



**Federal Aviation
Administration**

SAFETY APPROVAL Guide for Applicants

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Federal Aviation Administration
Office of Commercial Space Transportation
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GUIDANCE FOR SAFETY APPROVALS

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GUIDANCE FOR SAFETY APPROVALS

PREFACE

The Office of Commercial Space Transportation (AST) has developed guidance for use by an applicant for a *Safety Approval* of a launch vehicle, reentry vehicle, safety system, process, service, or of personnel that may be used in conducting licensed or permitted commercial space launch or reentry activities. This guide will provide procedures for identifying appropriate safety standards and obtaining a safety approval. It also provides guidance for use by prospective safety approval applicants. However, the information presented in this guide does not constitute regulation.

Section 5.0 provides step-by-step procedures for preparing a safety approval application. Appendix A, *Safety Approval Application Template*, covers the requirements of 14 CFR Part 414 (Safety Approvals) and is provided as a starting point for your Safety Approval application. Any section in the template that does not apply to a particular application should be marked N/A with supporting rationale.

The FAA will consider safety approval applications on a case-by-case basis using 14 CFR Part 414.

Development of a safety approval application is facilitated through early and frequent consultation between the applicant and AST to assure public safety issues are identified and adequately addressed by the applicant.

Interested persons are invited to provide comments regarding this guidance document by writing to AST at the following address: Federal Aviation Administration, Office of Commercial Space Transportation, 800 Independence Avenue SW, Room 331, Washington, DC 20591. Attention: AST-200/Safety Approval.

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1.0 GENERAL

1.1 STATUTORY AUTHORITY FOR ISSUING SAFETY APPROVALS

Pursuant to the authority provided in 51 U.S.C. Subtitle V, chapter 509, Commercial Space Launch Activities (Chapter 509), the Office of Commercial Space Transportation (AST) of the Federal Aviation Administration (FAA) licenses or permits commercial space launch and reentry operators and operators of launch and reentry sites. We exercise this authority consistent with public health and safety, safety of property, and the national security and foreign policy interests of the United States. In 1998 Congress amended Chapter 509 (formerly Chapter 701) to provide the FAA with authority to establish procedures for the issuance of “safety approvals” for launch vehicles, reentry vehicles, safety systems, processes, services, or personnel that may be used in conducting licensed commercial space launch or reentry activities. These are referred to herein as safety elements.

1.2 SAFETY APPROVAL APPLICABILITY AND BENEFIT TO HOLDER

As a result of the 1998 amendments, the FAA was authorized to issue safety approvals for safety elements separate from a licensing or permitting determination. A safety approval indicates the FAA has determined that the use of the approved safety element, within the limits of the safety approval, will not jeopardize public health and safety or safety of property. Unlike a license or permit, a safety approval is not an authorization to conduct a launch or reentry, or to operate a launch or reentry site.

The safety approval, separate from a license, would allow the safety approval holder to offer a launch vehicle, reentry vehicle, safety system, process, service, or personnel to prospective launch and reentry vehicle operators, including reusable launch vehicle (RLV) mission operators. Once an approval is granted the safety element may be used by launch service providers, launch site operators or other licensed or permitted entities without additional review by the FAA as long as the operations are conducted within the limits of the safety approval. The safety approval relieves the license or permit applicant and the FAA from reconsidering the safety-approved element impacts of a launch or reentry proposal on public health and safety and the safety of property, as long as the proposed use falls within the terms of the safety approval. This guide details the characteristics of a safety approval.

Example: A manufacturer of Command Receiver Decoders (CRD) could seek a Safety Approval with the CRD as the safety element. Using the hierarchy of technical evaluation criteria contained in §414.19, the manufacturer could then demonstrate compliance with the existing FAA requirements for CDR’s found in §D417.29. After being granted a safety approval the holder could then offer the

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CRD to a variety of launch operators who could incorporate the safety approval into a launch license application without further review or demonstration of compliance for that portion of the application. This same approach could be applied to any launch or reentry vehicle, safety system process, service, component, or qualified and trained personnel used in conducting or supporting a licensed or permitted launch or reentry that can be used to demonstrate compliance with a specific regulatory requirement.

