DISPOSITION OF PUBLIC COMMENTS
***Guidance for Hazard Classification of Runway Excursion*, Policy Statement No. PS-ANM-25-11**

No.	Comment	Requested Change	Disposition
	Commenter: GE Aviation Safety & Certification		
1	It is not unusual for engine nacelles to contact the ground in runway departures, and in practice—even when fuel leaks from engine accessories are involved—the severity of the event has not historically been increased by the nacelle/ground contact or a resulting fuel leak from engine configuration hardware and accessories. There is a very limited volume of fuel within the engine fuel system, which would likely not be sufficient to damage the aircraft if it spilled and caught fire. The fuel system has shutoff valves which, once commanded closed by the crew, would prevent further fuel flowing from the tanks down onto the ground.	We suggest that paragraph 2(c)1(a) should be reviewed in light of historical experience, since it currently implies that fuel spillage from nacelle components would lead to a catastrophic outcome.	As stated in the draft policy "…*service history also indicates that excursions at low speed and low thrust conditions usually result in no injuries or damage to the airplane.*" GE's comment reflects this situation. We have considered historical experience in drafting this paragraph. However, it would be incorrect to generally assume that a catastrophic outcome would not occur in all excursions (e.g., during a high-energy impact or if the fuel shutoff valve failed.) Nevertheless, we have revised the policy statement and the subject paragraph is deleted.

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No.	Comment	Requested Change	Disposition
	Commenter: EMBRAER		
1	Paragraphs 2.a.4 and 2.b.2 Airport characteristics, in terms of critical terrain features, obstacles, etc. due to non-existence of runway safety areas, are not considered as a factor for establishing failure conditions criticalities, since Embraer understands that such threats are closely related to the operational aspects and related regulations, rather than to the aircraft design and related regulations. Embraer's aircraft design seeks compliance with all CFR 25 already established crashworthiness regulations (§§ 25.561 925.562, 25.721, and 25.994) which provides occupants with all regulatory protection for impacts, post-crash fires, and emergency evacuation. Some of the proposed guidance relative to airport characteristics does not provide sufficient detail to ensure a standardized approach to these considerations.		Partially agree. We clearly indicated in paragraph 2.a.4 that applicants are not expected to analyze airports. To emphasize that this is not a requirement, we moved the content to the "Relevant Past Practice" section in support of our position that a classification below the hazardous category without rigorous substantiation is insufficient. The intent of these regulations is to provide reasonable crashworthiness protections. However, even if airplane designs comply with these regulations, it does not mean a runway excursion will never be catastrophic. The concern expressed in paragraph 2.b.2 of the draft policy statement remains valid. However, we have revised the policy statement and less than hazardous conditions are now addressed at #3 in the "Policy" section.

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2	Paragraph 2.a(4) "*General configurations, features, and characteristics of the airports into which the airplane model is designed to operate ...*" While this may be feasible for very large airplanes that operate commercially into a limited number of hub airports with well-defined infrastructure, it is not possible to establish these airport characteristics for other types of airplanes because of the wide variety of types of airports, and airport characteristics, used in the world. While the policy acknowledges that the intent is not an airport-by-airport justification, it is still not clear how to define the off-runway characteristics of "*airports into which the airplane model is designed to operate.*"		See Embraer comment #1. We moved the content of paragraph 2.a.4 into the "Relevant Past Practice" section.
3	Paragraph 2.c(l)(a) The ground clearance depends on the bearing strength of the soil surrounding the runway. While this can be found for airports with established runway safety areas, at other airports it is not feasible to address this concern.		Partially agree. This was part of the reason why we wrote issue papers when applicants proposed using speeds as the only assumptions to classify excursion without providing rationale to support those assumptions. However, we have revised the policy statement and this concern about minor runway excursions is now located in the last paragraph of "Relevant Past Practice."

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	Commenter: EMBRAER		
4	Paragraph 2.c(l)(b)3 There is no guidance on what is considered a "*significant obstacle.*" Obviously the impact protection required depends significantly on the structure robustness of the obstacle.		Agree. This paragraph was intended to allow applicants propose alternatives not described in this policy statement. It is preceded by the "or" in paragraph 2.c(1)(b)2. The FAA did not attempt to prescribe the obstacles. However, we determined that the policy can stand without this paragraph, so we deleted it.
5		It is agreed that the airport characteristics surrounding the runway certainly affect the criticality of the excursion in association with the aircraft excursion speed. However, the variability of terrain types and consistency, effects of contamination and obstacle types and distribution are so broad, that it makes compliance practically impossible, mainly in the cases where the runway safety area is absent. It is suggested that the policy establish some specific and reasonable assumptions to be considered for in the hazard assessment, such as surface friction coefficient, terrain load bearing capability, types and locations of obstacles, tolerable decelerations, etc.	Partially agree. The draft policy statement was essentially identical to the issue papers for applicants that proposed to classify failure conditions leading to runway excursions as less than catastrophic, based on some speed criteria, but did not provide adequate substantiation. It was not our purpose to prescribe criteria for airport characteristics.
		Because of the lack of specific guidance for these concerns, Embraer believes that the FAA should consider more objective and specific criteria for airport characteristics and republish the draft Policy PS-ANM-25-11 for comment.	Based on similar comments, we have revised the policy statement to state the FAA's expectation that system failures that cause runway excursions should be considered at least hazardous, and should be catastrophic if the excursion occurs at above taxi speeds.

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	Commenter: Gulfstream		
1		Current Regulatory and Advisory Material Reference should be made to 14 CFR part 25.735(b)(1), as the requirements stated in this paragraph are incompatible with the increased level of severity imposed on runway overruns by this policy. 14 CFR part 25.735(b)(1) allows a single failure of the brake system to double the landing distance of an aircraft – a condition that would cause a very high speed overrun in any rejected takeoff and an overrun in any type of landing operation (Reference 14 CFR parts 91, 121, and 135). Previous practice has included the exclusion of items covered under 14 CFR part 25.735 from 14 CFR part 25.1309 via issue paper. This policy should either state that items covered by 14 CFR part 25.735 are excluded from the application of this policy, or state how this policy applies to them.	Agree. To ensure consistency with applying § 25.735(b)(1) relative to § 25.1309(b), we added Note 1 to the policy statement to clarify that specific single failures in the brake systems are not required to meet § 25.1309(b) to reflect the existing regulations as well as the SDAHWG's recommendation and CS 25.1309.

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	Commenter: Gulfstream		
2		Relevant Past Practice The policy statement should clearly state what environmental conditions must be considered for assessing the criticality of a failure condition leading to a runway excursion, and which of the listed factors allow quantitative credit. In a recent application, the applicant was forced to assume an iced/contaminated runway while evaluating the effects of certain extremely remote failures, though such an environmental condition is in itself uncommon and in combination with the failure extremely improbable. Probabilistic credit was not allowed for this condition. "*Consequently, the criticality of a failure condition that results in a runway excursion is difficult to predict and cannot be determined based solely on airplane speed and the initial direction of the excursion, as some applicants have proposed.*" The above statement does not convey the fact that the determination of runway excursions based solely on airplane speed and the initial direction of the excursion has been the de facto industry practice for over 10 years. This criterion has been accepted by the FAA in previous applications without many of the additional considerations of this	This comment has 3 aspects: (1) probability credits for probability of environmental conditions; (2) industry practice of using speeds as the sole criteria; and (3) credits for meeting specific regulations for post-crash events. 1. The subject of this policy is about hazard classification, not probability of failure condition. The environmental conditions that could lead to a runway excursion (to be considered in conjunction with system failures) are typically the runway surface condition and wind. The main concern is whether applicants are allowed to combine the probability of an environmental condition with a single failure if the outcome is catastrophic. According to AC 25.1309-Arsenal (2002), a single failure must not be catastrophic when it occurs in the environmental conditions approved for the airplane operation. As a result of a recent ARAC ASAWG recommendation (2010), the FAA has accepted such single failures if the environmental condition is shown to be extremely remote. 2. In recent certification programs, applicants have used speeds such as those related to rudder effectiveness to

