experience. Therefore, an operator is not required by § 460.45 to obtain informed consent from a space flight participant if the funds provided by a space flight participant are refundable deposits or funds to screen or train the space flight participant. Operators are encouraged to explicitly represent when compensation is accepted or an agreement to fly is made for participation in a launch or reentry.

6.3.1.3 Operator-Customer Agreement and Compensation.

In the case of a paying space flight participant, the space flight participant must sign written informed consent before the operator executes the agreement or receives compensation for the space flight participant's seat, whichever occurs first, in accordance with § 460.45. In instances where an operator receives compensation from a customer to fly space flight participants prior to the customer knowing the identities of those space flight participants, the operator may execute an agreement and begin receiving payments from the customer.

6.3.1.4 Space Flight Participant Agreement or Compensation.

The operator does not incur a duty to inform any space flight participants under § 460.45 until the participants are identified by the customer. The operator must obtain informed consent of each space flight participant prior to concluding an agreement to fly that participant to meet the requirements of § 460.45. If the customer does not identify any space flight participants, no informed consent is required under § 460.45 and there is no regulatory restriction on when the operator may receive compensation from the customer. In the case of a non-paying space flight participant, an operator must obtain informed consent from the space flight participant once that space flight participant is identified to the operator and prior to completing an agreement to fly in accordance with § 460.45(a).

6.3.1.5 Restriction of Third-Party Delegation.

The statute (51 U.S.C § 50905(b)(5)(B)) and the regulation (§ 460.45) require operators to inform space flight participants of the risks of being carried on board their vehicles; they do not explicitly allow delegation of this requirement to any third party. The informed consent required by § 460.45 must be performed by the operator, whose knowledge of the risk, known hazards, potential for unknown hazards, functional hazard analyses, flight hazard analyses, and its vehicle safety record is current and complete.

6.3.2 Risk of Launch and Reentry.

In accordance with § 460.45(a), prior to receiving compensation or making an agreement to fly a space flight participant, an operator must inform each space flight participant, in writing, about the risks of the launch and reentry, including the safety record of the launch or reentry vehicle type. Section 460.45(a) states:

An operator must present this information in a manner that can be readily understood by a space flight participant with no specialized education or training, and must disclose in writing–

1. *For each mission, each known hazard and risk that could result in a serious injury, death, disability, or total or partial loss of physical and mental function;*
2. *That there are hazards that are not known; and*
3. *That participation in space flight may result in death, serious injury, or total or partial loss of physical or mental function.*

Thus, in accordance with § 460.45(a) and § 460.45(a)(2), an operator must inform space flight participants, in writing, about the risks of the launch and reentry, including known hazards and hazards that are not known. In accordance with § 460.45(a)(3), the operator must identify the risks and hazards that could result in serious injury, death, disability, or total or partial loss of physical and mental function to the space flight participant and may do so using a functional hazard analysis. Paragraph 6.3.4 of this AC provides guidance on the level of detail that would satisfy § 460.45.

6.3.2.1 Scope of Hazards and Risks Included.

In accordance with §460.45(a), an operator should describe the scope of the hazards and risks in its informed consent document and indicate whether they are mitigated or unmitigated hazards and risks. The operator should also inform the space flight participant that there may be hazards and risks that have been effectively mitigated below the threshold required to be included in the list. The omission of this context and assumptions for the list of hazards and risks may lead a space flight participant to misconstrue the information presented and therefore does not meet the regulation to be readily understood by the space flight participant.

6.3.2.2 Process to Update Informed Consent Based on New Hazards or Risks.

An operator should include a summary of its process for reviewing hazards and anomalies to determine if it needs to update the informed consent documentation. An operator should review anomalies that occur during each flight to determine if there was a high risk, per mishap or human space flight incident definitions of paragraph 4, to the safety of space flight participants, even if the flight did not result in a serious injury or fatality. This gives the space flight participant an understanding that the informed consent process is not static and requires updates based on past flights.

6.3.2.3 Vehicle Type.

Neither the 51 U.S.C. Subtitle V, Chapter 509, Commercial Space Launch Activities statute nor part 460 define the term “vehicle type.” In this AC, the term “vehicle type” means vehicles similar in design and structure as licensed or permitted by the FAA. For instance, SpaceShipOne and SpaceShipTwo are different vehicle types, as are the Mercury, Gemini, and Apollo capsules. The Space Shuttle vehicles are considered the same vehicle type. Safety Record Criteria paragraph A.1.1.7 in Appendix A of this AC discusses the use of “vehicle type” in the vehicle safety record.

Note: In this document, the terms “safety record of the launch or reentry vehicle type” and “vehicle safety record” are interchangeable.

6.3.2.4 Functional Hazard Analysis.

Because § 460.45(a)(1) requires that an operator inform each space flight participant of the known hazards and risks that could result in a serious injury, death, or disability, the operator should perform or review a functional hazard analysis focusing on identifying hazards and risks that could result in a serious injury, death, or disability to the space flight participant. The functional hazard analysis should be performed in accordance with AC 450.103-1 *System Safety Plan* and AC 450.107-1 *Hazard Control Strategies*.

