

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EVE AIR MOBILITY	Inclusão	<p>EVE.2000 - Applicability and definitions.</p> <p>To add specific definitions for key terms used in the proposed airworthiness criteria for the EVE-100 eVTOL, such as "Local Events".</p> <p>To include of the terms "essential performance" and "increased performance" into the EVE.2000, as well as the definition of these terms.</p> <p>To clarify on how the authority establishes "Flight path clear of obstacles."</p> <p>To clarify if EVE.2000(b)(1), in fact, does not allow a rejected takeoff. If this is confirmed, we suggest to exclude the reject takeoff scenario from CSFL definition.</p> <p>To align CSFL definition with other RBAC/14 CFR parts, admitting certain damage allowance to the aircraft.</p>	<p>EVE recommends including comprehensive definitions for terms used in the proposed airworthiness criteria for the EVE-100 eVTOL to enhance transparency and ensure a standardized understanding within the aviation community.</p> <p>Concern arises from the omission of "essential performance" in the criteria, leaving only requirements akin to "increased performance". as This lack of "essential performance" elevates the minimum certitude for EVE-100 beyond what is necessary for establishing airworthiness. While "increased performance" exceeds the airworthiness threshold, "essential performance" represents the essential minimum for an airworthy design.</p> <p>Industry seeks clarity on how the authority establishes "Flight path clear of obstacles." Clarification for these terms is critical for a clear understanding and consistent interpretation of the regulatory requirements.</p> <p>Eve expresses reservations about EVE.2000(b)(1) not allowing for rejected takeoff and point out discrepancies in the removal of allowances for certain aircraft damage, contrasting with other RBAC / FAA 14 CFR parts.</p> <p>The capability of climbing to a safe altitude, required on EVE.2000(b)(1), should only be applicable after the Takeoff Decision Point, since the aircraft is not supposed to continue the takeoff prior to this point (on an RTO scenario).</p> <p>EVE-100 Airworthiness Criteria seems to not admit any damage allowance under CSFL definition, which establishes a safety level that is higher than other airworthiness regulations (e.g., RBAC 23), that admit damage allowance. This approach is not consistent with the requirement of RBAC 21.17(b), which determines the application of airworthiness requirements appropriate for the aircraft and applicable to the specific type design and providing an equivalent level of safety with other RBAC.</p>	EVE.2000	<p>Partially accepted. ANAC included the definition of "Local events" and the definition of the "increased" and "essential" performance categories. Regarding the term "Flight Path Clear of Obstacles" it will be defined in the MOC. The Rejected Takeoff requirement will be maintained, and the RTO is part of the CSFL as required by 2105(f). Although the definition of CSFL in EVE.2000(b)(1) encompasses the concept after the decision point, it is understood that there will be no issues with interpretation by maintaining the harmonization of the CSFL definition for Increased Performance.</p> <p>ANAC does not agree with the inclusion of damage in the CSFL part. In RBAC 23, there is a provision to address the case of single-engine aircraft, which, in the event of an engine failure, must make an emergency landing wherever possible. The EVTOL aircraft is based on distributed propulsion, and therefore, it is not equivalent to a single-engine airplane or helicopter and must have the capability to maintain lift in cases of likely propulsion system failures. In the event of a failure where it cannot maintain lift, the CEL definition has been created to cover these scenarios, and EVE should use this provision instead of requesting a new definition of CSFL.</p>
GAMA	Inclusão	<p>GAMA recommends including comprehensive definitions for these terms in the regulatory framework to enhance transparency and ensure a standardized understanding within the aviation community.</p>	<p>GAMA seeks clarity and requests specific definitions for key terms used, as well as key terms to be added to the proposed airworthiness criteria for the EVE-100 eVTOL:</p> <ul style="list-style-type: none"> <li>• These terms include "Local Events", "Essential Performance", and "Increased Performance."</li> <li>• GAMA notes that the EVE-100 criteria lack the inclusion of the terms "essential performance" and "increased performance". We recommend incorporating these terms and their corresponding definitions into the EVE.2000 rule for clarity and completeness. <ul style="list-style-type: none"> <li>o Concern arises from the aforementioned omission of "essential performance" in the criteria, leaving only requirements akin to "increased performance". This omission of "essential performance" elevates the minimum certitude for EVE-100 beyond what is necessary for establishing airworthiness. While "increased performance" exceeds the airworthiness threshold, "essential performance" represents the essential minimum for an airworthy design.</li> </ul> </li> <li>• Industry seeks clarity on how the authority establishes "Flight path clear of obstacles." Clarification for these terms is critical for a clear understanding and consistent interpretation of the regulatory requirements.</li> <li>• GAMA members express reservations about EVE.2000(b)(1) not allowing for rejected takeoff and point out discrepancies in the removal of allowances for certain aircraft damage, contrasting with other FAA 14 CFR parts.</li> </ul>	EVE.2000	<p>Partially accepted. ANAC included the definition of "Local events" and the definition of the "increased" and "essential" performance categories. Regarding the term "Flight Path Clear of Obstacles" it will be defined in the MOC. The Rejected Takeoff requirement will be maintained, and the RTO is part of the CSFL as required by 2105(f). Although the definition of CSFL in EVE.2000(b)(1) encompasses the concept after the decision point, it is understood that there will be no issues with interpretation by maintaining the harmonization of the CSFL definition for Increased Performance.</p> <p>ANAC does not agree with the inclusion of damage in the CSFL part. In RBAC 23, there is a provision to address the case of single-engine aircraft, which, in the event of an engine failure, must make an emergency landing wherever possible. The EVTOL aircraft is based on distributed propulsion, and therefore, it is not equivalent to a single-engine airplane or helicopter and must have the capability to maintain lift in cases of likely propulsion system failures. In the event of a failure where it cannot maintain lift, the CEL definition has been created to cover these scenarios, and EVE should use this provision instead of requesting a new definition of CSFL.</p>

