

§ 415.125

hardware interfaces, software interfaces, data flow, and power systems, and all operations of each safety-critical computer system function;

(4) Provide all logic diagrams and software designs;

(5) List all operator user manuals and documentation by title and date;

(6) Describe the computing system and software system safety process as required by § 417.123(a).

(7) Provide all results of computing system and software hazard analyses as required by § 417.123(c).

(8) Provide all plans and results of computing systems and software validation and verification as required by § 417.123(d).

(9) Provide all plans for software development as required by § 417.123(e).

§ 415.125 Unique safety policies, requirements and practices.

An applicant's safety review document must identify any public safety-related policy, requirement, or practice that is unique to the proposed launch, or series of launches, as required by § 417.127 of this chapter. An applicant's safety review document must describe how each unique safety policy, requirement, or practice ensures the safety of the public.

§ 415.127 Flight safety system design and operation data.

(a) *General.* This part applies to an applicant launching an orbital or guided sub-orbital expendable launch vehicle that uses a flight safety system to protect public safety as required by § 417.107(a) of this chapter. An applicant's safety review document must contain the flight safety system data identified by this section. The applicant must file all data required by this section no later than 18 months before bringing any launch vehicle to a proposed launch site.

(b) *Flight safety system description.* A safety review document must describe an applicant's flight safety system and its operation. Part 417, subpart D of this chapter and appendices D, E, and F of part 417 of this chapter contain the flight safety system and subsystems design and operational requirements.

(c) *Flight safety system diagram.* An applicant's safety review document

14 CFR Ch. III (1–1–07 Edition)

must contain a block diagram that identifies all flight safety system subsystems. The diagram must include the following subsystems defined in part 417, subpart D of this chapter: flight termination system; command control system; tracking; telemetry; communications; flight safety data processing, display, and recording system; and flight safety official console.

(d) *Subsystem design information.* An applicant's safety review document must contain all of the following data that applies to each subsystem identified in the block diagram required by paragraph (c) of this section:

(1) *Subsystem description.* A physical description of each subsystem and its components, its operation, and interfaces with other systems or subsystems.

(2) *Subsystem diagram.* A physical and functional diagram of each subsystem, including interfaces with other systems and subsystems.

(3) *Component location.* Drawings showing the location of all subsystem components, and the details of the mounting arrangements, as installed on the vehicle, and at the launch site.

(4) *Electronic components.* A physical description of each subsystem electronic component, including operating parameters and functions at the system and piece-part level. An applicant must also provide the name of the manufacturer and any model number of each component and identify whether the component is custom designed and built or off-the-shelf-equipment.

(5) *Mechanical components.* An illustrated parts breakdown of all mechanically operated components for each subsystem, including the name of the manufacturer and any model number.

(6) *Subsystem compatibility.* A demonstration of the compatibility of the onboard launch vehicle flight termination system with the command control system.

(7) *Flight termination system component storage, operating, and service life.* A listing of all flight termination system components that have a critical storage, operating, or service life and a summary of the applicant's procedures for ensuring that each component does not exceed its storage, operating, or service life before flight.

(8) *Flight termination system element location.* For a flight termination system, a description of where each subsystem element is located, where cables are routed, and identification of mounting attach points and access points.

(9) *Flight termination system electrical connectors and connections and wiring diagrams and schematics.* For a flight termination system, a description of all subsystem electrical connectors and connections, and any electrical isolation. The safety review document must also contain flight termination system wiring diagrams and schematics and identify the test points used for integrated testing and checkout.

(10) *Flight termination system batteries.* A description of each flight termination system battery and cell, the name of the battery or cell manufacturer, and any model numbers.

(11) *Controls and displays.* For a flight safety official console, a description of all controls, displays, and charts depicting how real time vehicle data and flight safety limits are displayed. The description must identify the scales used for displays and charts.

(e) *System analyses.* An applicant must perform the reliability and other system analyses for a flight termination system and command control system of §417.309 of this chapter. An applicant's safety review document must contain the results of each analysis.

(f) *Environmental design.* An applicant must determine the flight termination system maximum predicted environment levels required by section D417.7 of appendix D of part 417 of this chapter, and the design environments and design margins of section D417.3 of appendix D of part 417 of this chapter. An applicant's safety review document must summarize the analyses and measurements used to derive the maximum predicted environment levels. The safety review document must contain a matrix that identifies the maximum predicted environment levels and the design environments.

(g) *Flight safety system compliance matrix.* An applicant's safety review document must contain a compliance matrix of the function, reliability, system, subsystem, and component re-

quirements of part 417 of this chapter and appendix D of part 417 of this chapter. This matrix must identify each requirement and indicate compliance as follows:

(1) "Yes" if the applicant's system meets the requirement of part 417 of this chapter. The matrix must reference documentation that demonstrates compliance;

(2) "Not applicable" if the applicant's system design and operational environment are such that the requirement does not apply. For each such case, the applicant must demonstrate, in accordance with section 406.3(b), the non-applicability of that requirement as an attachment to the matrix; or

(3) "Equivalent level of safety" in each case where the applicant proposes to show that its system provides an equivalent level of safety through some means other than that required by part 417 of this chapter. For each such case, an applicant must clearly and convincingly demonstrate, as required by §406.3(b), through a technical rationale within the matrix, or as an attachment, that the proposed alternative provides a level of safety equivalent to satisfying the requirement that it would replace.

(h) *Flight termination system installation procedures.* An applicant's safety review document must contain a list of the flight termination system installation procedures and a synopsis of the procedures that demonstrates how each of those procedures meet the requirements of section D417.15 of appendix D of part 417 of this chapter. The list must reference each procedure by title, any document number, and date.

(i) *Tracking validation procedures.* An applicant's safety review document must contain the procedures identified by §417.121(h) of this chapter for validating the accuracy of the launch vehicle tracking data supplied to the flight safety crew.

§415.129 Flight safety system test data.

(a) *General.* An applicant's safety review document must contain the flight safety system test data required by this section for the launch of an orbital and guided suborbital expendable launch vehicle that uses a flight safety