Benefit: The nature of the commercial space transportation industry makes safety approvals attractive to prospective license applicants, launch and reentry vehicle operators, manufacturers, and service providers supporting the commercial space industry. Because of the cost to prove the safety of a new system or process, many launch operators have not thought the benefits worth the cost, because of the small number of launches. With the safety approval process in place, the risk of approval would transfer from the launch or reentry operator to the prospective safety approval applicant, that is, the provider of the safety-approved system or service. The provider might elect to seek a safety approval and market the system or service to launch operators. This approval allows for the potential use of an approved system or component on more than one specific launch or reentry vehicle. Therefore, safety approvals have the potential to make the industry more willing to adopt innovative systems and processes because costs of obtaining the approval would be shared, rather than borne by a single launch operator.

2.0 DEFINITIONS

2.1 SAFETY APPROVAL

A *safety approval* is an FAA determination that one or more *safety elements*, when used or employed within a defined envelope, parameter, or situation, will not jeopardize public health and safety, or safety of property and is capable of providing the documented capability within the specified operating envelope.

A safety approval may be issued independent of a license or permit and it does not confer any authority to conduct activities for which a license or permit is required under 14 CFR Chapter III. [§414.3]

2.2 SAFETY ELEMENT

A *safety element* is a launch or reentry vehicle, safety system, process, service, or any identified component thereof; or qualified and trained personnel used in conducting or supporting a licensed or permitted launch or reentry.

Use of a safety-approved safety element, will facilitate launch and reentry licensing or permitting by the FAA. [§414.3]

2.3 WHAT A SAFETY APPROVAL IS NOT

A safety approval is not:

- a finding, guarantee, or warranty that an approved safety element will reliably or consistently function in accordance with manufacturer specifications,
- a relief to its holder of the duty to comply with all applicable requirements of law or regulation,
- an FAA certification of a vehicle or component design, or of services involved in a licensed or permitted launch or reentry,
- an indication of mission success or failure,
- a finding of suitability for purposes outside the stated limitations of the safety approval,
- an authorization to launch or reenter.

3.0 SAFETY APPROVAL ELIGIBILITY

3.1 WHO IS ELIGIBLE FOR A SAFETY APPROVAL?

There is no citizenship requirement to obtain a safety approval. You may be eligible for a safety approval if you are:

- a manufacturer or designer of a launch or reentry vehicle or component,
- a designer or developer of a safety system or process,
- a person who performs safety critical functions to be used in conducting a licensed or permitted launch or reentry, or
- a company providing a service in support of a launch operation.

The applicant must have sufficient knowledge and expertise with the safety element for which it seeks a safety approval in order to demonstrate that its design and operation qualifies for a safety approval. [§414.7]

3.2 WHAT IS ELIGIBLE FOR A SAFETY APPROVAL?

The FAA will determine, on a case-by-case basis, whether a safety element is eligible for a safety approval. Determination of eligibility is based upon the FAA acceptance of a proposed safety standard or standards for the safety element in question. Then a determination will be made on whether the safety standard has been met.

The FAA considers certain safety systems and services as possible candidates for safety approvals, along with the launch or reentry vehicles and personnel who perform safety critical functions. FAA will not issue safety approvals for safety elements that do not perform a safety function in the conduct of a licensed or permitted launch or reentry.