6.3.3 Level of Technical Detail.

In accordance with § 460.45(a), an operator must present technical information in a manner that ensures each space flight participant is informed of the risks of the launch or reentry and that those risks can be readily understood with no specialized education or training. Furthermore, an operator is not required to provide information that would violate export control regulations or disclose proprietary information. The operator is only required to describe hazards, risks, and technical data at a general system level. For example, if a hazard exists in the turbo pump of a rocket engine, the operator should state only that the hazard exists in the propulsion system. The risks associated with this stated hazard should be described generically as catastrophic (see Appendix A, Safety Record Criteria, paragraph A.1.1.14 of this AC).

6.3.3.1 The operator should provide hazards and risks as a general description to satisfy the regulation, which is to ensure individuals on board are aware of the risks associated with a launch or reentry. An operator needs only to disclose, for example, that the propulsion system failed, not the details of how the failure occurred.

6.3.3.2 Furthermore, the FAA recognizes that, while providing detailed descriptions about the vehicle might be helpful to the flight crew, such details might conflict with the requirement of § 460.45(a) that the information be readily understood by a space flight participant with no specialized education or training.

6.3.3.3 The operator may choose to provide additional information at a more detailed level to ensure the space flight participants understand the risks. The FAA recommends that, if an operator accepts a level of risk above the operational standard (outside of the typical risk thresholds per its own processes), that risk should be communicated to the space flight participant.

6.3.4 Non-Certification Statement for Space Flight Participants.

6.3.4.1 In accordance with § 460.45(b), an operator must inform each space flight participant, in writing, 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. (See paragraph 6.3.12 of this AC for the required documentation regarding informed consent.) To comply with § 460.45(b), an operator must inform each space flight participant in writing of the following:

"*The United States Government has not certified the launch vehicle and any reentry vehicle as safe for carrying flight crew or space flight participants."*

The operator may modify the non-certification statement above to specifically call out its vehicle name(s).

6.3.4.2 As shown in Appendix B, *Example of Non-Certification Statement to the Crew*, and Appendix C, *Example of Informed Consent Space Flight Participant* of this AC, a non-certification statement explains to the space flight participant that the FAA's licensing and permitting requirements are not intended to ensure occupant safety. The FAA is currently prohibited from regulating the safety of occupants, except in response to specific situations that result in occupant casualties or pose a high risk of causing casualties. Additionally, although Congress has charged the FAA with certificating aircraft, it has not provided the agency with the authority to certificate launch or reentry vehicles.

6.3.5 Human Space Flight Safety Record.

In accordance with § 460.45(c), an operator must inform each space flight participant of the safety record of all launch and reentry vehicles that have carried one or more persons on a suborbital or orbital space flight. This information must include the total number of people who have been on a suborbital or orbital space flight, the total number of people who have died or been seriously injured on these flights per § 460.45(c)(1); and the total number of launches and reentries conducted with people on board and the number of catastrophic failures of those launches and reentries per § 460.45(c)(2).

6.3.5.1 The FAA maintains on its website[2] the information referenced in § 460.45(c)(1) and (2) that an operator may use, but the operator is responsible for ensuring the accuracy of its data provided to the space flight participant. The FAA's website contains information for both U.S. government and private sector[3] vehicles and is categorized into orbital and suborbital flights (see Appendix D of this AC). The website also documents the safety record criteria (see Appendix A) used to derive the data. Section 460.45(c)(1) and (2) requires the following:

1. *The total number of people who have been on a suborbital or orbital space flight and the total number of people who have died or been seriously injured on these flights; and*
2. *The total number of launches and reentries conducted with people on board and the number of catastrophic failures of those launches and reentries.*

6.3.5.2 The operator should provide updated information proximately and prior to launch if there have been changes to the safety record that result in a representation of higher risk (e.g. a mishap has occurred) than what the space flight participant acknowledged when signing informed consent documentation. Ultimately, it is the responsibility of the launch vehicle operator to inform each space flight participant of that safety record and provide an updated safety record proximate to launch that is necessary to ensure that space flight participants are aware of the most current risk.

6.3.6 Vehicle Safety Record.

In accordance with § 460.45(d), an operator must describe the safety record of its vehicle to each space flight participant as follows:

1. For licenses issued under 14 CFR part 450, the operator's safety record must cover any event that meets any of paragraph (1), (4), (5), or (8) of the definition of "mishap" in § 401.7 that occurred during and after vehicle verification performed in accordance with § 460.17, and include:
    i. The number of vehicle flights;
    ii. The number of events that meet any of paragraph (1), (4), (5), or (8) of the definition of "mishap" in § 401.7 of chapter III of Title 14; and
    iii. Whether any corrective actions were taken, and whether closure of corrective actions was completed, to resolve these mishaps.