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		policy statement. The factors listed in the opening of this paragraph (geometry, structural strength, landing gear, fuel tanks and fuel line installation, and engine ground clearance) are all subject to specific regulation. It is plausible to assume that the aircraft meets that specific regulation when evaluating the effects of runway overrun, which is why these factors were not considered to be "variables" in assessing the runway excursion severity. This policy statement should recognize that the standards for approval are being changed from the previously established practice.	judge the criticality of systems that, in combination, contribute to airplane controllability on the ground, so that an excursion can be shown extremely improbable. As indicated in the policy, the FAA had traditionally assumed any excursion could be catastrophic although we did not issue specific policy on this subject until now. 3. The specific regulations for post-crash situations provide a level of protection. However, meeting them does not mean there would not be a catastrophic runway excursion. We have changed our practice in that we are now open to accepting hazard classification that is *lower* than catastrophic when appropriate rationale is provided.
3	Policy paragraph 2.a.(3) Anticipated combination of independent adverse operating and environmental conditions approved for the airplane; for example, weight, center of gravity, flap setting, cross wind, tail wind;	In a recent application, the FAA required that all runway surface conditions approved for operations be considered when demonstrating compliance to 14 CFR 25.901(c) for Uncontrolled High Thrust failures. If that is the policy, it should be clearly stated here.	The consideration of environmental conditions *approved for operations* is a general practice, applicable to safety assessments of all systems. It is applicable to compliance with § 25.901(c). As such it should be (and it is) in AC 25.1309. We see no need to single it out in the context of this policy. We have revised the policy statement, and the intent of the draft paragraph 2.a.(3) is now located in the "Relevant Past Practice"

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			section.
4		Policy paragraph 2.a.(4) General configurations, features, and characteristics of the airports into which the airplane model is designed to operate, for example, runway dimensions and surface conditions, presence or absence of runway safety areas capable of supporting the airplane model; off-runway wet surface load bearing capability; and types and locations of critical terrain features and obstacles. It is not our intent that the applicant surveys all the airports into which the airplane model will operate. Rather, the intent is to consider these external factors that could intensify or alleviate the risk of an excursion. It is not practical to analyze every airport individually as stated within the above mentioned paragraph, therefore Gulfstream requests a definition of "*consider these external factors*" if it is recognized that this task is impractical. Using all worst case parameters yields impractical assumptions (e.g., the aircraft exits a runway, crosses a ditch, then falls off a cliff into a freezing river, while maneuvering to avoid buildings and other obstacles). By requiring these factors to be "considered," the policy statement	Partially agree. We do not intend to prescribe safety objectives for airports with this policy statement. To ensure correct understanding of our intent for paragraph 2.a.4, we moved it to the "Relevant Past Practice" section to discuss why speed criteria alone are not sufficient means to classify the hazards of runway excursions. We revised the policy to clarify the safety objective that systems be designed, to the extent practical, to minimize failures that could cause an excursion at any speed.

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	Commenter: Gulfstream		
		effectively classifies every excursion as catastrophic, since the excursion cannot be shown not to be catastrophic when worst case factors are present. The policy statement must provide a reasonable standard to be used for off runway conditions. This standard may be a function of the aircraft's capability to maintain landing gear integrity in soft terrain or other technical aspects of the design – but it should be specific and objective. Additionally, the direction to consider the "*presence or absence of runway safety areas*" is contradictory with what is stated in 2.c.(1)(b) that implies the presence of a "*runway safety area that meets the design criteria in AC150/5300-13 or equivalent*" may be assumed when establishing the maximum allowable off-runway excursion speed. The policy statement should provide clear guidance on the assumption of the presence of a runway safety area.	Regarding consideration of runway safety area: given that not all airports have a runway safety area and some airplane models most likely will not operate at certain airports, the worst-case assumption would be not to consider there exists runway safety area for any given airplane model. To allow the applicants leeway to propose means of compliance appropriate for their particular airplane, we originally provided paragraph 2.c(1)(b) in the draft policy while acknowledging the absence of runway safety areas at some airports. The subject paragraph has been removed from the final policy. In light of other comments about considerations of airports, we have revised the policy statement to bring the airports into the "Relevant Past Practice" and provide specific policies on hazard

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			classifications.
5	Policy paragraph 2.c.(1)(b)1 The airplane can be: Brought to rest within the runway safety area that meets the design criteria in AC 150/5300-13 or equivalent, In a recent application, the authority did not allow credit for the runway safety area because the existence of such an area was not a limitation on the operation of the aircraft.	The policy statement should state that it is permissible to assume that a runway safety area equivalent to the cited criteria exists, even though some airfields where the type might operate may not be compliant with AC150/5300-13. Additionally, the policy statement is not clear how paragraph 2.c.(1)(b)2 relates to 2.c.(1)(b)1. Gulfstream believes the combined intent of 1 and 2 could be more clearly stated as follows: "*Brought to rest within the runway safety area that meets the design criteria in AC150/5300-13 or equivalent, considering the maximum runway excursion speed and surface condition (assuming an appropriate braking coefficient for the off-runway tire-to-ground surface), or…*"	Agree. However, we revised the policy statement so that this specific criterion regarding runway safety area is no longer needed.
6	Policy paragraph 2.c.(1)(b)3 The airplane can be: Protected from impacting significant obstacles in some other acceptable manner. Gulfstream questions whether this option is realistic. "Protecting" an airplane from a high speed collision with a solid structure such as a building or antenna does not seem like something that can be accomplished. If		The intent of this paragraph was to allow applicants to propose alternatives not addressed in the policy statement. As that proposition can stand without this paragraph, we deleted it.

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	these obstructions must be assumed to exist, there does not seem to be a rational standard of protection from collision that can be met.		
7		Policy paragraph 2.d.(1) Compliance with the remaining failure mitigation provisions of §§ 25.901(c) and 25.1309(b) can be shown by: Following the general guidance in paragraphs 2a and 2b of this policy statement to establish the worst anticipated outcome, and The lack of specificity of paragraph 2.a.(4) combined with the overall concept that "hazard classification for a failure condition should reflect the anticipated worst-case outcome given the causal failure that occurs under any of the approved operating and environmental conditions" renders obtaining any classification other than catastrophic impractical. The policy statement must provide clear guidance on what on and off runway conditions may be assumed to exist.	After reviewing all comments, and considering applicants' responses to issue papers, we revised paragraph 2 to define the classification hazards: • A failure condition resulting in runway excursion should be considered at least hazardous. • Any failure condition that causes a runway excursion above taxi speeds (~30 knots) is considered catastrophic. The applicants may provide justification for other classifications, which are subject to FAA concurrence. Guidance for acceptable justifications are added.

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8		Policy paragraph 2.e. These results can be used to show compliance with § 25.901(c). Any failure condition classified as "major" or less may be assumed to not "jeopardize the safe operation of the airplane." The requirement of 14 CFR part 25.901(c) has commonly been understood to be that no single failure should have catastrophic effects – as consistent with other such rules. The specific guidance provided in 2.c. instructs the applicant how to demonstrate "*Compliance with the catastrophic failure prevention provisions of …§ 25.901(c)…*", is consistent with this understanding and implies that a Hazardous or lower classification is the success criterion for § 25.901(c). This statement implies that compliance with § 25.901(c) actually requires a major or lower classification. The policy statement effectively extends the "*no single failure*" requirements to Hazardous failure conditions (therefore above the standard of 14 CFR part 25.1309). Gulfstream requests a justification for applying a higher standard.	We disagree that the policy is applying a "higher standard" for consideration of single failures under § 25.901(c). Section 25.901(c) preamble material or any of the deliberative First Biannual Airworthiness Review (circa 1974-75) records do not define "jeopardize." The term has the generally accepted dictionary meaning of "*to expose to danger or risk*." The FAA has the legal discretion to find any "hazardous failure condition" jeopardizes safe operation. That being said, in practice not all powerplant failure conditions that would be classified as "hazardous" under § 25.1309(b) have been required to meet § 25.901(c). In fact, some project specific policies published on this subject defined "jeopardize the safe operation of the airplane" to mean "*result in catastrophe, serious injury or exceedingly hazardous continued operation. While any condition more severe than a single engine safe shutdown has traditionally been viewed as potentially jeopardizing the safe operation of the airplane, traditionally only those failure conditions which would be classified as "catastrophic" or near the upper end of the "hazardous" category have been considered to "jeopardize the safe operation of the airplane.*" This is especially true when applying the rule to prohibit single failure effects. The FAA relies upon

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			compliance with § 25.901(b)(2) and § 25.1309(b) to regulate less severe powerplant installation failure conditions. As an example, the propulsion branch in the Seattle Aircraft Certification Office uses the quiet single engine failure during the takeoff phase as the upper bound of that which does NOT jeopardize the safe operation of the airplane for the purpose of compliance with § 25.901(c). So, neither the difference between "major" and "hazardous" or between "hazardous" and "catastrophic" under § 25.1309(b) directly correlates with the failure condition severity historically considered to "jeopardize." So while the statement, "*Any failure condition classified as "major" or less may be assumed to not "jeopardize the safe operation of the airplane*" is valid, the inverse assumption inferred by Gulfstream that "Any failure condition classified as 'hazardous' may be assumed to "jeopardize the safe operation of the airplane" is not entirely true either. We revised the policy and removed the statement, not because it was inappropriate, but because it was no longer needed.