A safety approval may be appropriate for:

- Launch or reentry vehicles
- Safety systems, e.g., flight safety systems, on-board and ground tracking systems, and vehicle health monitoring systems, including individual elements thereof
- Safety-related processes and services, such as training
- System testing procedures
- Manufacturing procedures
- Flight testing processes or procedures
- Flight safety analysis services, such as wind weighting and risk assessment
- Flight safety monitoring systems, such as a sky-screen
- Safety officials (flight and range)
- Radar operators

4.0 OVERVIEW OF THE SAFETY APPROVAL PROCESS

4.1 PROCESSING AN INITIAL APPLICATION

The FAA will initially screen an application to determine if the application is complete enough to enable the FAA to initiate the reviews and evaluations required under 14 CFR Part 414. This initial screening will include the review of proposed criteria on which the safety approval is to be accepted and effectiveness assessed. [§414.15]

After completing the initial screening, the FAA will notify the applicant, in writing, of one of the following:

- The FAA accepted the application as submitted and will initiate the reviews or evaluations required for a safety approval determination. Acceptance by the FAA of an application for a safety approval is not a determination that the application is complete.
- The FAA rejected the application because it is incomplete or indefinite. The application may be considered incomplete if the performance criteria or standard is not provided or identified. The FAA may return a rejected application to the applicant or may hold it pending additional submissions by the applicant. An applicant whose safety approval application is denied may attempt to correct any deficiencies identified by the FAA and request reconsideration of the revised application. The notice will state the reason(s) for rejection and corrective actions necessary for the application to be accepted.
- An applicant may withdraw, amend, or supplement an application anytime before the FAA makes a final determination by submitting a written request to AST.

4.2 MAINTAINING INITIAL APPLICATION ACCURACY

- The applicant must maintain the continued accuracy and completeness of information in the application. If at any time the information changes, the applicant must submit a written statement to AST explaining the changes and providing corrected information. [§414.17]

4.3 PERFORMANCE CRITERIA AND STANDARDS

The FAA will determine eligibility for a safety approval based on performance based criteria. [§414.19]

- In some instances, standards may already exist in FAA regulations.
- Non-FAA federal regulations or directives may contain standards that are acceptable for use as safety approval criteria.

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- An industry consensus standard may exist that is widely relied upon and accepted by federal agencies.
- An applicant may propose criteria as part of its application.

4.3.1 Performance and Verification Requirements

In order to receive a safety approval, the applicant must verify to the FAA's satisfaction that acceptable performance criteria have been met. An applicant may be required to:

- address potential hazards and risks to public safety posed by use of the approved safety element,
- provide engineering and safety analyses, system tests, quality assurance procedures, manufacturing processes, and test plans and results,
- validate the adequacy and reliability of the various analyses and procedures used in the safety element's demonstration, and
- submit test results that show a measure of proficiency and experience for personnel involved in training.

The FAA will verify and validate performance to acceptable criteria before issuing a safety approval. As part of the verification process the applicant may be required to:

- develop a plan that identifies the methods of verification: demonstration, analysis, inspection, and testing,
- develop procedures or reports documenting verification methods and results,
- conduct verification, and
- submit verification reports and results.

For example, the applicant may seek a safety approval for an ordnance item used in an explosive flight termination system. Criteria for the parts, materials, and processes used in the design, manufacture, test, operational installation, and storage for the item must be identified. Various military standards, such as DoD-E-83578, MIL-STD-1576, and MIL-I-23659 could be acceptable. These standards define in detail the necessary verifications for ordnance items in safety critical applications. The applicant may need to identify additional criteria applicable to a particular item, such as installation requirements. [§414.19]

4.3.2 FAA Role in Establishing Standards

The FAA recognizes that it is not feasible to develop all criteria or standards that are applicable or necessary to issue a safety approval for all eligible safety elements. FAA understands that it may be necessary to follow an individualized approach to safety approvals and expect to draw on its experience in evaluating license, permit, and safety approval applications. Eventually, we may establish and publish safety standards in key areas.