[2] https://www.faa.gov/space/human_spaceflight.
[3] "Private sector" is the term used in the regulations. It is used synonymously with "commercial" for the purposes of this AC.

2. For licenses issued under 14 CFR parts 415, 431, or 435, the operator's safety record must cover launch and reentry accidents and human space flight incidents as defined by § 401.5, that occurred during and after vehicle verification performed in accordance with § 460.17, and include:

    i. The number of vehicle flights;

    ii. The number of accidents and human space flight incidents as defined by § 401.5; and

    iii. Whether any corrective actions were taken, and whether closure of corrective actions was completed, to resolve these accidents and human space flight incidents.

6.3.7 Vehicle Safety Record Description.

The operator must describe its vehicle safety record to the space flight participant in accordance with § 460.45(d). An operator should follow the safety record criteria documented in Appendix A of this AC and apply it to their complete vehicle history to produce an acceptable vehicle safety record. An acceptable vehicle safety record includes all flights of launch and reentry vehicles designed to carry humans, whether or not the vehicle was occupied. An acceptable vehicle history includes both of the following (see Appendix D of this AC for an example):

1. Operator's vehicle history (fleet history for the vehicle type) in which the space flight participant will launch or reenter, including both government and commercial launches or reentries. In accordance with § 460.45(d), the vehicle history must include, at a minimum, the number of vehicle flights, and either the number of accidents and human space flight incidents as defined in §401.5, or any event that meets any of paragraph (1), (4), (5), or (8) of the definition of "mishap" in § 401.7, depending on the license type by regulation. Licenses under Parts 415, 431, or 435, also called legacy licenses, use the definitions of § 401.5 and the Part 450 vehicle operator licenses use the definitions of § 401.7. The FAA may determine that a mishap, under either § 401.5 and § 401.7, be considered a human space flight incident or meet paragraph (4) of the mishap definition for the respective regulations, if there are no occupants onboard at the time of the mishap, but the vehicle is human-capable.

2. Whether any corrective actions were taken, and whether closure of corrective actions was completed, to resolve any of the accidents or human space flight incidents or any event that meets any of paragraph (1), (4), (5), or (8) of the definition of "mishap" in § 401.7, depending on the license type, as described above.

6.3.7.1 If multiple vehicle operators have operated the same type of vehicle, the vehicle operator should provide the vehicle safety record to the space flight participant that includes all flights of this vehicle type. A vehicle safety record – that includes the operator's fleet history of a specific vehicle type – provides the space flight participant with an understanding of the entire vehicle safety record and associated risks. The vehicle operator may contact the FAA for data to generate the vehicle safety record.

6.3.7.2 In accordance with § 460.45(d)(1)(iii) and (2)(iii), if asked about corrective actions taken after an accident, incident, or mishap, the operator can provide only the nature of its corrective action (e.g., that the turbo pump of a rocket engine was redesigned, not that there was a material change in the impeller blades). Just as in the human safety record, after the space flight participant provides consent, the operator should update the space flight participant of material changes in the risk or safety records before flight.

6.3.7.3 With regard to vehicle verification, verification flights are identified by the operator in its license or permit application to satisfy § 460.17 verification program requirements. In accordance with § 460.17, the operator's verification program demonstrates the integrated performance of the vehicle's hardware and any software in an operational flight environment before allowing space flight participants on board during a flight. The FAA does not require an operator to include developmental testing in the vehicle safety record if it occurs prior to the vehicle verification. If the operator removes the vehicle from verification testing or operational flights for additional development testing, those tests are not required to be included in the vehicle safety record. Also called out in § 460.17 is the requirement that verification must include flight testing. The FAA will review and approve the verification flights identified in the operator's verification program on a case-by-case basis.

6.3.7.4 Utilizing the FAA safety record criteria when calculating the vehicle safety record will result in consistent reporting for all operators.

6.3.7.5 When documenting the information required in the vehicle safety record, the operator may describe accidents and incidents at a general system level. Many members of industry have a concern regarding proprietary information or violating export control regulations; to address these concerns, it is acceptable to use general system level information when disclosing a vehicle's safety record with space flight participants.

6.3.8 Request for Additional Information About Accidents and Incidents.

Congress requires that a space flight participant be informed of the risks.[4] Since the FAA expects space flight participants to have varying degrees of technical expertise and understanding, an operator must present this information in a manner that can be readily understood by a space flight participant with no specialized education or training or understanding of basic engineering principles in accordance with § 460.45(a). In accordance with § 460.45(e), an operator must inform a space flight participant that he or she may request additional information regarding any accidents and human space flight incidents reported.

6.3.8.1 The operator may provide additional information, as necessary, if it helps to explain the risk. By answering questions raised by space flight participants about accidents or human space flight incidents, the operator provides space flight participants with an opportunity to better understand the risks of space flight. Operators are not expected to provide failure summaries of another operator's vehicles due to a potential lack of insight into those failures.