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	Commenter: Gulfstream		
9	General Comments Overall, this policy does not recognize that previous approvals over the last decade have been based on overrun speed criteria where the speed references implicitly assume that the aircraft is of typical design and construction, meets the applicable standards for landing gear and fuel tank integrity and is operated at airfields with typical safety areas. This past practice circumvents the fact that there are too many local variables to create a "worst case" scenario that is both representative and practical. The reference speeds were speeds at which a certain outcome could be reasonably expected in such typical conditions – based on historic overrun occurrences. The current policy lists a series of factors for consideration and leaves the burden of establishing an acceptable overrun scenario to the applicant. Practical experience in a recent application where similar policy was imposed via issue papers is that any and all assumptions about operating conditions and airfield characteristics are not accepted by the authority and worst case parameters must be used for all factors – and applied simultaneously. The applicant in that instance was required to consider that a rejected takeoff could		Partially agree. Until now the Transport Airplane Directorate has not published any standards for classification of runway excursion, other than occasional issue papers stating the assumption that any excursion could be catastrophic. Gulfstream comments assist the FAA in developing a standard. As discussed in the policy statement, although applicants' proposed speed criteria that would allow classifications less than catastrophic, none has provided adequate substantiation. Applicants have used in-service overruns in various ways to derive their speed criteria, but none has correlated the in-service data to the airplane under study. Regarding rejected takeoffs, especially a rejected takeoff below V_1, it is an operation at pilot discretion. It is reasonable to apply the no-catastrophic single failure in the presence of such a rejected takeoff. For example, the FAA has been consistent in requiring that a thrust lever assembly jam (single failure) combined with a discretionary rejected takeoff must not result in a catastrophic overrun. Compliance to §§ 25.901(c) and 25.1309(b) would require eliminating the jam, or showing that the jam could not occur. Regarding the 30-knot delineation for

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	occur at any time, therefore that any failure which would be critical if an rejected takeoff were initiated for other reasons – not due to the failure itself – was still considered to be a "single failure" for the purpose of requirement compliance even in combination with a completely unrelated rejected takeoff. This effectively makes any classification other than catastrophic impossible to prove satisfactorily for any failure with a perceptible effect on aircraft deceleration capability and for which performance credit is taken. In the cited recent application, the FAA allowed excursions below 30 knots to be considered non catastrophic (the FAA specialist chose this reference arbitrarily). Higher speed overruns were all classified as catastrophic. Known past practice has included considering excursions between 30 and 50 knots Major, and between 50 and 80 knots Hazardous. Overruns above 80 knots were considered catastrophic (slightly different numbers have been used by various applicants). This change can have very significant effects on system architecture and design.		catastrophic classification: As industry has not been able substantiate their (variety of) speed criteria for the same reasons Gulfstream stated (there are too many local variables to analyze), the FAA has allowed 30 knots as a means to comply with our issue papers. This is practical, conservative, and more lenient than the previous approach (i.e., that any overrun was catastrophic.)

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	Commenter: Cessna		
1		Cessna appreciates the need for guidance regarding excursions, but fails to understand the reasoning behind accounting for obstacles around runways as well as terrain conditions. Guidance should provide clear and unambiguous definitions that would enable aircraft OEMs to understand the design constraints while leveling the compliance playing field between the various aircraft certification offices and directorates. OEMs have no means to control runway hazards and conditions. It is assumed that the majority of domestic runways follow the guidance of AC150/5300-13 "Airport Design" to some extent. Aircraft OEMs, however do control the performance and, to some extent, the intended usage of their airplane (e.g., runway length, types of runways, runway width, etc.). Cessna would therefore like to propose that guidance be made more relevant to parameters that can be measured and used as design requirements. In addition to all of this, what has historically been neglected while establishing hazard levels following runway excursions is the mass of the aircraft. A large transport category aircraft exiting the runway in any direction will not experience	Agree. Based on similar comments, we have revised the policy statement. Once the airplane inadvertently exits the runway, the risk is essentially unpredictable. We revised the policy statement to focus on minimizing excursions, rather than to analyze the discrete factors that affect the severity of an excursion.

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	Commenter: Cessna		
		the same energy transfer as a smaller general aviation aircraft or even a single engine. The guidance should account for the various aircraft type certificated under part 25.	
2	Page 3, Paragraph 2(a)(2) Cessna agrees to the first part of the paragraph, "*All relevant airplane design features, for example, controllability and stopping capability as affected by engine thrust, speed brakes, landing gear, ground handling characteristics, brakes, and nose wheel steering*." Cessna does not understand this paragraph with respect to the use of off-runway operation on systems and fuselage integrity. The ability for systems, equipment, and structure to withstand impact loads as well as landing and deceleration stresses are governed through other Subparts (14CFR Part 25 Subpart C and Subpart D for example).	If an applicant can show that their product meets these requirements, it should therefore be assumed that it is fit to operate on runways meeting the guidance of AC150/5300-13. The effect of lateral or longitudinal excursions on aircraft is undefined and depends on momentum, excursion angle, aircraft configuration, and terrain. An aircraft that is appropriately designed and type certificated may have a better chance in surviving such event. This claim can however not be guaranteed under all foreseeable circumstances. This paragraph can easily be interpreted as stating that any runway excursions will lead to the rupture of a flammable fluid carrying component and cause an uncontrolled fire event. Cessna recommends removing "and effects of off- runway operation on landing gear, engines, flammable fluid carrying components, brakes, steering, and fuselage integrity."	Agree. Change made.

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	Commenter: Cessna		
3	Page 3, paragraph 2(a)(4) This paragraph appears to contradict itself. The last two sentences appear to undo the earlier statements. Aircraft OEM have no control on airport design, hazards around the runway, and terrain. It is however our responsibility to drive hazard out of our designs and the best way to do this is to define measurable and consistent parameters. For example, if the FAA believes that the soil around a runway is soft and allows a loaded main gear of TBD lbs to sink 12 inches, then this could easily become guidance that would be consistently applied by the industry. A better approach however would be for the applicants to define how the aircraft will be used (runway length and width), define the configuration such as wing mounted engines, types of landing gears, and mass of the aircraft and develop a graduated hazard classification scale based on deviation from centerline as well as excursion speeds. These parameters are easily quantifiable and should reduce the risk of inconsistent application throughout the various ACOs and directorates.	Cessna recommends that 2(a)(4) be deleted and replaced with quantifiable parameters.	Partially agree. We agree that the intent of paragraph 2(a)(4) is for the applicants to define how the aircraft will be used and define the configuration accordingly. Cessna's comment is similar to others on this paragraph. Instead of deleting this content, we moved it to the "Relevant Past Practice" section to maintain our position that there are other parameters to be considered in addition to the runway departure speed.

