AST Commercial Space Transportation

DRAFT

FAA AST Workshop: AC 450.107-1

Advisory Circular (AC) for Hazard Control Strategies (HCS) Determination

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Federal Aviation Administration

Background on Advisory Circulars

Advisory Circulars (ACs) are being used to supplement streamlined regulations by the Federal Aviation Administration (FAA), Commercial Space Transportation (AST).

Their goal is to assist license applicants in two ways:

- Further explain the meaning of the regulatory text and its intent/goal
- Provide a means of compliance

The ACs are guidance, not a regulation, and compliance is voluntary

To demonstrate compliance using an AC, the entire AC must be implemented. This means all "should" statements must be accomplished if an AC is used.

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§ 450.107 Hazard Control Strategies.

(a) *General.* To meet the safety criteria of § 450.101(a), (b), or (c) for the flight, or any phase of flight, of a launch or reentry vehicle, an operator must use one or more of the hazard control strategies identified in § 450.108 through § 450.111.

(b) Hazard control strategy determination. For each phase of flight during a launch or reentry, an operator must use a functional hazard analysis to determine a hazard control strategy or strategies that account for—

(1) All functional failures associated with reasonably foreseeable hazardous events that have the capability to create a hazard to the public;

(2) Safety-critical systems; and

(3) A timeline of all safety-critical events.

(c) *Flight hazard analysis.* An operator must conduct a flight hazard analysis in accordance with § 450.109 of this part for the flight, or phase of flight, of a launch or reentry vehicle if the public safety hazards cannot be mitigated adequately to meet the public risk criteria of § 450.101(a), (b), and (c) using physical containment, wind weighting, or flight abort.

(d) *Application requirements.* An applicant must submit in its application—

(1) The results of the hazard control strategy determination, including—

(i) All functional failures identified under paragraph (b)(1) of this section;

(ii) The identification of all safety-critical systems; and

(iii) A timeline of all safety-critical events.

(2) A description of its hazard control strategy or strategies for each phase of flight.

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Section 1: Purpose.

- This Advisory Circular (AC) provides a means of compliance and guidance for an applicant to determine its hazard control strategy or strategies in accordance with title 14 of the Code of Federal Regulations (14 CFR) § 450.107(b).
- This AC presents one, but not the only, acceptable means of compliance with the associated regulatory requirements. The FAA will consider other means of compliance that an applicant may elect to present.

Section 2: Applicability -

- The guidance in this AC is for launch and reentry vehicle applicants and operators required to comply with 14 CFR part 450.

Section 3: Applicable Regulation and Relate Documents.

Section 4: Definitions of Terms.

- System Safety Hazard. A real or potential condition that could lead to an unplanned event or series of events resulting in: unintentional death, injury, or occupational illness; damage to or loss of equipment or property; or damage to the environment.

Section 5: Acronyms.

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Section 6.1: Hazard Control Strategies.

- One or more of the hazard control strategies defined in §§ 450.108 through 450.111 must be used to meet the safety criteria in accordance with § 450.101(a), (b), or (c).
- Different hazard control strategies may be utilized during any one phase of flight because a different strategy may be more appropriate for one phase of a flight or to protect different sets of people and property.
- The hazard control strategies are:
    - Flight Abort - The traditional safety approach for expendable launch vehicles. It is a process to limit or restrict the hazards to public safety and the safety of property presented by a launch vehicle or reentry vehicle, including any payload, while in flight by initiating and accomplishing a controlled ending to vehicle flight.
    - Flight Hazard Analysis - The traditional safety approach for reusable launch vehicles, is the most flexible hazard control strategy because it allows for deriving specific hazard controls unique to the launch or reentry vehicle system and operations concept.
    - Physical Containment - Used for low energy test flights when a launch vehicle does not have sufficient energy for any hazards associated with its flight to reach the public or critical assets.
    - Wind Weighting - Traditionally used in the launch of unguided suborbital launch vehicles, otherwise known as sounding rockets, where launcher azimuth and elevation settings are adjusted to correct for the effects of wind conditions at the time of flight to provide a safe impact location for the launch vehicle or its components.
- The appropriate hazard control strategy is determined by conducting a functional hazard analysis.

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Section 6.2.1: Overview of a Functional Hazard Analysis.

A functional hazard analysis is a critical element for ensuring public safety during flight.

- At a foundational level, the analysis provides a holistic, systematic approach to identifying potential hazards.
- Second, the analysis supports the validation of adequacy for determined hazard control strategies.
- Third, the analysis supports a justification for use of historical flight outcome data in the probability of failure analysis. Development of prior launch and reentry vehicles has included a structured system safety process, and thus this foundational system safety analysis is one necessary element in defining similar vehicles in accordance with § 450.131, *Probability of Failure Analysis*.
- Fourth, it provides a basis for developing quantitative models of debris, in accordance with § 450.121, and malfunction trajectories, in accordance with § 450.119.
- Fifth, the analysis is a basis for a flight hazard analysis if that hazard control strategy is used.