6.3.8.2 An operator must inform space flight participants that they may request additional information about any accident, human space flight incident, or event that meets paragraph (1), (4), (5), or (8) of the definition of mishap, as disclosed in compliance with § 460.45(d). If asked, the operator should, at a minimum, describe failures at a general system level.

6.3.9 Space Flight Participant Oral Questions.

The FAA believes that an opportunity to ask questions allows a space flight participant a chance to get clarification on any information that may be confusing or unclear. In addition to receiving informed consent in writing from a space flight participant, this requirement serves as another "cognizance test" or affirmation that the space flight participant understands what risk they are accepting before embarking on a mission. In accordance with § 460.45(f), *before flight, an operator must provide each space flight participant with an opportunity to ask questions orally to acquire a better understanding of the hazards and risks of the mission. Each space flight participant must then provide consent in writing to participate in a launch or reentry. The consent must—*

1. *Identify the specific launch vehicle the consent covers.*
2. *State that the space flight participant understands the risk, and his or her presence on board the launch vehicle is voluntary; and*
3. *Be signed and dated by the space flight participant.*

[4] Title 51 U.S.C. Subtitle V, Chapter 509, Commercial Space Launch Activities. https://uscode.house.gov/

6.3.9.1 In accordance with § 460.45(f), prior to space flight participants giving written consent, an operator must provide an opportunity for the space flight participants to ask oral questions to acquire a better understanding of the hazards and risks of the mission. The discussion does not have to occur if the space flight participants decline the opportunity to ask questions. The questions may be in-person or remote (e.g., phone, video chat, etc.). If asked, the operator may address questions at a general system level. The operator may provide additional information, as necessary, if it helps to explain the risk. While there is no requirement to document the nature of the questions asked, operators are encouraged to incorporate that information into their informed consent presentations to enhance risk information provided to space flight participants.

6.3.9.2 To address export control regulation concerns and proprietary information disclosure, operators should answer the questions at the general system level.

6.3.10 Minimum Age of a Space Flight Participant.

Section 460.45(f)(3) requires each space flight participant to provide written informed consent. The consent must state that the space flight participant understands the risk associated with being a space flight participant aboard the specific vehicle and that his or her presence on board is voluntary.

6.3.10.1 In accordance with § 460.45(f)(3), the informed consent must be signed and dated by each space flight participant. Due to the risks involved with space flight, the FAA does not consider a person under the age of 18 someone who can provide informed consent, nor will the FAA accept parental consent[5]. Societally, the U.S. Government has acknowledged that it is reasonable to place restrictions on individuals who are under the age of 18 years old to legally consent. In the United States, a person may vote in federal elections at the age of 18. A person may not enlist for military service without parental consent until the age of 18. While some states classify a person as a minor until the age of 21, in many states the age of majority is 18. In no state is the age of majority less than the age of 18 years old. Given the risks involved, parental consent may not substitute for the minor's inability to be informed.

[5] Human Space Flight Requirements for Crew and Space Flight Participants, 71 FR 75632 (Dec. 15, 2006), https://www.federalregister.gov/d/E6-21193/p-170.

6.3.11 Electronic Signature.

For the purpose of documenting informed consent, electronic formats, including digital signatures or scanned copies of signatures on paper, are acceptable to the FAA. The regulatory text of § 460.45(f) does not state whether the signed writing it requires must be expressed in a paper or electronic format. Accordingly, the signed informed consent required by § 460.45(f) may be made in either electronic formats or written signature.

6.3.12 Documentation.

Under § 460.45, an operator must obtain the space flight participant's informed consent before making an agreement to fly. Satisfying the requirements of § 460.45 ensures that the space flight participant understands the hazards and risks of launch or reentry before committing to the flight. To comply with § 460.45, operators must provide the information described in Table 1 of this AC in writing in either paper or electronic format. Appendices A, B, and C of this AC provide examples of acceptable forms for providing the information required by § 460.45(b) and (c).

Table 1 – Documentation Related to Informed Consent

Regulation	Required Documentation
§ 460.45(a)	Risks of the launch and reentry
§ 460.45(a)	Safety record of the launch or reentry vehicle type
§ 460.45(a)(1)	Each known hazard and risk that could result in a serious injury, death, disability, or total or partial loss of physical and mental function
§ 460.45(a)(2)	That there are hazards that are not known
§ 460.45(a)(3)	That participation in space flight may result in death, serious injury, or total or partial loss of physical or mental function
§ 460.45(b)	Non-certification statement
§ 460.45(c)	Description of human space flight safety record
§ 460.45(c)(1)	Total number of people who have died or been seriously injured
§ 460.45(c)(2)	Total number of launches/reentries and catastrophic failures
§ 460.45(d)	Description of vehicle safety record
§ 460.45(d)(1)(i), § 460.45(d)(2)(i)	The number of vehicle flights
§ 460.45(d)(1)(ii), § 460.45(d)(2)(ii)	The number of accidents and human space flight incidents
§ 460.45(d)(1)(iii), § 460.45(d)(2)(iii)	Whether any corrective actions were taken
§ 460.45(f)	Consent (by the space flight participant) (1) Identifies the specific launch vehicle that the consent covers; (2) States that the space flight participant understands the risk, and his or her presence on board the launch vehicle is voluntary; and (3) Is signed and dated by the space flight participant