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GAMA	Inclusão	GAMA strongly recommends ANAC include distinct essential and increased performance certification criteria in the proposed airworthiness criteria for the EVE-100 eVTOL. The absence of distinct essential and increased performance criteria complicates international aircraft validation processes. GAMA advocates for the consideration of language aligned with the approach taken by the FAA in the recently published special class airworthiness criteria for the Joby JAS4-1 (FAA docket FAA-2021-0638-0055), particularly concerning essential performance and increased performance criteria. This alignment would ensure consistency and facilitate smoother international regulatory processes.	GAMA expresses caution and concern regarding certain aspects. First, we recommend that ANAC include a clear definition of "Local events" in EVE 2000 under "Applicability and definitions," as this term is utilized in Subpart H (e.g., EVE 33100(g)(4)) without an accompanying definition. Additionally, we advocate for the inclusion of definitions for "Continued Safe Flight and Landing" for both Essential Performance and Increased Performance. Notably, industry's concern stems from the observation that the current definition of Continued Safe Flight and Landing omits scenarios such as rejected takeoffs, which we believe should be explicitly addressed given the inferred requirements derived from the definition itself ("...climbing to safe altitude...maintaining level flight..."). This feedback is aimed at enhancing clarity in the EVE-100 proposal, with specific consideration of the framework recently introduced by the FAA in its publication of the special class airworthiness criteria for the Joby Aero Inc. Model JAS4-1 powered-lift. GAMA expresses caution about the fact that ANAC did not adopt the RBAC (14 CFR Part) 23 amendment 64 and RBAC (14 CFR Part) 33 amendment 34 numbering system for those requirements that have the same Part 23/Part 33 safety intent. There are certain requirements where the differences are only related to the reference to airplane instead of aircraft. GAMA requests ANAC to confirm that the newly adopted numbering system maintains the same safety intent as those original Part 23/Part 33 requirements.	EVE.2000	Partially accepted. ANAC has included the criteria for 'essential' and 'increased' performance, aligned with the FAA's proposal.
TCCA AARDD Eng Division	alteração	Revise terminology throughout the proposed certification basis to ensure consistent terminology is used for a given concept (including but not limited to the examples listed). TCCA notes that the approach used by EASA in SC-VTOL uses consistently the term "lift / thrust" and clarifies under VTOL.2000 that "lift/thrust units (are) used to generate powered lift and control". This approach ensures a single, common, term is used through the cert basis to cover all elements contributing to vertical and forward thrust, as well as flight control. If ANAC sees a need for the EVE-100 design certification basis to use multiple terms, these should each be defined under EVE.2000, including their relationships between them, to ensure there is clarity on the intent and scope of each term.	The electric engines and propellers on Model EVE-100 are used to generate powered lift and flight control, such that the flight control function is indissociable from the thrust and lift functions. Various terminology is used across the proposed EVE-100 certification basis to address these functions and associated systems. While in some cases the different terms may be intentionally referring to different concepts, TCCA believes the lack consistency in terminology (engine, powerplant, lift/thrust, power, thrust, propulsion, flight control...) throughout the proposed certification basis is likely to cause confusion in the interpretation. Some examples: <ul style="list-style-type: none"> <li>- [EVE.2000(a)(3)] "engine driven lift device"</li> <li>- [EVE.2000(a)(5)] "Critical change of thrust" includes "failures of the flight control and propulsive system"</li> <li>- [EVE.2105(g)] "loss of power or thrust"</li> <li>- [EVE.2140] "primary flight controls"</li> <li>- [EVE.2215(c)] "lift/thrust unit"</li> <li>- [EVE.2225(c)] "engine-driven lifting-device assemblies"</li> <li>- [EVE.2270(a)(3)] "engines or auxiliary power units"</li> <li>- [EVE.2300] "flight control system", "primary flight control"</li> <li>- [EVE.2320, .2330] "flight controls"</li> <li>- [EVE.2400] "propulsion"</li> <li>- [EVE.2405] "power or thrust control system", "powerplant control system"</li> <li>- [EVE.2430, .2435] "powerplant and auxiliary power unit"</li> <li>- [EVE.2440] "powerplant system"</li> <li>- [EVE.2600] "powerplant controls"</li> <li>- [EVE.2610] "primary flight controls"</li> <li>- [EVE.2615] "lift/thrust system"</li> </ul>	EVE.2000	Partially accepted. ANAC agrees with the definition of "Flight Control System" that EASA used in MOC SC-VTOL.  EVE.2215(c) has been removed from the certification basis. The term "engine-driven lifting-device assemblies" from EVE.2225(c) was retained because this subsection of the requirement is applicable only to lifters. This approach is in line with RBAC 23.2225, which does not have a corresponding requirement for lifters, assuming that this aspect of engine design is addressed by RBAC 33. It should be noted that in this proposed rule, this aspect of RBAC was included in this certification basis, incorporating the engine requirements, with RBAC 33.27 and 33.84 for "overspeed/over torque" being applicable in this case, respectively.  For EVE.2140, there is a specific comment, and it was agreed to replace the term with "inceptor."  The wording of requirement 2105(g) is being amended based on a contribution received from EASA, as follows: "(g) Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness." With the removal of "loss of power or thrust" from the requirement text, the definition is no longer necessary.  Comment not accepted for EVE.2370. There is no need for adjustment, as ANAC, harmonized with the FAA, understands that the term "engine" encompasses the understanding that both APU and engine cover the power system that generates lift and thrust, thus maintaining the intent of the rule.