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	Commenter: Cessna		
4		Page 3, paragraph 2(b) Cessna recommends deleting paragraph 2(b) and replace with "*FAA is mainly concerned that runway excursions be survivable*" as a conclusion in the Relevant Past Practice paragraph.	Disagree. The failure conditions in the paragraph describe the potential catastrophic risk about which the FAA is concerned. The primary safety objective of this policy statement is to prevent runway excursions as much as is practicable, which makes increasing the survivability of them a moot point. However, since we have revised the policy, this sentence is no longer in it.
5	Page 4, paragraph 2(c)(1)(a) Cessna is concerned with the expressions "*sufficient ground clearance*" and "*substantial flammable fluid leakage*."	These terms are vague and ambiguous and may lead to inconsistent means of validation and verification when imposed by the various aircraft certification offices and directorates. Cessna would again recommend that any airplane meeting the structure and design subpart be held to measurable variables such as mass, deviations from centerline (adjusted for runway width perhaps), and speeds. Cessna recommends removal of the vague and ambiguous terms and that quantifiable parameters be developed to ensure that the design can be verified against this guidance.	Agree. We removed the sentence from the policy statement. Development of quantitative parameters, as Cessna requested, is not needed.

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	Commenter: Cessna		
6	Page 4, paragraph 2(c)(1)(b)3 Cessna does not understand this paragraph. What is implied and how can it be verified? Obstacles are an area where aircraft OEMs have no control.	Cessna recommends that this paragraph be deleted.	Requested change accepted. There are similar comments from other commenters.
7	Page 5, Effect of Policy Cessna questions the use of the word "*must*" (defined in attachment 1) in the first and second paragraphs. In the first paragraph "*Agency employees and their designees and delegations must not depart from this policy statement without appropriate justification and concurrence from the FAA management that issued this policy statement*" implies that this policy is regulatory in nature and requires the applicant to coordinate only with the FAA management that issued this policy statement.	Cessna recommends using "should" rather than "must" in this context.	Disagree. This statement is an instruction for agency employees, designees, and delegations to support standardization. This policy statement provides one method of compliance; it does not *require* it. Although deviations are not prohibited, they do have to be coordinated with the standards staff office that issued the policy. No change.

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No.	Comment	Requested Change	Disposition
	Commenter: Transport Canada		
1	Paragraph 2.a The guidance below defines acceptable methods of establishing the hazard classification for runway excursions caused by system failures. a. In addition to excursion speed, the evaluation for each system failure condition potentially involving a runway excursion should take into consideration: …. (4) General configurations, features, and characteristics of the airports into which the airplane model is designed to operate, for example, runway dimensions and surface conditions, presence or absence of runway safety areas capable of supporting the airplane model; off-runway wet surface load bearing capability; and types and locations of critical terrain features and obstacles. It is not our intent that the applicant surveys all the airports into which the airplane model will operate. Rather, the intent is to consider these external factors that could intensify or alleviate the risk of an excursion.	TCCA acknowledges that off-runway conditions, characteristics, and obstacles could have an intensifying effect on the severity of a failure induced runway excursion. Quantitatively predicting these effects for a runway departure onto a variety of unprepared surfaces is difficult task to model and substantiate. As a result of the inconsistent and changing nature of these conditions and the lack of reliable data associated with the characteristics of the off-runway surfaces, this aspect is not considered as appropriate for consideration as an intensifying factor for runway excursion failure case scenarios. Instead it is recommended that the emphasis in this policy letter with respect to off-runway conditions be limited to the assessment of the aircraft structure and systems and demonstrating the robustness of design when failure scenarios leading to a runway excursion are identified. These comments are applicable to all similar references in this policy relating the need for consideration of off-runway conditions, obstacles, etc. in the analysis (e.g., paragraphs 2.c.(1)(b)3, 2.c.(2)).	Agree. We revised the policy statement based on this and similar comments. See response to Embraer comment #2.

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No.	Comment	Requested Change	Disposition
	Commenter: Transport Canada		
2		Paragraph 2.c.(2) *"When the failure condition* ***<u>results from a combination</u>*** *of* ***~~multiple~~*** *independent failures* ***<u>and/or events</u>****, the probability of the conditions leading to the catastrophic failure may be considered as well as the probability of the failure condition itself."* TCCA believes the reference to "multiple independent failures" in the first part of this sentence is also meant to take into account the conditional probabilities of events such as cross-wind conditions, etc. that contribute to the failure condition.	Agree. However, we determined that the entire sentence is not necessary in the context of this policy statement and deleted it.

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No.	Comment	Requested Change	Disposition
	Commenter: Dassault Aviation		
1	Relevant Past Practice "*the applicant is advised to consider any anticipated intensifying factors.*" In previous certification projects, Dassault considered the worst case within the approved aircraft flight envelope to assess the severity of the failure. This can be considered as "anticipated intensifying factors."		Noted. No change.
2	Relevant Practice "*The obstacles, runway surface conditions, and other hazards associated with and adjacent to runways are diverse.*"	Noted, but this cannot be taken into account for performance computations to determine the consequence of failures. The present criteria used for failure severity classification is runway overrun speed obtained from performance models.	As indicated in the policy statement, speed alone is not sufficient information to classify failure conditions because applicants do not provide adequate substantiation. This was the reason issue papers were written, leading to this policy statement.
3	Relevant Past Practice *"For applicants that used speed as the primary parameter in their hazard classification, the FAA used issue papers to convey its concerns and to share the guidance it developed to help them substantiate their use of speed for hazard classification."*	Dassault proposes that the FAA harmonize these various issue papers and incorporate them as a basis for this policy.	Agree. The FAA used issue papers as the basis for this policy. This policy statement is essentially identical to all the issue papers, so harmonization with the issue papers is given. We did not change the policy in response to this comment.

No.	Comment	Requested Change	Disposition
	Commenter: Dassault Aviation		
4	Paragraph 2.a (1): "Unique threats posed by the failure condition itself…" This particular aspect is already covered in the functional hazard assessment so it is not necessary to modify the present certification rules on this subject.		Dassault is correct. No certification rules are modified as a result of this policy statement.
5	Paragraph 2.a(2) "effects of off- runway operation on landing gear, engines"	This requirement is considered not applicable because there is no possible modelization of these off-runway conditions. In the absence of an AC on the subject or generally accepted tests results, it is not possible to define a model to determine these effects.	Agree. We deleted this paragraph. See response to Cessna comment #2.
6	Paragraph 2.a(3) "*Anticipated combination of independent adverse operating and environmental conditions approved for the airplane.*" Dassault considers that this proposition is acceptable if operating and environmental conditions are compliant with the Limitations section of AFM, as of today.		Yes, it is the same as today, as indicated by the phrase "…approved for the airplane." We did not change the policy in response to this comment.
7	Paragraph 2.a(4): "*General configurations, features, and characteristics of the airports into which the airplane model is designed to operate.… … the intent is to consider these external factors that could intensify or alleviate the risk of an excursion.*"	This requirement is not applicable nor practical in term of airworthiness certification, since the risk linked to runway overrun and failure consequences are fully determined by the aircraft and conditions listed in paragraph 2a(3). Conditions outside this envelope cannot be taken into account to upgrade or downgrade runway excursion	This comment is similar to others about the same paragraph. We revised the policy and now this information is in the "Relevant Past Practice" section. See response to Gulfstream comment #10.

No.	Comment	Requested Change	Disposition
	Commenter: Dassault Aviation		
		consequences.	
8		Paragraphs 2.b(1) and (2) The two failures conditions listed in this paragraph are already considered in the hazard assessments.	In theory, these two failure conditions should be routinely analyzed in the safety analysis, although not all functional hazard assessments specifically identify them. They are shown here as objectives specific to runway excursions. However, we revised the policy to focus on minimization of failures that could cause excursions, rather than to analyze these two failure conditions.
9		Paragraphs 2.c(1) and (2) Dassault does not concur. Assessment of failure conditions is already covered by AC 25.1309. This proposal is a reversal of the usual certification demonstration, where the overrun speed thresholds fully determine the criticality of the failure event, whatever the failure considered. There, it is the applicant that has to define for each failure event the speed threshold beyond which the failure becomes catastrophic. Consequently, Dassault does not see any interest in adding the same guidance in that policy.	Paragraph 2.c is intended to provide guidance for substantiating applicants' speed criteria. For example, if an applicant proposes that a failure causes an excursion below 80 knots and claims that it is not catastrophic, there should be substantiation why it is not catastrophic. As indicated at the beginning of the paragraph, we have found applicants use assumptions, but they do not provide substantiation.