6.3.12.1 Although an operator is not required to document that it notified a space flight participant that he or she may request additional information regarding any accidents and human space flight incidents reported in accordance with § 460.45(e), or that it provided the space flight participant with an opportunity to ask questions orally to acquire a better understanding of the hazards and risks of the mission in accordance with § 460.45(f), doing so will simplify demonstration of compliance.

6.3.12.2 In accordance with §§ 417.15, 431.77, 437.87, or 450.219, informed consent records are required to be retained until the latest of either (1) three years, or (2) if a launch or reentry accident or incident occurs or an event that meets any of paragraph (1), (4), (5), or (8) of the definition of "mishap" in § 401.7, the completion of any Federal investigation and the FAA advises the licensee that there are no further requirements to retain the records. Per § 405.1, *Monitoring of licensed, permitted, and other activities*, Federal officials may choose to observe oral briefings, as these discussions are not required to be documented and retained.

6.3.12.3 It is important to note that an operator's written disclosures regarding § 460.45(e) and (f)(1) and (2) do not have to be submitted to the FAA as part of the application because § 460.45 is a post-licensing requirement. However, these materials are subject to compliance monitoring by the FAA.

6.3.13 FAA Reporting Requirements.

Title 51 U.S.C. § 50905(b)(5)(A) requires that "the Secretary has informed the space flight participant in writing of any relevant information related to risk or probable loss during each phase of flight gathered by the Secretary in making the determination required by section 50914(a)(2) and (c). Congress has directed the FAA by statute to inform space flight participants in writing of any relevant information related to risk or probable loss when making the Maximum Probable Loss (MPL) determination (section 50914(a)(2) and (c)). The FAA has developed a *Federal Aviation Administration Reporting Requirement Notice to Space Flight Participants* (Notice) specific to each operator to meet its statutory requirement. The Notice will contain the template information but will be tailored to each operator. To alleviate the administrative burden for the operators to provide contact information to the FAA and to protect the space flight participants' personally identifiable information, the FAA is requesting that the operator provide the Notice to its space flight participants on behalf of the FAA.

6.3.13.1 The FAA will coordinate with each operator to determine when the Notice is provided to the space flight participant. Ideally, the Notice would be provided with the operator's informed consent package. If a space flight participant has already completed the informed consent required by § 460.45, the FAA requests that the operator provide the Notice as soon as practical and prior to flight. Alternatively, the operator may provide the Notice to the space flight participant with the executed Reciprocal Waiver of Claims required by Part 440. The operator may provide the Notice electronically or in hardcopy. The FAA requests that the operator documents the expectation of when it will provide the Notice to the space flight participant. Additionally, the FAA requests that the operator confirm that the space flight participant has received the Notice either via email or in writing, at a readiness review.

6.3.13.2 If the operator does not choose to provide the Notice on behalf of the FAA, the FAA will work with the operator on alternative ways for the FAA to provide the Notice to space flight participants.

Appendix A. Safety Record Criteria.

A.1 SAFETY RECORD CRITERIA.

The FAA uses the safety record criteria listed in paragraphs A.1.1 through A.1.15 of this AC when developing the human space flight safety record. An operator following these safety record criteria when developing its vehicle safety record will produce an acceptable accounting. An operator is not required to use these provided safety record criteria; the operator has the option to develop comparable safety record criteria. Safety inspections may include verification of the consistent use of safety record criteria (or operator-developed criteria) when deriving the safety records pertaining to their vehicles, flight crew, and space flight participants.

A.1.1 The human space flight safety record only includes launch and reentry vehicle flights during which a human was on board. The vehicle safety record includes all flights of launch and reentry vehicles designed to carry humans.

Rationale: While the human space flight safety record requirement, § 460.45(c), specifies counting only human-occupied launch and reentry vehicles, the vehicle-specific requirement in § 460.45(d) does not contain this restriction. The vehicle-specific information, whether humans are on board or not, is important to the space flight participant to fully understand the risks and hazards. Thus, records should be kept of this information as well.

A.1.2 Licensed or permitted launches and reentries, as well as launches and reentries conducted by and for the U.S. Government, should be counted when computing the human space flight safety record and vehicle safety record.