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For now, the FAA will rely upon the following sources of criteria, standards and practices in determining whether to proceed with the evaluations of a particular safety approval:

- Established federal launch range practices that are considered best engineering practice and that have been demonstrated to adequately safeguard public health and safety and the safety of property, such as described in *the Air Force Space Command Manual* (AFSPCMAN 91-710), *Launch Safety Requirements for Air Force Space Command Organizations* (AFSPCM 91-711), or *Launch Safety Software and Computing System Requirements* (AFSPC 91-712).
- For subsystems and components, publicly available industry consensus standards maintained by organizations such as the American Society of Mechanical Engineers (ASME), the Society of Automotive Engineers (SAE), and the American Institute of Aeronautics and Astronautics (AIAA).
- In the absence of an existing federal or industry safety standard, applicant proposed safety criteria against which the FAA may assess the fitness of a proposed element in protecting public health and safety and safety of property. As part of the approval process, the FAA may issue a notice seeking public comment on the proposed use of specific criteria prior to issuing a safety approval in the context of a particular application. The comment period may take up to 60 days depending on the safety element and its application.

4.3.3 Acceptance of a Proposed Standard

The FAA may accept or reject an application using a proposed safety criteria based on its adequacy for demonstrating safety of use within the context of a licensed or permitted launch or reentry. At a minimum, the applicant-developed criteria must define: [§414.19]

- design and minimum performance criteria,
- quality assurance system requirements,
- production acceptance test specifications, and
- continued operational monitoring system characteristics.

4.3.4 Terms and Conditions

The FAA will determine specific terms and conditions of a safety approval on a case-by-case basis, consistent with the intended use of the safety-approved launch or reentry element.

- The scope of the approval will be limited by the scope of the safety demonstration contained in the application. For example, for a radar tracking system integral to range safety, the applicant must demonstrate the ability of the radar to track a launch or reentry vehicle as a function of radar cross section, vehicle velocity, acceleration, and trajectory along with notable ambient effects such as weather conditions. In this instance, the demonstration and, hence, the

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scope of the applicability of the safety approval, would not be specific to a particular vehicle, but to a performance envelope. [§414.21]

- The FAA grants safety approvals for a five-year duration. [§414.21]
- The holder of a safety approval may apply for a renewal or modification of the safety approval.

4.4 SAFETY APPROVAL MAINTENANCE

The safety approval holder is responsible for maintaining a valid safety approval. The approval holder must ensure the continued accuracy and completeness of representations contained in the safety approval application. [§414.23]

- If at any time information provided by an applicant as part of a safety approval application is no longer accurate and complete, the holder must submit to AST a statement furnishing the new or corrected information.
- An approval holder's failure to do so is a sufficient basis for suspension or revocation of a safety approval any time during the five year period.

4.5 SAFETY APPROVAL RENEWAL

The holder of a safety approval may apply to renew the approval by submitting to the FAA a written application for renewal at least 90 days before the approval's expiration date. [§414.27]

- The approval holder must describe any proposed changes in the approved systems or services and provide any additional information necessary to support the fitness of the proposed changes to meet appropriate standards.
- The FAA conducts the reviews required for a safety approval to determine whether the safety approval may be renewed for an additional term. The FAA may request a description of how the element has been used, including its success or failure rates.
- The FAA may amend the expiration date of an existing safety approval or issue a new safety approval after conducting the required review. Additional or revised terms and conditions necessary to protect public health and safety or safety of property may be imposed.

If the FAA denies the request, the applicant may correct any deficiencies identified and resubmit for reconsideration. The applicant also has the right to appeal a denial. The FAA will provide written notice of an approved renewal request.

4.6 SAFETY APPROVAL TRANSFER

The holder of a safety approval or the prospective transferee may request a safety approval transfer. The FAA will give written approval only after all required approvals and determinations have been met. [§414.29]

- Only the FAA may approve or deny a transfer of a safety approval.
- Both the holder and the prospective transferee must agree to the transfer.

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- If the FAA denies the request for the transfer, the applicant may correct any deficiencies and request reconsideration.

5.0 HOW TO PREPARE A SAFETY APPROVAL APPLICATION

5.1 PRE-APPLICATION CONSULTATION

A safety approval applicant must consult with the FAA prior to submitting an application. Unless otherwise requested, either by the applicant or the FAA, an oral discussion about the process and the relevant potential issues is sufficient. [§414.9]

5.2 APPLICATION

A safety approval application must be in writing, in English, and filed in duplicate with the Federal Aviation Administration, Office of Commercial Space Transportation, Room 331, 800 Independence Avenue, S.W., Washington, D.C. 20591. Attention: Safety Approval Application Review. [§414.11]

Willful false statements made in any application or document relating to an application are punishable by fine and imprisonment under Section 1001 of Title 18, United States Code, and by administrative sanctions.