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Section 6.2.2

Two Constraints to HCS Determination

- First, § 450.107(c) requires a flight hazard analysis to be conducted in accordance with § 450.109, if the public safety hazards cannot be mitigated adequately to meet the public risk criteria of § 450.101(a), (b), and (c) using physical containment, wind weighting, or flight abort.
- Second, in accordance with § 450.101(c), if the consequence of any reasonably foreseeable failure mode, in any significant period of flight, is greater than 1 × 10^{-3} conditional expected casualties, then flight abort must be used as a hazard control strategy in accordance with the requirements of § 450.108, or the launch or reentry vehicle must have sufficient demonstrated reliability as agreed to by the FAA Administrator based on conditional expected casualties during that phase of flight. AC 450.101-1, *High Consequence Event Protection*, provides additional guidance on conditional expected casualty.

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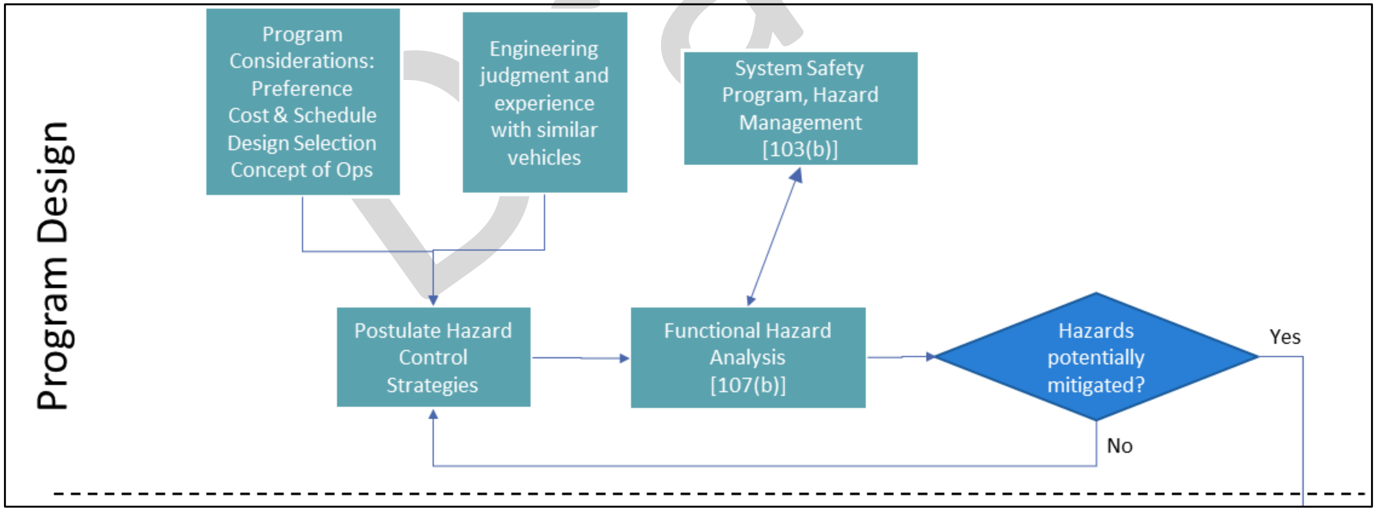
Section 6.2.3: Hazard Control Strategy Determination Logic.

- The approach to determining and validating hazard control strategies is a process, which is iterative.
- The functional hazard analysis is utilized to ensure that all potential hazards to the public have a determined hazard control strategy.
- Generally, the applicant will determine a hazard control strategy based on engineering and program considerations.


Program Design
Program Considerations: Preference Cost & Schedule Design Selection Concept of Ops
Engineering judgment and experience with similar vehicles
System Safety Program, Hazard Management [103(b)]
Postulate Hazard Control Strategies
Functional Hazard Analysis [107(b)]
Hazards potentially mitigated?
Yes
No