Rationale: This criterion addresses the need to present only data that is relevant to the space flight participants. Non-licensed activities, such as glide flights under an airworthiness certificate, will not be counted because of the subjective nature in determining applicability. Although the FAA does not license or issue permits for space activities the Government carries out for the Government, it still plays a role in tracking and maintaining safety records for several reasons, including safety oversight, data collection and analysis, interagency coordination, and public safety assurance. The human space flight safety record and vehicle safety record conveys the risks of launch and reentry; they should consist of all licensed or permitted activities, as well as government launches and reentries that would have been licensed or permitted, had they been conducted by the private sector. This history record includes flights with humans on board and intended for space, including but not limited to, the X-15, Mercury, Gemini, Apollo, and Space Shuttle programs, but excludes flights not intended for space, such as the lunar lander test program and aircraft with rocket-assisted capabilities.

A.1.3 Foreign launches and reentries (those not FAA-licensed or not conducted by the U.S. government) will not be counted in either the human space flight safety record or vehicle safety record unless accurate launch and reentry information is available. For example, if a bilateral agreement to share safety data exists between the FAA and the foreign government or entity, accurate information may be available.

Rationale: The FAA does not require disclosure of foreign (government or private) launch or reentry accidents because the information may not always be publicly available, and its accuracy is difficult to verify. If the FAA has a bilateral agreement to share space flight safety data with a foreign government or entity, access to accurate launch and reentry information may be available; and, if so, it may apply to the human space flight safety record.

A.1.4 The human space flight safety record includes any flight with a human on board regardless of whether it occurred before, during, or after vehicle verification.

Rationale: This criterion clarifies that, even though the vehicle safety record only includes flights during and after vehicle verification, all flights with humans on board are included in the human space flight safety record. Verification flights are identified by the operator in its license or permit application to satisfy the requirements of § 460.17, *Verification program*.

A.1.5 The vehicle safety record includes all flights during and after vehicle verification regardless of whether any humans were on board.

Rationale: The FAA agrees that an operator need only disclose its safety record created during and after vehicle verification performed in accordance with § 460.17. Verification flights are identified by the operator in its license or permit application to satisfy § 460.17. The FAA does not require an operator to include developmental testing in their verification program.

A.1.6 Earlier vehicle types that predate the verification of the vehicle are not part of the vehicle safety record. In this AC, a vehicle type is defined as vehicles that are similar in design and structure as licensed or permitted by the FAA.

Rationale: The safety performance related to an earlier, experimental model is not directly relevant to a final, passenger-carrying vehicle type. The term “vehicle type” is used in the commercial space regulations and statute to describe vehicles similar in design and structure (e.g., SpaceShipOne and SpaceShipTwo are different vehicle types). Verification flights are identified by the operator in its license or permit application to satisfy the requirements of § 460.17, *Verification program*. (See paragraph 6.3.2.3 of this AC.)

A.1.7 The launch and reentry count as one flight for both safety records for orbital and suborbital missions.

Rationale: To simplify reporting and avoid confusion, the FAA counts the launch and reentry phases as one in the human space flight and vehicle safety records. From an informed consent perspective, the risk of the whole flight matters and not the specifics of the launch or reentry phase.

A.1.8 If there was intent to launch, vehicles that do not leave the launch pad or air-launched vehicles that do not have a successful ignition do not count as a flight in the human space flight and vehicle safety records unless a mishap occurs. If a mishap occurs, the human space flight and vehicle safety record covers the timeframe from when the occupants are (or would have been) exposed to vehicle hazards prior to flight until after landing when they were no longer (or would no longer be) exposed to vehicle hazards.

Rationale: This criterion includes accidents occurring on the ground but avoids counting launch recycles as flights in both safety records. The FAA includes accidents occurring on the ground because those are relevant to the risks that a space flight participant faces. Accordingly, if a launch vehicle explodes upon ignition while on the ground, the explosion is included as part of the vehicle safety record. An example where an explosion is not counted is the Apollo 1 fire, which occurred with crew on board during a launch pad test but is not counted in the human space flight record because there was no intent to launch. The FAA asserts this same philosophy in its *Recommended Practices for Human Space Flight Occupant Safety* (See paragraph 3.4 of this AC.)

A.1.9 A flight with the intent to launch that fails to complete its nominal flight profile is counted as a flight in both safety records.

Rationale: This criterion includes any vehicle that ignites its rocket and does not attain its nominal altitude or orbit. If the vehicle does not complete the nominal flight profile (e.g., a flight abort), the occupants are exposed to risk; therefore, the flight will count in the human space flight and vehicle safety records.

A.1.10 Regarding hybrid launch systems, only occupants on board the rocket-powered, space-bound vehicle count toward the safety record.

Rationale: In this instance, the carrier vehicle is the first stage of the launch system but only the rocket-powered vehicle is designed to go into space. As required by § 460.45(c), only "people who have been on a suborbital or orbital space flight" count in the safety record.

A.1.11 The human space flight safety record includes crew and space flight participants who suffered serious or fatal injury from the time they are exposed to vehicle hazards prior to flight, until after vehicle landing when they are no longer exposed to vehicle hazards.