No.	Comment	Requested Change	Disposition
	Commenter: Dassault Aviation		
10	Paragraph 2c(2): *"When the failure condition consists of multiple independent failures the probability of the conditions leading to the catastrophic failure may be considered as well as the probability of the failure condition itself. Examples of these conditions are environmental, those that limit runway performance, and general airport configuration, features, and characteristics."*	Dassault requests clarification.	This sentence is removed as it is not needed for the purpose of this policy. See response to Transport Canada comment #2.
11	Effect of policy and implementation *"Whenever a proposed method of compliance is outside this established policy, the project aircraft certification office has to coordinate it with the policy issuing office using an issue paper."* Considering this policy's effects on design and certification, Dassault may prefer an issue paper. This policy is definitely difficult to comply with in the frame of a certification project.		Dassault's preference is noted. No change.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
1		Summary Airbus is concerned about the Policy Statement Guidance for Hazard Classification of Runway Excursion and considers its application as impractical since its content refers to means of compliance not applicable to 14 CFR Part 25 or results from non-compliance to 14 CFR Part 139 or ICAO standards. Moreover, the policy content is very similar to our current A350 IP for which Airbus expressed a request for withdrawal and which triggered more than 2 years discussions with the FAA for the identification of reasonable alternate Means of Compliance that are not mentioned in the policy. Indeed, manufacturers are not accountable for aerodrome design and operational considerations such as runway safety areas, off-runway surfaces, types and locations of critical terrain features. Moreover, determining and taking into account in the aircraft system design all the external environmental factors that could intensify the risk of an excursion is considered as impractical and not the appropriate way to address the issue. FAA Runway Safety Area program initiated by US congress for completion by 2015 is considered as the adequate means to recover	The FAA is familiar with the concerns Airbus expresses here. These concerns were indeed discussed at length during the A350 issue paper process. As Airbus revealed in one of its comments below, the issue paper was not withdrawn and the FAA retained compliance finding. As paragraph 2.a.(4) indicates, the intent was not to require applicants to analyze all aerodrome designs to adequately classify airplane system failures that could cause runway excursions. But certain environmental/operational conditions (e.g., cross wind, tire/surface friction, etc…) have been traditionally considered in the design of the airplane systems. They should also be considered in the safety analysis of system failures that could cause runway excursions. We moved the content to the "Relevant Past Practice" section to clarify that it is not a requirement.

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	Commenter: Airbus		
		Runway Safety Area standards. Similarly the non-adherence to Standards Operating Procedures (SOP) cannot be taken into account in assessing the classification of the runway excursion as part of 14 CFR Part 25. We also believe that complying with the already existing requirements would address the FAA main points of concern for structural design and that the policy is not needed for structural aspects. Airbus is definitely concerned that the policy does not offer or doesn't take any credit from alternate MoCs based on dedicated fleet in-service experience surveys conducted by the applicant to support their hazard classification criteria and complement their hazard classification assessment by comprehensive Performance & Handling Qualities evaluations confirmed by flight test crews. Moreover, further detailed guidance material on environmental and off-runway conditions would need to be developed and agreed by the manufacturers and the other Airworthiness Authorities within the frame of a rulemaking activity. This approach would ensure that the guidance material is practical and that all the manufacturers are treated equally.	Regarding structural aspects, Airbus provided more specific comments below and they are addressed accordingly. Regarding in-service experience surveys which resulted in a set of speed criteria, and how those criteria are used in conjunction with performance/handling quality evaluations, Airbus has not provided such information. Hence no "credits" can be addressed in this policy. As stated earlier, we do not require applicants to analyze airport designs to classify airplane system failure conditions. We see no need for rulemaking activity. No change.

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
		Finally, Airbus opinion is that this policy is not mature enough to be applied as is to TC, amended TC, supplemental TC, or amended supplemental TC because showing direct compliance is impracticable. This will trigger long discussions between the FAA and the applicant with useless certification burden.	
2		Relevant Past Practice and paragraph 2 a(2), 2 a(4), and 2 c(1)(a) Airbus recommends deleting these paragraphs. Airbus considers that this policy requires the applicant to assess the effects of non-compliances to 14 CFR Part 139 or ICAO standards as representing intensifying factors and that this policy refers to means of compliance not applicable to 14 CFR Part 25. The examples below are illustrating Airbus concerns: - Consider that a Runway Safety Area will not be present or not be able to sustain the weight of a commercial aircraft or will not be obstacle free - That an airplane can be brought to rest within the Runway Safety Area assuming appropriate braking coefficient for the off-	Partially agree. Airbus' comments appear to repeat the reasons why the FAA drafted this policy, and related issue papers that preceded this policy to convey the point that the excursion speeds alone are not sufficient rationale/criteria for classifying a runway excursion. The intent of these paragraphs is in the "Relevant Past Practice" section to fully address the broad scope of potential risks when an excursion occurs, leading to our conclusion in the revised policy that the objective should be to minimize failures that would cause excursions. No change.

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	Commenter: Airbus		
		runway tire to ground surface or that the airplane will be protected from impacting significant obstacles in some acceptable manner - Effect of weather on off-runway conditions affecting stopping distance, structural loads on landing gear (e.g., stopping in mud) - Sufficient ground clearance when a maximum gross weight airplane sinks into the soil (wet, sandy, etc.) surrounding the runway FAA Runway Safety Area program initiated by US congress for completion by 2015 is considered as the adequate means to recover Runway Safety Area standards. Similarly the non-adherence to Standards Operating Procedures cannot be taken into account in assessing the classification of the runway excursion as part of 14 CFR part 25.	
3	Relevant Past Practice *"Consequently, the criticality of a failure condition that results in a runway excursion is difficult to predict and cannot be determined based solely on airplane speed and the initial direction of the excursion, as some applicants have proposed. For applicants that used speed as the primary parameter in their hazard classification, the*	Airbus is concerned about FAA the statement. Airbus is not determining the criticality of a failure condition that results in a runway excursion solely on airplane speed and initial direction of the excursion. Airplane speed is a criterion that provides the minimum safety classification. Based on case by case analysis, final safety effect classification of	We acknowledge Airbus' concern. We note that many applicants had proposed speed as the primary, if not the sole criteria, to determine failure conditions leading to runway excursions. Further, it was apparent to the FAA that applicants based their proposals on the same study mentioned in Airbus comment #8 below; they came up with different speed criteria than those in the

No.	Comment	Requested Change	Disposition
	Commenter: Airbus		
	FAA used issue papers to convey its concerns and to share the guidance it developed to help them substantiate their use of speed for hazard classification."	the assessed failure case may be upgraded to a higher level.	study, and without substantiation. We believe that without issue papers to state the FAA's position that speed alone (without even relating it to the airplane configuration and other design characteristics) is not sufficient to determine such failure condition criticality (especially the low criticalities), we would not have received the response that Airbus provided presently. We did not change the policy in regard to this comment.
4	Paragraph 2 a(3) "*Anticipated combination of independent adverse operating and environmental conditions approved for the airplane; for example, weight, center of gravity, flap setting, cross wind, tail wind; and [...]*"	Airbus proposes to modify the sentence as shown below: "Anticipated combination of independent adverse operating and environmental conditions approved for the airplane; for example, weight, center of gravity, flap setting, cross wind, tail wind. *(Maximum wind magnitude used for the evaluation may depend on failure probability)* and" Airbus agrees to consider all relevant anticipated combination of independent adverse operating conditions and considers the relevant and most dimensioning conditions to evaluate the failure cases (weight, cg, flap setting, flight phase). Airbus would recommend that guidance be further developed and applied to all	Disagree. The requested change, if implemented, would incorrectly imply wind magnitude is somehow *dependent* on system failure *probability*. They are two independent factors that when combined could result in a different outcome than the failure alone. The maximum wind magnitudes to be considered are shown in the Appendix to AC 25.1309, and draft AC25.1309-Arsenal (which the FAA has allowed to be used via equivalent level of safety process in recent type certification programs.) On the other hand, if Airbus' intent is to suggest an approach to prescribe allowable criticalities using the handling quality techniques, that would be out of the scope of this policy statement.