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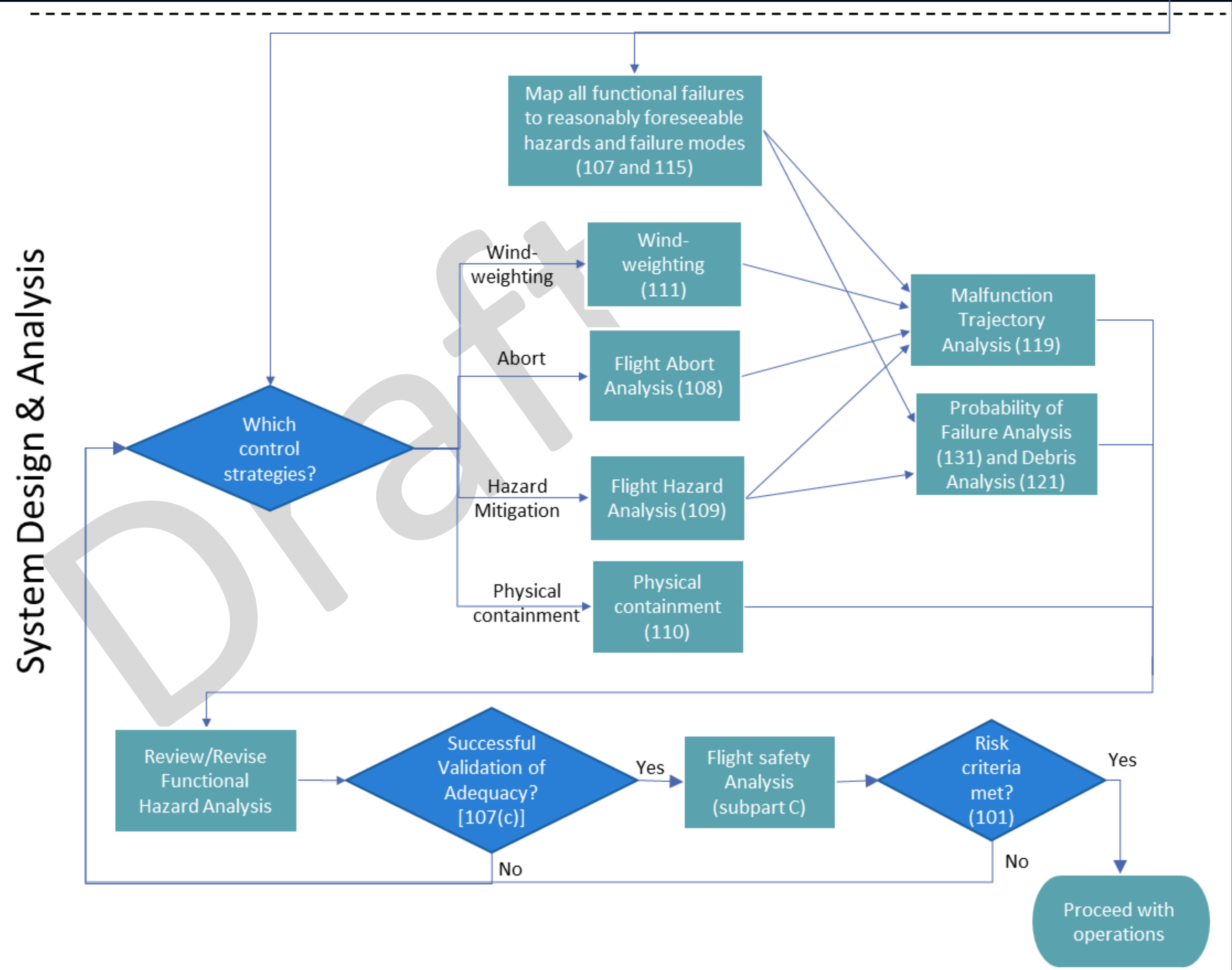
- If the hazards to the public are potentially mitigated, then the selected strategies are developed, and the supporting data is used as general input for the flight safety analysis.
- If adequate mitigation is not validated by supporting data, then the hazard control strategy should be revisited.
- If validation is successful, then the flight safety analysis is used to demonstrate whether the safety criteria are satisfied.
- If the safety criteria cannot be met, then additional hazard controls must be implemented, in accordance with 450.107(c).


System Design & Analysis
Map all functional failures to reasonably foreseeable hazards and failure modes (107 and 115)
Which control strategies?
Wind-weighting
Wind-weighting (111)
Abort
Flight Abort Analysis (108)
Hazard Mitigation
Flight Hazard Analysis (109)
Physical containment
Physical containment (110)
Malfunction Trajectory Analysis (119)
Probability of Failure Analysis (131) and Debris Analysis (121)
Review/Revise Functional Hazard Analysis
Successful Validation of Adequacy? [107(c)]
Yes
No
Flight safety Analysis (subpart C)
Risk criteria met? (101)
Yes
No
Proceed with operations
Draft

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Response to real-time feedback

Please type your question into the Q&A chat box in Zoom or send an email to ASTWorkshops@faa.gov

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Section 7.1: Functional Hazard Analysis.

- In accordance with § 450.107(b)(1) through (3), the hazard control strategies must account for all functional failures associated with reasonably foreseeable hazardous events that have the capability to create a hazard to the public, safety-critical systems, and a timeline of all safety-critical events.

  Note: The term “reasonably foreseeable” is not associated with probability or likelihood, but is inherent to a methodical assessment of the entire system. “Reasonably foreseeable hazardous events” are those identifiable through the system safety process, beyond those that could be determined solely by “brainstorming.”
- The functional hazard analysis should be completed as early as possible in the launch or reentry system’s lifecycle.
- A functional hazard analysis is used to analyze system functions associated with the proposed operation (mission).
- The functional hazard analysis is primarily used to identify and classify the overall system functions and consequences of functional failure or malfunction.
  - The objective is to identify all potential system, subsystem, and component functional failures that could impact public safety.
  - Any foreseeable mitigations or predetermined hazard control strategies should not affect the identification of potential system safety hazards and respective functional sources (i.e. subsystem functional failures).