Rationale: Section 460.45(c)(1) requires disclosure of deaths and serious injury. Paragraph 4.2 of the FAA's *Recommended Practices for Human Space Flight Occupant Safety* defines a minimum medical timeframe adopted by that guidance document: "the occupants of commercial human space flight vehicles should not experience an environment that would cause a serious injury or fatality, from the time they are exposed to vehicle hazards prior to flight until after landing when they are no longer exposed to vehicle hazards."

A.1.12 Title 49 CFR 830.2 lists the definition used for serious injury.

Rationale: The definitions of "launch accident," and "mishap" in §§ 401.5 and 401.7 respectively, include "a fatality or serious injury (as defined in 49 CFR 830.2)." The same definition of "serious injury" applies to part 460. Pursuant to 49 CFR 830.2, serious injury means any injury which:

1. Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;
2. Results in a fracture of any bone (except simple fractures of fingers, toes, or nose);
3. Causes severe hemorrhages, nerve, muscle, or tendon damage;
4. Involves any internal organ; or
5. Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

A.1.13 "Catastrophic failure" from § 460.45(c) for the purpose of determining a safety record means a failure causing death or serious injury to the people on board. Launch or reentry aborts, regardless of the cause, are not counted as a catastrophic failure unless death or serious injury occurs.

Rationale: While the regulations do not define "catastrophic," ACs 437.55-1 and 431.35-2A provide guidance on how to define "catastrophic" in the context of distinguishing the different types of outcomes to public safety. The definition provided above has been modified to address occupant safety. While there are numerous ways to define a catastrophic failure, ultimately the space flight participant's risk comes down to death or serious injury. A flight abort from an exploding rocket may be a very significant experience, but by itself may not be catastrophic to the space flight participant who is not injured by the event.

A.1.14 Safety-critical aborts are considered a human space flight incident in the vehicle safety record.

Rationale: Safety-critical aborts are considered incidents because they pose a high risk to the occupant and therefore meet the definition in § 401.5: "Human space flight incident means an unplanned event that poses a high risk of causing a serious or fatal injury to a space flight participant or crew." Additionally, safety-critical is defined in § 401.5 as "essential to safe performance or operation." Non-safety-critical aborts such as a carrier vehicle returning to the launch site due to high winds do not count as a human space flight incident because a system did not malfunction requiring safety critical action to prevent serious or fatal injury. Aborts resulting from the activation of an escape system, to separate from an exploding rocket, are safety critical, pose a high risk to the occupants, and, even if successful, are considered a human space flight incident.

Appendix B. Example of Non-Certification Statement for Crew.

Example of acceptable documentation to comply with § 460.9 (Informing Crew of Risk):

NON-CERTIFICATION DISCLOSURE TO THE CREW

[Crewmember's Name],

As required by 14 CFR § 460.9, we are informing you:

The United States Government has not certified the launch vehicle and any reentry vehicle as safe for carrying flight crew or space flight participants.

This non-certification statement means the U.S. Government does not ensure the safety of flight crew or space flight participants.

[Company Name]

CREWMEMBER SIGNATURE

DATE

Appendix C. Example of Informed Consent for a Space Flight Participant

C.1.1 **Example of Space Flight Participant Consent**.

Example of acceptable documentation to comply with § 460.45 (Operator informing space flight participant of risk):

INFORMED CONSENT FOR SPACE FLIGHT PARTICIPANTS

Company Name:

Vehicle Name:

I ACKNOWLEDGE that before paying compensation or agreeing to fly on [INSERT THE SPECIFIC LAUNCH OR REENTRY VEHICLE THE CONSENT COVERS], I received and reviewed the following information from [INSERT OPERATOR NAME].

INFORMATION

1. The following are known hazards and risks that could result in a serious injury, death, disability, or total or partial loss of physical and mental function. [INSERT or ATTACH: LIST OF EACH KNOWN HAZARD AND RISK] (___) INITIAL EACH HAZARD AND RISK.
2. There are hazards that are not known. (___) INITIAL
3. My participation may result in my death, serious injury, disability, or total or partial loss of physical and mental function. (___) INITIAL
4. The United States Government has not certified the launch vehicle and any reentry vehicle as safe for carrying crew or space flight participants. (___) INITIAL
5. I have received from [INSERT OPERATOR NAME] **Appendix A** (Human Space Flight Safety Record) to this Acknowledgment of Receipt, and have been informed of the safety record of all launch and reentry vehicles that have carried one or more persons on board, including both U.S. Government and private sector vehicles, which included:
    i. The total number of people who have been on a suborbital or orbital space flight and the total number of people who have died or been seriously injured on these flights and
    ii. The total number of launches and reentries conducted with people on board and the number of catastrophic failures of those launches and reentries.