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	Commenter: Airbus		
		applicants for environmental conditions. In particular, maximum wind magnitude used for the evaluation may depend on failure probability.	No change.
5	Paragraph 2.a(4) "*General configurations, features, and characteristics of the airports into which the airplane model is designed to operate, for example, runway dimensions and surface conditions, presence or absence of runway safety areas capable of supporting the airplane model; off-runway wet surface load bearing capability; and types and locations of critical terrain features and obstacles. It is not our intent that the applicant surveys all the airports into which the airplane model will operate. Rather, the intent is to consider these external factors that could intensify or alleviate the risk of an excursion.*"	Airbus requests deleting this paragraph. (Refer to Airbus comment #2). Guidance for off-runway conditions assumed when performing aircraft safety assessments should be developed and agreement should be reached in the frame of rulemaking activities. Referring to FAA conclusion to A350 IP, Airbus recalls that it is impractical to reach such an agreement in the frame of a project issue paper. Extract from the A350 Issue Paper S-1: *"The FAA recognizes the need for more explicit guidance regarding the off runway conditions which should be assumed when performing transport category aircraft safety assessments. Furthermore, we accept that developing and reaching agreement on those conditions is impractical within the scope of this A350 issue paper. Consequently, having reviewed the proposed methodology for runway excursion hazard classification as summarized by Airbus in their 12 April 2010 position, and in the absence of any clear agreement regarding*	Partially agree. As indicated in the paragraph, the intent is not to require analysis of airports. Instead of deleting the paragraph, we moved the content to the "Relevant Past Practice" section to ensure correct understanding of the intent. This is also consistent with comments received from other FAA offices.

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	Commenter: Airbus		
		the off runway conditions to be assumed, the FAA is closing this issue paper subject to the retained compliance determination discussed below." Airbus is concerned that, as such, it is impractical to apply this policy to any type certificate, amended type certificate, supplemental type certificate, and amended supplemental type certification programs before the issuance of further guidance.	
6	Paragraphs 2.b.(1) & 2.c.(1)(a) *"2.b. The FAA is mainly concerned with two top-level failure conditions:* *(1) uncontrolled fire or explosion following a runway excursion, due to engine or fuel tank damage"* *"2.c.(1)(a) There is sufficient ground clearance to avoid substantial flammable fluid leakage due to impacting components of the engine fuel system, or any other significant flammable fluid carrying components when a maximum gross weight airplane sink into the soil surrounding the runway"*	Airbus recommends deleting these paragraphs. Airbus considers it is impossible to determine what would be a sufficient ground clearance to avoid flammable fluid leaks and to relate it to a speed. In addition, the accident/incident experience shows that fires that have occurred after runway excursions do not necessarily have a catastrophic outcome. The aircraft are indeed designed such as to provide sufficient time for aircraft evacuation even in case of post crash external fire. Airbus therefore considers that it is overly conservative to imply that a fire occurring after a runway excursion would result in a catastrophic outcome. The FAA recently published Special Conditions applicable to aircraft built with composite wings, which require	Partially agree. Paragraph 2.b(1) correctly summarizes the FAA's concern, and it remains a legitimate concern. However, as noted previously, we moved this content to the "Relevant Past Practice" section. Regarding the concern on ground clearance, we partially agree. The objective is to ensure the airplane is sufficiently protected against flammable fluid leakage. Airbus' characterization of the Special Conditions does not change the issue addressed in this policy. The Special Conditions provides an acceptable level of safety with which to compare composites. Its intent is to capture the inherent "average" capability that conventional airplanes have; however, it does not mean that any airplane under any scenario would have that same

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		that these wings can endure an external fuel-fed pool fire for at least 5 minutes. The rationale developed in these Special Conditions imply that airplane with wings made of aluminium meet this requirement and have shown an acceptable level of safety based on in-service experience and FAA testing. Airbus therefore recommends the FAA take into consideration the above and do not prescribe additional requirements to prevent flammable leakages for which compliance demonstration will be impossible.	capability. As indicated in the draft policy, we do not imply that any fire occurring after a runway excursion is always catastrophic. Aluminum airplanes have suffered catastrophic runway excursions. We disagree with the comment that this policy prescribes additional requirements. Under current rules, we expect that applicants design systems to minimize or eliminate runway excursions, because loss of control on the ground is a potentially dangerous event whose outcome is unpredictable. The diversity of, as well as the lack of any accepted standard model for, the off-runway threats has led to the conservative simplifying assumption that any runway departure (at least above taxi speeds) could prevent continued safe operation and hence is classified as "catastrophic." If the applicant does that, then it does not need to demonstrate any additional crashworthiness. However, if the applicant claims a runway departure scenario is not catastrophic, then it will have to credibly characterize and demonstrate that claim, and the speed-only proposal provided to date simply cannot be credibly validated as generally applicable criteria without at least fully vetting the adequacy and source(s) of the data upon which it is based, and the rationale for why it

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	Commenter: Airbus		
			is directly applicability to the airplane under study. To summarize: those paragraphs capture our concerns for potential catastrophic effect of a runway excursion, and we expect applicants to address them in demonstrating compliance with the subject rules. If an applicant cannot provide and validate a deterministic assessment of the outcome of a failure condition due to the diversity and complexity of the off runway threats, then the applicant will need to make conservative simplifying assumptions until they can. If that means any runway departure above taxi speeds must be assumed to be catastrophic, then that is a classification method historically accepted by the FAA.
7	Paragraph 2.b, "*The FAA is mainly concerned with two top-level failure conditions:* *(1) Uncontrolled fire or explosion following a runway excursion, due to engine or fuel tank damage, and* *(2) Impacts or sudden decelerations that cause fatalities."*	Airbus recommends deleting this paragraph. Airbus believes that FAA concerns are already addressed through 14CFR Part 25/ CS 25 requirements: 1) The necessary structural design precautions limiting the threat of uncontrolled fire or explosion due to engine or fuel tank damage are already imposed through the following FAR Part 25 requirements: • § 25.721(a) – Landing Gear general, covering main landing gear overload	Partially agree. For the structural aspects, the FAA regulations mentioned in the comment cover relatively benign low descent rate forced landing events on a paved surface. Compliance with those rules does not constitute an acceptable means of demonstrating compliance to the "fail-safe" rules addressed in the policy. Specifically regarding FAR/CS 25.721 and § 25.963: The FAA and EASA rules are different, but not significantly, and we are in the process

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	Commenter: Airbus		
		scenarios • § 25.963 (d) – Fuel tank Moreover, engine overload scenarios are covered by the CS 25.721(c) and CS 25.963(d)(5) embodied in CS25 since Amdt 3: *"CS25.721(c) For configurations where the engine nacelle is likely to come into contact with the ground, the engine pylon or engine mounting must be designed so that when it fails due to overloads (assuming the overloads to act predominantly in the upward direction and separately predominantly in the aft direction), the failure mode is not likely to cause the spillage of enough fuel to constitute a fire hazard."* *"CS25.963(d)(5) Fuel tank installations must be such that the tanks will not rupture as a result of an engine pylon or engine mount or landing gear, tearing away as specified in CS 25.721(a) and (c)."* As already mentioned in comment n°6, post crash fire survivability requirements for aircraft build with composite wings have been addressed by FAA special conditions. Airbus believes that complying with the above mentioned requirements would	of harmonizing to the CS. These rules are intended to keep post-crash fires from happening. But they do not guarantee fires will not happen. Case in point: Toronto A340-500 accident. The airplane met CS 25.721, but still the tanks were ripped open when the gear collapsed. Nevertheless, due to re-structuring of the policy statement based on recent reviews of system designs, the subject paragraph has been deleted.