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Section 7.1: Functional Hazard Analysis.

Prior to performing a functional hazard analysis, an operator should have sufficient understanding of the mission.

The functional hazard analysis, at a minimum, should provide the following:

a) A decomposition of the overall system to its next-level systems and related subsystems to the major component level. Further decomposition may be necessary if relevant to public safety.

> NOTE: The FAA expects the depth of system decomposition within the functional hazard analysis to be variable depending on the level necessary to adequately discern and mitigate impacts to public safety.

b) A functional description of each next-level system, subsystem, and component identified, to include interfaces between subsystems and components.

c) A designation of the implementation method for each function (e.g., hardware, software, etc.).

d) Identification of phases of system operation.

e) Identification of failure modes.

f) Assessment of "end-effect" resulting from failure of each function during each phase under each failure mode, excluding mitigation.

g) Assignment of functional failure identification to allow for traceability.

h) Assessment of the severity associated with each failure "end-effect".

NOTE: Adapted from the guidance of MIL-STD-882E

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Section 7.1: Functional Hazard Analysis.

i) A level of rigor determination for logic-based functions based on severity of the failure “end-effect” and “degree of control”.

j) Assessment of whether each failure “end-effect” poses a potential system or mission hazard to the public.

Note: Grouping of different component or subsystem failures that may lead to the same end-effect allows for identification of public safety hazards for the overall system.

k) Traceability between each functional failure and associated hazards during each phase of flight to respective hazard control strategies that should mitigate the hazard at the system or mission-level, as per § 450.103(b)(1).

NOTE: Adapted from the guidance of MIL-STD-882E

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Section 7.2: Assistance of Flight Safety Analysis.

- The flight safety analysis (FSA) assists in understanding the end-effect of functional failures prior to mitigation. Thus, assistance from an initial FSA is important for identifying system and mission level hazards to the public from functional failures.
- Section 450.113(a) requires that an FSA be performed and documented for all phases of flight, except as specified in § 450.113(b) regarding demonstrated reliability.
- Section 450.115(a) requires the FSA method to account for all reasonably foreseeable events and failures of safety-critical systems during nominal and non-nominal launch or reentry that could jeopardize public safety.

Section 7.3: Primary Outputs of the Functional Hazard Analysis.

- Identification of all functional failures associated with reasonably foreseeable hazardous events that have the capability to create a hazard to the public"
- Identification of safety critical systems. By identifying each system carrying an assessed failure "end effect" resulting from failure of each system function during each phase under each failure mode, excluding mitigation, posing a potential system or mission hazard to the public.
- Timeline of safety-critical events. By merging a given mission's timeline of flight events with the assessment of whether each failure "end effect" resulting from failure of each function during each phase under each failure mode, excluding mitigation, poses a potential system or mission hazard to the public.