    (___) INITIAL [PROVIDE **APPENDIX A** TO THIS AGREEMENT]

6. I have received from [INSERT OPERATOR NAME] Appendix D.1.3 (Vehicle Safety Record) to this Acknowledgment of Receipt, which describes the safety record of [INSERT VEHICLE NAME], as detailed at Appendix D1.3 to this Acknowledgment of Receipt. [This description included the number of any events resulting in fatalities or serious injuries, high risk of causing a serious or fatal injury to any occupant or member or the public, substantial damage to property not associated with the operation, or the impact of hazardous debris outside the planned landing site or designated hazard area, that occurred during and after vehicle verification was performed, and included: the number of vehicle flights, the number of these events, and whether any corrective actions were taken to resolve these accidents and human space flight incidents.] OR (for legacy operators) [This description included the number of any launch and reentry accidents and human space flight incidents that occurred during and after vehicle verification was performed, and included: the number of vehicle flights, the number of accidents and human space flight incidents, and whether any corrective actions were taken to resolve these accidents and human space flight incidents.]

   (__) INITIAL [PROVIDE APPENDIX D.1.3 TO THIS AGREEMENT]

7. I understand that I may request additional information regarding any accidents and human space flight incidents reported. (___) INITIAL
8. I have been provided with the opportunity to ask questions orally to acquire a better understanding of the hazards and risks of this mission. (___) INITIAL

I knowingly consent to participate in the launch and/or reentry of the [INSERT THE SPECIFIC LAUNCH OR REENTRY VEHICLE THE CONSENT COVERS] vehicle. I understand the risk and my presence on board is voluntary.

SPACE FLIGHT PARTICIPANT

DATE

Appendix D. Examples of Safety Records.

D.1.1 Examples of Safety Records Informing Space Flight Participants of Risk.

The following is an example of acceptable documentation to comply with §§ 460.45(c) and 460.45(d).

The FAA provides a U.S. Human Space Flight Safety Record on its website: https://www.faa.gov/space/humanspaceflight/us-human-space-flight-safety-record.

D.1.2 Human Space Flight Safety Record.

In accordance with § 460.45(c), an operator must inform each 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—

1. The total number of people who have been on a suborbital or orbital space flight and the total number of people who have died or been seriously injured on these flights; and
2. The total number of launches and reentries conducted with people on board and the number of catastrophic failures of those launches and reentries.

U.S. Human Space Flight Safety Record
(As of 11 Oct 2023)

Launch Type	Total # of People on Space Flight	Total # People Died or Seriously Injured[3]	Total # of Human Space Flights	Total # of Catastrophic Failures[6]
Orbital (Total)	959[1]	17	174[4]	3
Suborbital (Total)	291[2]	3	223[5]	2
Total	1250	20	397	5

Example

§ 460.45(c) An operator must inform each 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—
(1) The total number of people who have been on a suborbital or orbital space flight and the total number of people who have died or been seriously injured on these flights; and
(2) The total number of launches and reentries conducted with people on board and the number of catastrophic failures of those launches and reentries.

Figure 1 – U.S. Human Space Flight Safety Record

D.1.3 **Vehicle Safety Record.**

In accordance with § 460.45(d), an operator must describe the safety record of its vehicle to each space flight participant as follows:

1. For licenses issued under part 450 of this chapter, the operator's safety record must cover any event that meets the paragraph (1), (4), (5), or (8) definition of "mishap" in § 401.7 that occurred during and after vehicle verification performed in accordance with § 460.17, and include:
    i. The number of vehicle flights;
    ii. The number of events that meets the paragraph (1), (4), (5), or (8) definition of "mishap" in § 401.7 of this chapter; and
    iii. Whether any corrective actions were taken to resolve these mishaps.
2. For licenses issued under part 415, 431, or 435 of this chapter, the operator's safety record must cover launch and reentry accidents and human space flight incidents as defined by § 401.5, that occurred during and after vehicle verification performed in accordance with § 460.17, and include:
    i. The number of vehicle flights;
    ii. The number of accidents and human space flight incidents as defined by § 401.5; and
    iii. Whether any corrective actions were taken to resolve these accidents and human space flight incidents.

Operator Provided *Vehicle Safety Record*			
Operator A	**# of Vehicle Flights**	**# of Accidents*** **OR** **# of Mishaps****	**# HSF Incidents*** (this column can be removed for operators under 14 CFR part 450)
Vehicle Y	**X**	**X**	**X**

Vehicle flight information was last updated MM/DD/YYYY

*The operator must indicate whether any corrective actions were taken to resolve these accidents and human space flight incidents.

**For operators under 14 CFR part 450, the operator is only required to report events that meet 14 CFR 401.7 mishap definition (1), (4), (5), or (8).

Figure 2 – Example of Operator Provided Vehicle Safety Record

Additionally, the FAA recommends defining all of the terms (e.g., accident, human space flight incident, mishap (paragraphs (1), (4), (5), (8)) within the Informed Consent document.

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Expiration Date: 12/31/2027

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Subject:_____ Date: _____

Please mark all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____on page _____.

☐ Recommend paragraph _____ on page be changed as follows:

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

☐ Other comments:

☐ I would like to discuss the above. Please contact me using the information below.

Submitted by: _____ Date: _____