5.2.1 Basic Information

An application must identify the following:

- The name and address of the applicant,
- The name, address, and telephone number of the point of contact to whom inquiries and correspondence should be directed,
- The safety element for which there is an application for a safety approval, and
- The relevant standards or criteria upon which the applicant proposes to demonstrate the fitness and safety of the proposed system. [§414.11]

5.2.2 Technical Information

The following parameters for which the safety approval is sought must be specified and provided as applicable: [§414.11]

- Statement of Conformance letter describing the specific criteria used to show the adequacy of the safety element and how the safety element complies with the specific criteria,
- Specific operating limits,
- Engineering design and analyses that demonstrate the fitness of the proposed element for its intended use, such that its use in the conduct of a licensed or permitted launch or reentry will not jeopardize public health and safety or the safety of property,
- Relevant manufacturing processes,

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- Test and evaluation procedures,
- Test results,
- Maintenance procedures,
- Personnel qualifications,
- Training procedures,
- Quality assurance procedures, and
- Configuration management.

5.2.3 Application Authorizations

An application must be legibly signed, dated, and certified as true, complete, and accurate by one of the following: [§414.11]

- An officer authorized to act for the corporation,
- A general partner or proprietor, respectively, or
- An officer or other individual duly authorized to act for a joint venture, association, or other entity.

6.0 ADDITIONAL INFORMATION

6.1 SAFETY APPROVAL USAGE

A safety approval allows a license or permit applicant to use an approved safety element in its proposed launch or reentry without requiring re-examination of the safety element's performance characteristics. The performance characteristics of the safety element were already provided as part of the safety approval. However, the license or permit applicant will need to show evidence that the safety element is suitable for the particular launch or reentry being proposed.

- The use must be consistent with launch or reentry safety and fall within the operating limits of its approval.

The FAA will evaluate whether its use does not exceed the limits of the safety approval. In addition, a safety approval does not relieve the license or permit applicant from demonstrating the safety of any portion of the applicant's launch or reentry not already covered by the safety approval.

6.1.1 Safety Approval Modification, Suspension, or Revocation

The holder of a safety approval may submit an application for a modification of the safety approval if the approved safety element will be used in a modified condition in a licensed or permitted launch or reentry. If the FAA denies the request for the modification, the license or permit applicant is fully responsible for demonstrating safe launch or reentry capability and cannot rely upon a previously issued safety approval as part of its license or permit application.

The FAA may make a modification to the safety approval in the interest of public health and safety, safety of property, or if the holder fails to comply with the conditions of the safety approval. The FAA may choose to:

- Modify the terms and conditions of the approval, or
- Suspend or revoke the approval

Unless otherwise stated by the FAA, any modifications, suspensions, or revocation of an approval will:

- Take effect immediately; and
- Continue in effect during any reconsideration or appeal.

The FAA will notify the approval holder in writing of the decision to suspend a safety approval.

6.2 COMPLIANCE MONITORING

A holder of a safety approval is required to cooperate with the compliance monitoring responsibilities of the FAA. Each holder must allow FAA access to

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inspect manufacturing or assembly performed by a holder of a safety approval or its contractor. The FAA may inspect a safety approval process or service, including training programs and personnel qualifications. [§414.31]

6.3 SAFETY APPROVAL RECORDS

A holder of a safety approval must maintain all records necessary to verify that activities are conducted in accordance with representations contained in the holder's application for the valid period of the approval plus one year. [§414.25]

6.4 CONFIDENTIALITY

Any person furnishing information or data to the FAA may request in writing that trade secrets or proprietary commercial or financial data be treated as confidential. The request must be made at the time the information or data are submitted, and state the period of time for which confidential treatment is desired. FAA will mark previously submitted data as confidential, if requested.