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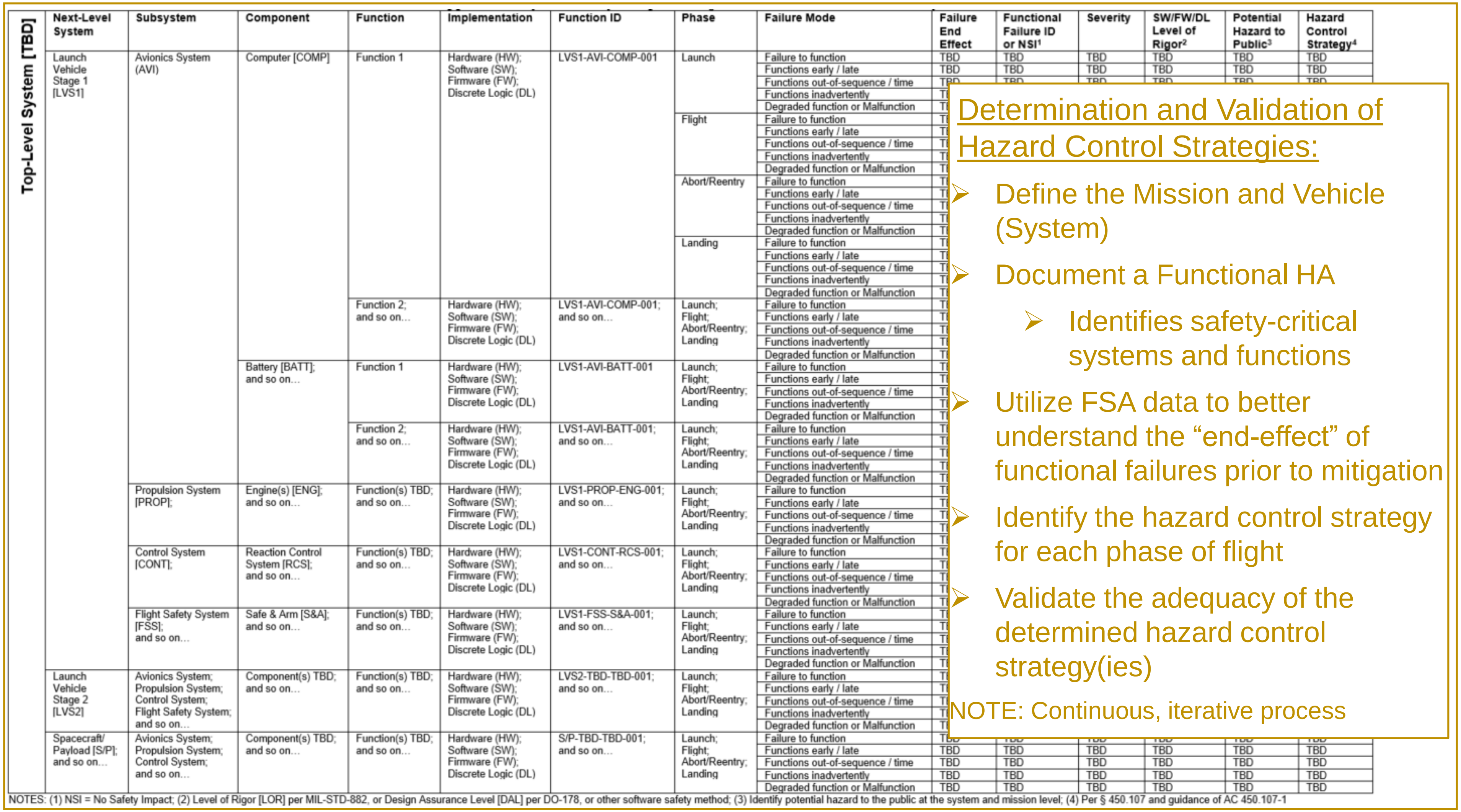

Top-Level System [TBD]	Next-Level System	Subsystem	Component	Function	Implementation	Function ID	Phase	Failure Mode	Failure End Effect	Functional Failure ID or NSI[1]	Severity	SW/FW/DL Level of Rigor[2]	Potential Hazard to Public[3]	Hazard Control Strategy[4]
	Launch Vehicle Stage 1 [LVS1]	Avionics System (AVI)	Computer [COMP]	Function 1	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-AVI-COMP-001	Launch	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
								Functions early / late	TBD	TBD	TBD	TBD	TBD	TBD
								Functions out-of-sequence / time	TBD	TBD	TBD	TBD	TBD	TBD
								Functions inadvertently						
								Degraded function or Malfunction						
							Flight	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
							Abort/Reentry	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
							Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
				Function 2; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-AVI-COMP-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
			Battery [BATT]; and so on…	Function 1	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-AVI-BATT-001	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
				Function 2; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-AVI-BATT-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
		Propulsion System [PROP];	Engine(s) [ENG]; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-PROP-ENG-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
		Control System [CONT];	Reaction Control System [RCS]; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-CONT-RCS-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
		Flight Safety System [FSS]; and so on…	Safe & Arm [S&A]; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-FSS-S&A-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
	Launch Vehicle Stage 2 [LVS2]	Avionics System; Propulsion System; Control System; Flight Safety System; and so on…	Component(s) TBD; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS2-TBD-TBD-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function						
								Functions early / late						
								Functions out-of-sequence / time						
								Functions inadvertently						
								Degraded function or Malfunction						
	Spacecraft/ Payload [S/P]; and so on…	Avionics System; Propulsion System; Control System; and so on…	Component(s) TBD; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	S/P-TBD-TBD-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
								Functions early / late	TBD	TBD	TBD	TBD	TBD	TBD
								Functions out-of-sequence / time	TBD	TBD	TBD	TBD	TBD	TBD
								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
								Degraded function or Malfunction	TBD	TBD	TBD	TBD	TBD	TBD

NOTES: (1) NSI = No Safety Impact; (2) Level of Rigor [LOR] per MIL-STD-882, or Design Assurance Level [DAL] per DO-178, or other software safety method; (3) Identify potential hazard to the public at the system and mission level; (4) Per § 450.107 and guidance of AC 450.107-1

Determination and Validation of Hazard Control Strategies:

- Define the Mission and Vehicle (System)
- Document a Functional HA
  - Identifies safety-critical systems and functions
- Utilize FSA data to better understand the "end-effect" of functional failures prior to mitigation
- Identify the hazard control strategy for each phase of flight
- Validate the adequacy of the determined hazard control strategy(ies)

NOTE: Continuous, iterative process

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AC 450.107-1: HCS Determination

Section 8.0: Potential Determination Scenarios.