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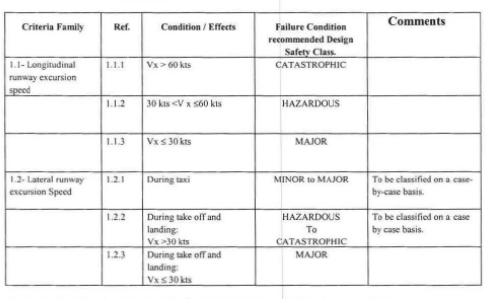
	Commenter: Airbus		
		address FAA main points of concern with structural design and that additional policy statement is not required for structural aspects. Airbus would recommend that FAA consider harmonization with EASA for the engine overload scenarios rather that issuing an additional requirement through this policy. 2) Similarly, the following paragraphs already provide the necessary requirements limiting the risk of fatalities due to impacts or sudden decelerations: • § 25.561 – emergency landing conditions • § 25.562 – emergency landing dynamic conditions Airbus believes that, by complying with these requirements for emergency landing condition, the risk linked to runway excursions will inherently be covered from a structural design point of view.	

<table>
<tr><th>No.</th><th>Comment</th><th>Requested Change</th><th>Disposition</th></tr>
<tr><td></td><td colspan="3">Commenter: Airbus</td></tr>
<tr><td>8</td><td></td><td>Paragraph 2.c, “On recent certification projects, the FAA observed that applicants typically used speed as the primary parameter in their hazard classification, but frequently did so without adequate substantiation. The FAA developed the following guidance to help applicants substantiate their use of speed for hazard classification.”

Airbus methodology is based on the JAA Flight Working Papers (FWP) 699, 700, and 749 that were generated in the year 2000, presented in Flight Study Group (in presence of FAA observers) and were substantiated for the Airbus in-service fleet experience data.

Extract from the JAA FWP 749:

 
<table>
<tr><th>Criteria Family</th><th>Ref.</th><th>Condition / Effects</th><th>Failure Condition recommended Design Safety Class.</th><th>Comments</th></tr>
<tr><td>1.1- Longitudinal runway excursion speed</td><td>1.1.1</td><td>Vx > 60 kts</td><td>CATASTROPHIC</td><td></td></tr>
<tr><td></td><td>1.1.2</td><td>30 kts <V x ≤60 kts</td><td>HAZARDOUS</td><td></td></tr>
<tr><td></td><td>1.1.3</td><td>Vx ≤ 30 kts</td><td>MAJOR</td><td></td></tr>
<tr><td>1.2- Lateral runway excursion Speed</td><td>1.2.1</td><td>During taxi</td><td>MINOR to MAJOR</td><td>To be classified on a case-by-case basis.</td></tr>
<tr><td></td><td>1.2.2</td><td>During take off and landing:
Vx >30 kts</td><td>HAZARDOUS
To
CATASTROPHIC</td><td>To be classified on a case by case basis.</td></tr>
<tr><td></td><td>1.2.3</td><td>During take off and landing:
Vx ≤ 30 kts</td><td>MAJOR</td><td></td></tr>
</table>

For ground control, the speed criterion is used as a minimum for classification. It is defined from in-service airbus fleet data (see above). The final hazard classification may</td><td>We acknowledge Airbus’ concern, as it reiterates the discussion we had in the issue paper in which we retained compliance determination. As Airbus has not presented the outcome of the methodology that Airbus is using to show compliance to the issue paper, we have no information to consider in this policy. We note that the same JAA FWPs have also been used by other applicants as the basis to classify failures leading to runway excursion. However, we found they produced various speed criteria with no specific pattern or rationale. Hence, we do not consider that the flight working papers provide a concise methodology that produces consistent results that can be substantiated or be applicable to any specific airplane.

We did not change the policy in response to this comment.</td></tr>
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	Commenter: Airbus		
		be more severe based on a global evaluation made by a flight test crew. For instance, in case of lateral runway excursion, particular attention shall be paid to the shape of the a/c trajectory on ground (straight line trajectory, curved trajectory coming back on the runway...). During Handling Qualities failure cases assessment, a lateral runway excursion is an undesirable event classified at least as Major. Thus a lateral excursion at low speed can be classified as Hazardous if lateral control on ground is considered as particularly difficult. Also a lateral excursion at high speed is considered as hazardous if the event is transitorily showing a limited lateral deviation. The runway excursion hazard classification performed on Airbus aircraft is based on a combination of performance and Handling Quality evaluations confirmed by a global evaluation by a flight test crew. Airbus is concerned that the current proposed policy does not mention this type of methodology which is based on fleet in-service experience as an alternate Means of Compliance.	

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	Commenter: Airbus		
9	Effect of the Policy This policy is not mature enough to be applied as is to TC, amended TC, supplemental TC, or amended supplemental TC. This will trigger lots of long discussions between the FAA and the applicant with useless certification burden as the policy is impractical.		We anticipate that public comments will lead us to a mature policy. However, we note that the current draft policy is essentially identical to the issue papers for Airbus and other manufacturers. These issue papers did not always trigger long discussions with applicants. On the contrary, some applicants have been able to implement practical design solutions that resolved our concerns. No change.

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	Commenter: The Boeing Company		
Intro		Boeing Commercial Airplanes appreciates the opportunity to review and provide comments on the subject proposed FAA policy statement. We have a number of concerns about its content, however, and do not consider it mature enough at this point for application to any certification program. As it is currently written, we find it difficult to visualize how it could serve as a means to reduce the certification burden or clarify what criteria are acceptable for a given program. Foremost, the policy implies that there is a problem with the method of compliance employed in the past and it attempts to raise the bar as to how the referenced regulations are applied. We see this as constituting an increase in regulation without due public process. The Summary section of the policy states: *"Lessons learned on this subject from issue papers used for several recent certification projects were incorporated into this policy statement. Therefore, if applicants follow the guidance in this policy statement, issue papers regarding runway excursion may not be necessary for most certification projects."* However, there have been no such issue	We disagree that the policy raises the bar; on the contrary, it is relieving because up to now we have considered any runway excursion to be catastrophic. As "control airplane on the ground" is a function supported by multiple systems, we note that even at "low speed" ranges (a term used in Boeing's safety analyses) although failures in an individual system may be classified as non-catastrophic in consideration of potential runway excursions (giving the impression that FAA previously accepted lower hazard classifications), at the airplane level the safety analyses typically show other systems are available to the flight crew to prevent an excursion. As the policy does not generate new requirements, rulemaking is not necessary. The draft policy stated, "*For applicants that used speed as the primary parameter in their hazard classification, the FAA used issue papers to convey its concerns and to share the guidance it developed to help them substantiate their use of speed for hazard classification*." The reason we did not apply issue papers to Boeing airplanes is because Boeing did not propose to classify certain systems failure conditions lower than catastrophic without showing that, at the airplane level, such failures are minimized

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	Commenter: The Boeing Company		
		papers related to runway excursions for brakes or nose wheel steering previously applied to Boeing airplanes—nor have there been any airworthiness directives or special conditions issued to improve brake or steering designs or basic requirements. It appears then that this new policy would expand the use of the requirements into new areas without appropriate prior assessment of safety benefit and costs. For these reasons, we request that the FAA reassess its plan to issue the proposed policy statement in its current form. If new requirements are determined to be necessary, they should be promulgated through the normal rulemaking process after appropriate analyses of cost and safety benefits are undertaken.	and other systems are available to counteract the effects of such failures, and that such failures are minimized at the individual system level. No change.

No.	Comment	Requested Change	Disposition
	Commenter: The Boeing Company		
1	The term "anticipated" is used multiple times throughout the proposed policy without clear definition. As such, it is left open to interpretation as to whether an operational or environmental condition is "anticipated" if it has a certain likelihood, and whether a "worst anticipated outcome" would include only combinations of operational and environmental conditions more likely than a given probability.	We recommend providing a definition of "anticipated" in probabilistic terms that can be evaluated. For example: *"Anticipated combinations of operational and environmental conditions are those that have a probability > 1E-5."* Example—a worst anticipated outcome must consider combinations of operational and environmental conditions more likely than 1E-5. Further, we request clarification of the meaning of "anticipated" when used with "worst case outcome." Boeing has experienced inconsistent guidance from the FAA on this term in the past and, therefore, we are rightfully wary of perpetuating terminology that is open to varying interpretation. "Anticipated," as used in AC 25.1309, seems to be roughly synonymous with "expected;'" is this definition intended here, or is something else? Clarification will ensure greater understanding, more consistency in application, and better compliance.	The term "anticipated" is used in the current AC 25.1309-1A, in EASA's AMC 25.1309, and in the ARAC recommended draft AC 25.1309-Arsenal. For example, AC 25.1309-Arsenal states: "*Extremely remote failure conditions are those not anticipated to occur to each airplane during its total life, but which may occur a few times when considering the total operational life of all airplanes of the same type.*" The term "anticipated" in the policy is intended to be consistent with the above. We have applied the term "anticipated" in the sense that something is not so rare to the point that it occurs less often than "extremely remote." We agree to clarify the meaning of "anticipated," as follows: An anticipated condition is a condition that is not extremely remote." The numerical probabilistic values will then follow the existing guidance in AC 25.1309. We removed the use of "anticipated" in conjunction with "worst-case outcome" to be consistent with the requirement that a catastrophic failure condition must not be anticipated to occur in the life of all airplanes of one type.