Information or data for which any person or agency requests confidentiality must be clearly marked with an identifying legend, such as "Proprietary Information," "Proprietary Commercial Information," "Trade Secret," or "Confidential Treatment Requested."

Information or data for which confidential treatment has been requested or information or data that qualifies for exemption under section 552(b)(4) of Title 5, United States Code, will not be disclosed to the public unless the Associate Administrator determines that the withholding of the information or data is contrary to the public or national interest.

Proposed safety standards cannot be used as a basis for issuance of safety approval if they are considered confidential, or marked as such. [§414.13]

6.5 PUBLIC NOTIFICATION

For each safety approval granted, the FAA will publish in the FEDERAL REGISTER a notice and a description of the criteria that were used to evaluate the safety approval application. [§414.35]

Appendix A: Safety Approval Application Template

Safety Approval Application

Name of Safety Approval Element

Version 1.0

Date

Company Name
Company Address

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NOTICE

This template is not mandatory, but is provided to an applicant as guidance. An applicant may use any other logical format, as long as all required information is included. **This page should be removed if this template is used.**

Additional information and verification data may be required from the evaluation team. This information and/or results will need to be included in subsequent versions of the applications. This template demonstrates the minimum information required to move from the Pre-Application phase into FORMAL submission of the application.

Some sections of the application will not be complete at the time of FORMAL submission, as the information may not be known at that time. Any additional information can be included in the application at any time, to facilitate the review by the evaluation team.

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Applicant Information

In this section please include the following information:

Name of Applicant Organization
Address of Applicant Organization

Point of Contact Name
Point of Contact Address
Point of Contact Telephone Number
Point of Contact Email Address

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List page numbers of major sections in the application.

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FIGURES

List figure reference number and title for any figures included in the application.

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TABLES

List figure reference number and title for any tables included in the application.

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BASIC INFORMATION

Confidentiality Statement

This section should include the request, if desired, for confidential treatment and the period of time for which confidential treatment is desired.

Safety Element Description

This section should include a basic description of the safety element (i.e., launch vehicle, reentry vehicle, safety system, process, service, or any identified component thereof; or personnel) for which a safety approval is being requested.

- *For example: for a launch vehicle or reentry vehicle the application may include but is not limited to the following data:*
 - *Dimensioned three-view drawing or photograph*
 - *Dimensions and overall footprint*
 - *Mass: dry and fueled*
 - *Payload description*
 - *Rocket systems; i.e., structural, flight control, thermal, pneumatic, hydraulic, propulsion, electrical, environmental control, software and computing systems, avionics, and guidance systems used*

TECHNICAL INFORMATION

Statement of Conformance

Provide a Statement of Conformance describing the specific criteria used to show the adequacy of the safety element for which the safety approval is sought, and show how the safety element complies with the specific criteria.

List the existing or proposed standards for the safety element in which you seek approval for. The Statement of Conformance Letter is a separate document that should be submitted with this application.

Operating Limits

Provide the specific operating limits for which the safety approval is sought. List the operational capabilities for the safety element and discuss the tolerance levels.

Performance Criteria

Provide the following, performance criteria, as applicable:

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Performance Data & Analyses

Submit information and analyses that may be applicable to demonstrating safe performance of the safety element for which the safety approval is sought.

Engineering Design & Analyses

Submit engineering design and analyses that show the adequacy of the proposed safety element for its intended use, such that the use in a licensed launch or reentry will not jeopardize public health or safety or the safety of property.

Manufacturing Processes

Submit relevant manufacturing processes for the safety element in which you seek approval for.

Test and Evaluation Procedures

Submit test and evaluation procedures for the safety element in which you seek approval for.

Test Results

Submit test results for the safety element in which you seek approval for.

Maintenance Procedures

Submit maintenance procedures for the safety element in which you seek approval for.

Personnel Qualifications and Training Procedures

Submit personnel qualifications and training procedures for the safety element in which you seek approval for.