Although not all encompassing, the following scenarios are potentially expected outcomes:

- Flight Abort with Highly Reliable Flight Safety System
- Flight Hazard Analysis with Flight Abort
- Flight Hazard Analysis
- Physical Containment
- Wind Weighting

Note: Per § 450.143(a), documenting compliance to § 450.143 must be performed for all safety-critical systems, except for:

1) Highly reliable flight safety systems covered under § 450.145; or
2) Safety-critical systems for which an operator demonstrates through its flight hazard analysis that the likelihood of any hazardous condition specifically associated with the system that may cause death or serious injury to the public is extremely remote, pursuant to § 450.109(b)(3).

Note: AC 450.103-1 provides guidance on "extremely remote" criteria

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Section 9.0: Hazard Control Strategy Validation.

In accordance with § 450.107(a), the safety criteria of 450.101(a), (b), and (c) must be met by using hazard control strategies. In accordance with § 450.107(c), if an operator cannot adequately mitigate the public safety hazards to meet the public risk criteria of § 450.101(a), (b), and (c) using physical containment, wind weighting, or flight abort, then the operator must conduct a flight hazard analysis in accordance with § 450.109.

1) The hazard control strategy should mitigate system safety hazards to the public such that the likelihood of any hazardous condition that may cause death or serious injury to the public is extremely remote;

2) Hazards and hazard control strategies are characterized with fidelity commensurate with the flight safety analysis, per § 450.115(b), such that they are valid for use in debris data development (§ 450.121) and malfunction trajectory analysis (§ 450.119), and are consistent with the probability of failure analysis (§ 450.131); and

3) The flight safety analysis incorporating the hazard control strategy satisfies the safety criteria of § 450.101(a), (b), and (c).

If an operator using the means of compliance in this AC is unable to demonstrate the three criteria above as applied to physical containment, wind weighting, or flight abort, then the operator would need to perform a flight hazard analysis or utilize another means of compliance to demonstrate the hazard control strategy adequately mitigates the hazard.

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Section 9.1: Adequacy of Determined Hazard Control Strategy.

Compliance data from the following items will support the validation of adequacy:

- Flight Safety Analysis - Assistance from the initial FSA is important for identifying system and mission hazards to the public. Additionally, FSA data assists in understanding the effectiveness of mitigations. Thus, the final FSA should inform the validation of any hazard control strategy for a phase of flight.
- Flight Hazard Analysis - Documenting compliance to § 450.109 for a flight hazard analysis produces data that should inform the validation of a flight hazard analysis strategy for each phase of flight in which it is used. Reference AC 450.109-1 for further guidance on flight hazard analyses.
- Computing Systems - Documenting compliance to § 450.141 for computing systems produces data that should inform the validation of a flight abort and flight hazard analysis strategy for each phase of flight in which it is used. Reference AC 450.141-1 for further guidance on computing systems and software safety.
- Safety-Critical Systems Design, Test, and Documentation - Documenting compliance to § 450.143 for safety-critical systems produces data that should inform the validation of a flight abort and flight hazard analysis strategy for each phase of flight in which it is used. Reference AC 450.143-1 for further guidance on safety-critical systems DT&D.
- Highly Reliable Flight Safety System - Documenting compliance to § 450.145 for a highly reliable FSS produces data that should inform the validation of a flight abort strategy for each phase of flight in which it is used.