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2	Page 3, Policy, paragraph 2.a. The proposed text states: *"a. In addition to excursion speed, the evaluation for each system failure condition potentially involving a runway excursion should take into consideration: …"*	While conceptually sound at an airplane or system fault hazard analysis (FHA) level, the evaluation of each failure condition to support multi-function fault tree analyses (FTA) (i.e., FTAs performed to verify that resource systems are not used in a way that improperly violates the intended independence of systems) would not be possible. These large FTAs can have thousands of failure combinations, with slightly different considerations with regard to the items described in paragraph 2.a.(1) - (4) of the proposed policy. We request that guidance be provided for how to handle these cases. Boeing's most recent new development program included performing some cross-system FTAs to address the potential for interactions across all of the stopping/steering related functions (i.e., thrust reverser, forward thrust, spoilers, high lift, brakes, nose wheel steering, etc.). This effort was undertaken in part to address FAA's concerns about increased integration and complexity. This analysis used a departure speed to correlate the many combinations of failures with the hazard classification. These combinations of failures do not show up in systems' FHAs because they are outside any one system's	The intent of paragraph 2.a is to capture the fact that excursion speeds alone is not enough to justify hazard classification. The comment is concerned with the amount of effort, rather than the concept of the proposed policy. As a practical matter, applicants' fault tree analyses typically focus on the worst cases that together sufficiently define the risks and associated design/operational requirements. Paragraph 2.a does not go beyond this practice. Nevertheless, after reviewing all comments received, we believe we simplified the policy to address the need for a more "black-and-white" set of criteria. We have revised it, taking into account applicants' responses to issue papers in recent certification projects.

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		scope. If each combination of these failures (e.g., a combination of loss of 3 spoiler pairs, 1 brake, 1 thrust reverser) had to be reviewed, and the departure speed adjusted and justified for each failure combination to the level described in this proposed policy statement, it will likely result in these valuable analyses not being performed in the future. The latest direction of Industry guidance (ARP 4754 and ARP 4761) encourages more of these types of airplane level assessments.	
3		Page: 3 Section: Policy Paragraph 2.a.(4) We recommend revising the proposed text: *"a. In addition to excursion speed, the evaluation for each system failure condition potentially involving a runway excursion should take into consideration:* … *(4) General configurations, features, and characteristics of the airports into which the airplane model is designed to operate, for example, runway dimensions and surface conditions, presence or absence of runway safety areas capable of supporting the airplane model; off-runway wet surface load bearing capability;* ***and designed in accordance with AC 150/5300-13*** ~~*and types and locations of critical terrain features and*~~	We partially agree with the comment in that there is no practical way to analyze all potential threats in and around all airports. However, the suggested change (to reference a "standard runway") could be misinterpreted as limiting operation only to airports that have runway safety areas. To clarify, we moved the content in paragraph 2.a.4 to the "Relevant Past Practice" section, and revised the "Policy" section to include more specific criteria.

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		~~*obstacles.*~~ *It is not our intent that the applicant surveys all the airports into which the airplane model will operate. Rather, the intent is to consider these external factors that could intensify or alleviate the risk of an excursion."* As proposed, paragraph 2.a.(4) appears to contradict itself. It first says to consider location of critical terrain features and obstacles, and then states that a survey of airports into which the airplane model will operate is not required with regard to paragraph d. (1) (that is, *"establish worst anticipated outcome"*). It would be more appropriate to use a standard runway configuration to establish what terrain features and obstacles can be expected.	
4	Page: 2 Section: Relevant Past Practice The proposed text states: *"The hazard classification for a failure condition should reflect the anticipated worst-case outcome given the causal failure that occurs under any of the approved operating and environmental conditions. …"*	We request that further guidance be included on what can be used to justify a reduction in the hazard classification. As there have been a few of many low-speed departures that have resulted in multiple fatalities, the approach to justify a lower hazard level appears to be impractical if *"worst-case outcome"* must include all possible outcomes.	As the comment stated, low-speed excursions can and have resulted in multiple fatalities. That was the reason the policy statement stated that if applicants classify an excursion (any speed) as catastrophic, the FAA would accept without requiring further substantiation. Recognizing in-service experience that most low-speed excursions do not result in fatalities, the FAA is willing to reconsider our past position that any excursion was catastrophic, but our position continues to be that any system failure that causes excursion is a highly undesirable and

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			potentially dangerous event. Therefore systems should be designed to eliminate or minimize such failures. We have revised the policy to add more succinct guidance, part of which is on hazardous versus catastrophic classifications.
5	Page 4, Section: Policy, paragraph 2.c.(2) The proposed text states that compliance can be shown by: *"(2) Demonstrating that no single failure or combination of failures not shown to be extremely improbable will result in an off-runway excursion speed above the maximum speed established in 2.c.(1), above …"*	We suggest revising this text as follows to allow the probability of conditions to be included in showing compliance in accordance with next sentence of 2.c.(2): *"(2) Demonstrating that no single failure or combination of failures* ***and operational and environmental conditions*** *not shown to be extremely improbable will result in an off-runway excursion speed above the maximum speed established in 2.c.(1), above …"* Our suggested revision ensures consistency with the second and third sentence of paragraph 2.c.(2), which allow probability of the conditions leading to the catastrophic failure to be considered for combinations of failures.	While we agree with the intent, we have revised the criteria such that the subject paragraph is no longer needed.

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6	Page 4, Section: Policy, paragraph 2.c.(2) *"(2) Demonstrating that no single failure or combination of failures not shown to be extremely improbable will result in an off-runway excursion speed above the maximum speed established in paragraph 2c(1) above. When the failure condition consists of multiple independent failures the probability of the conditions leading to the catastrophic failure may be considered as well as the probability of the failure condition itself. Examples of these conditions are environmental, those that limit runway performance, and general airport configuration, features, and characteristics."*	In addition to our suggested revision of this paragraph described in our comment above, we recommend adding a statement to acknowledge § 25.1309 applicability, which excepts failures covered by § 25.735(b)(1). The draft policy is inconsistent with the applicability section of the Arsenal (June 2002 Draft) version of § 25.1309 and Section 4.c. of the AC 25.1309 Arsenal, which except single failures covered under § 25.735(b)(1) that can lead to runway excursion, from the § 25.1309 analysis.	Agreed. To ensure consistency with applying § 25.735(b)(1) relative to § 25.1309(b), we added Note 1 to the policy statement to clarify that specific single failures in the brake systems are not required to meet § 25.1309(b) to reflect the existing regulations as well as the SDAHWG's recommendation and CS 25.1309.
7	Page 4, Section: Policy, paragraph 2.e. *"e. These results can be used to show compliance with § 25.901(c). Any failure condition classified as 'Major' or less may be assumed to not 'jeopardize the safe operation of the airplane'."*	We recommend deleting paragraph 2.e. altogether, or at least deleting the second sentence. Paragraph 2.d. of the proposed policy is sufficient and propulsion requirements shouldn't be treated differently from other systems.	Partially agree. The sentence in paragraph 2.e is consistent with current § 25.901(c) and correctly describes today's policy. However, we have revised the policy statement and deleted the content in paragraph 2.e. We do agree that propulsion should not be treated differently from other systems. That is the subject in the ARAC ASAWG tasking that concluded in May 2010. However, that subject is beyond the scope of this policy statement.