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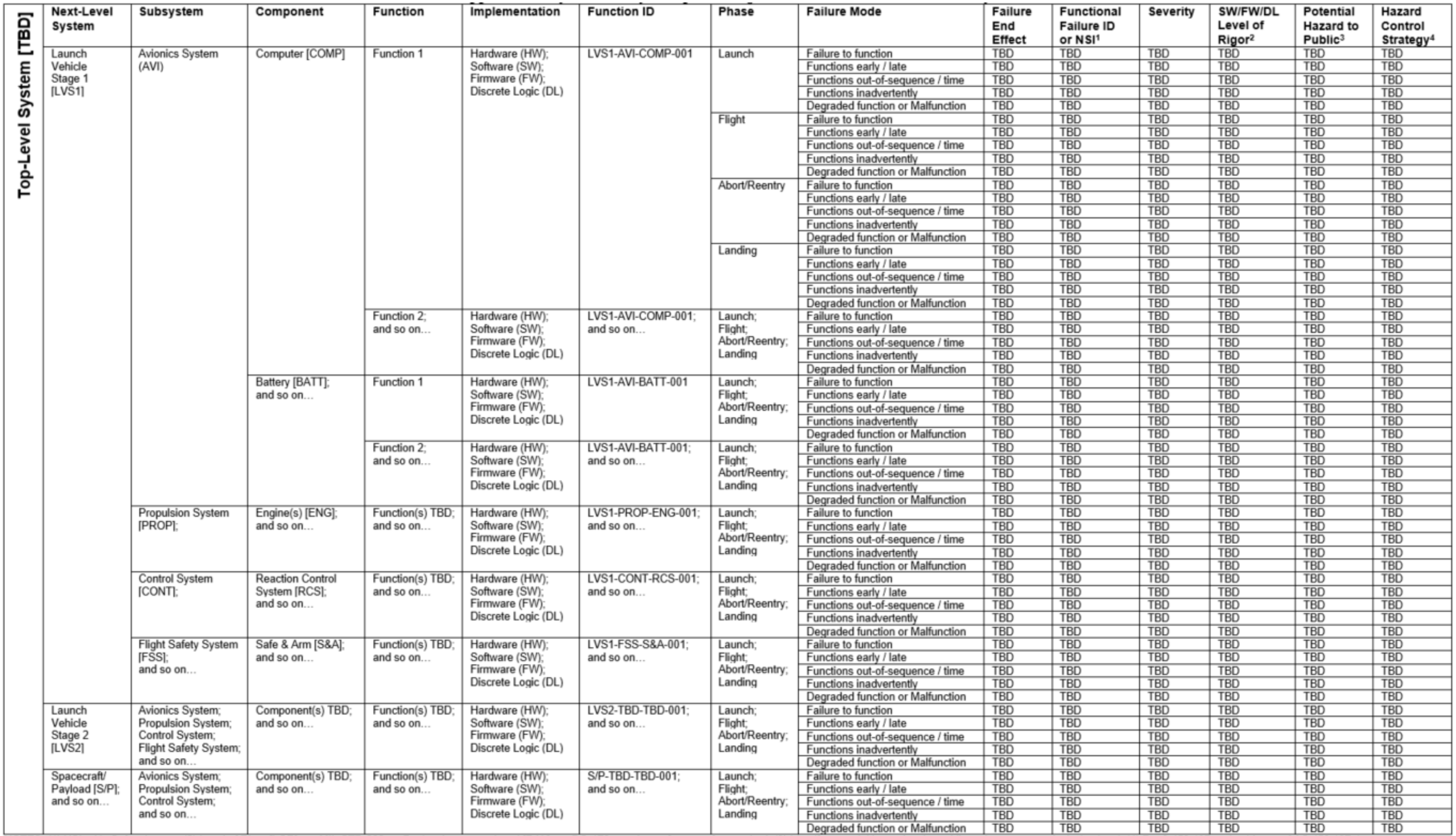
Section 9.1 [CONTINUED]

- Wind Weighting Safety System DT&D - Documenting compliance to § 450.111 for a wind weighting safety system should produce data that validates the adequacy of a wind weighting strategy for each phase of flight in which it is used.

Section 10: Continuing Accuracy of License Application.

- The functional hazard analysis and adequacy of the determined hazard control strategy must be updated or re-validated as the system design and operation mature in accordance with § 450.211(a)(2).

AC 450.107-1 – HCS Determination
Appendix A



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							Flight	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
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							Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
								Functions early / late	TBD	TBD	TBD	TBD	TBD	TBD
								Functions out-of-sequence / time	TBD	TBD	TBD	TBD	TBD	TBD
								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
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				Function 2; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-AVI-COMP-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
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								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
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			Battery [BATT]; and so on…	Function 1	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-AVI-BATT-001	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
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		Control System [CONT];	Reaction Control System [RCS]; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-CONT-RCS-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
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								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
								Degraded function or Malfunction	TBD	TBD	TBD	TBD	TBD	TBD
		Flight Safety System [FSS]; and so on…	Safe & Arm [S&A]; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS1-FSS-S&A-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
								Functions early / late	TBD	TBD	TBD	TBD	TBD	TBD
								Functions out-of-sequence / time	TBD	TBD	TBD	TBD	TBD	TBD
								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
								Degraded function or Malfunction	TBD	TBD	TBD	TBD	TBD	TBD
	Launch Vehicle Stage 2 [LVS2]	Avionics System; Propulsion System; Control System; Flight Safety System; and so on…	Component(s) TBD; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	LVS2-TBD-TBD-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
								Functions early / late	TBD	TBD	TBD	TBD	TBD	TBD
								Functions out-of-sequence / time	TBD	TBD	TBD	TBD	TBD	TBD
								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
								Degraded function or Malfunction	TBD	TBD	TBD	TBD	TBD	TBD
	Spacecraft/ Payload [S/P]; and so on…	Avionics System; Propulsion System; Control System; and so on…	Component(s) TBD; and so on…	Function(s) TBD; and so on…	Hardware (HW); Software (SW); Firmware (FW); Discrete Logic (DL)	S/P-TBD-TBD-001; and so on…	Launch; Flight; Abort/Reentry; Landing	Failure to function	TBD	TBD	TBD	TBD	TBD	TBD
								Functions early / late	TBD	TBD	TBD	TBD	TBD	TBD
								Functions out-of-sequence / time	TBD	TBD	TBD	TBD	TBD	TBD
								Functions inadvertently	TBD	TBD	TBD	TBD	TBD	TBD
								Degraded function or Malfunction	TBD	TBD	TBD	TBD	TBD	TBD

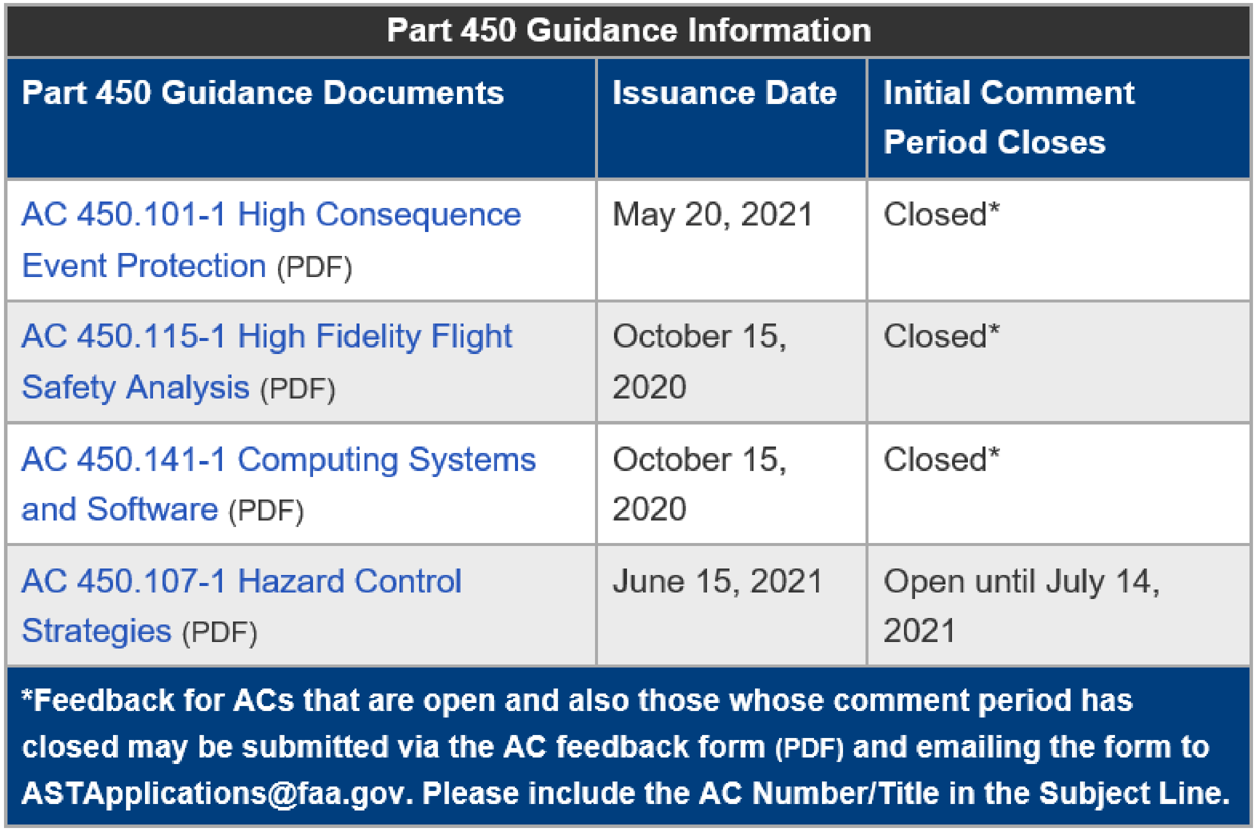
NOTES: (1) NSI = No Safety Impact; (2) Level of Rigor [LOR] per MIL-STD-882, or Design Assurance Level [DAL] per DO-178, or other software safety method; (3) Identify potential hazard to the public at the system and mission level; (4) Per § 450.107 and guidance of AC 450.107-1

AC 450.107-1: HCS Determination

Response to real-time feedback

Please type your question into the Q&A chat box in Zoom
or send an email to ASTWorkshops@faa.gov

Where to Find Part 450 ACs



Part 450 Guidance Information

Part 450 Guidance Documents	Issuance Date	Initial Comment Period Closes
AC 450.101-1 High Consequence Event Protection (PDF)	May 20, 2021	Closed*
AC 450.115-1 High Fidelity Flight Safety Analysis (PDF)	October 15, 2020	Closed*
AC 450.141-1 Computing Systems and Software (PDF)	October 15, 2020	Closed*
AC 450.107-1 Hazard Control Strategies (PDF)	June 15, 2021	Open until July 14, 2021

***Feedback for ACs that are open and also those whose comment period has closed may be submitted via the AC feedback form (PDF) and emailing the form to ASTApplications@faa.gov. Please include the AC Number/Title in the Subject Line.**

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