TCCA AARDD Flight Test Division	Alteração	Recommend aligning with EASA definition and add "without requiring exceptional piloting skill".	For controlled emergency landing the definition strays from definitions accepted by other authorities and does not account for workload.	EVE.2000	Accepted. TCCA recommended that ANAC align with the EASA definition and add "without requiring exceptional piloting skill" to the definition of controlled emergency landing to consider the workload. ANAC agreed to adopt TCCA's recommendations for the Airworthiness Criteria EVE-100 aircraft.
Eduardo de Freitas Tobias	Inclusão	Que haja sensores de aproximação de qualquer obstáculo, e que seja, automaticamente, corrigido a rota para evitar colisão.	No futuro, a tendência que aja muitos desses veículos aéreos, principalmente, quando ficar acessível a todos os cidadãos, naturalmente, a segurança deverá ser o item principal.	EVE.2000	A implementação de sensores de aproximação para detectar obstáculos e corrigir automaticamente a rota para evitar colisões é relevante, especialmente com o aumento previsto do uso de eVTOLs em áreas urbanas. Atualmente, os critérios de aeronavegabilidade já contemplam sistemas que garantem a segurança do voo, incluindo a capacidade de evitar colisões.  A adoção de sistemas completamente autônomos para detecção de obstáculos e correção de rota depende de avanços tecnológicos e regulatórios. No momento, a tecnologia para uma implementação segura e eficaz desses sistemas ainda está em desenvolvimento, e poderá ser considerada em futuras revisões regulatórias.

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Embraer S.A.	Inclusão	<p>EVE.2000 - Applicability and definitions.</p> <p>To add specific definitions for key terms used in the proposed airworthiness criteria for the EVE-100 eVTOL, such as "Local Events".</p> <p>To include of the terms "essential performance" and "increased performance" into the EVE.2000, as well as the definition of these terms.</p> <p>To clarify on how the authority establishes "Flight path clear of obstacles."</p> <p>To clarify if EVE.2000(b)(1), in fact, does not allow a rejected takeoff. If this is confirmed, we suggest to exclude the reject takeoff scenario from CSFL definition.</p> <p>To align CSFL definition with other RBAC/14 CFR parts, admitting certain damage allowance to the aircraft.</p>	<p>Embraer recommends including comprehensive definitions for terms used in the proposed airworthiness criteria for the EVE-100 eVTOL to enhance transparency and ensure a standardized understanding within the aviation community.</p> <p>Concern arises from the omission of "essential performance" in the criteria, leaving only requirements akin to "increased performance". This lack of "essential performance" elevates the minimum certitude for EVE-100 beyond what is necessary for establishing airworthiness. While "increased performance" exceeds the airworthiness threshold, "essential performance" represents the essential minimum for an airworthy design.</p> <p>Industry seeks clarity on how the authority establishes "Flight path clear of obstacles." Clarification for these terms is critical for a clear understanding and consistent interpretation of the regulatory requirements.</p> <p>Embraer expresses reservations about EVE.2000(b)(1) not allowing for rejected takeoff and point out discrepancies in the removal of allowances for certain aircraft damage, contrasting with other RBAC / FAA 14 CFR parts.</p> <p>The capability of climbing to a safe altitude, required on EVE.2000(b)(1), should only be applicable after the Takeoff Decision Point, since the aircraft is not supposed to continue the takeoff prior to this point (on an RTO scenario).</p> <p>EVE-100 Airworthiness Criteria seems to not admit any damage allowance under CSFL definition, which establishes a safety level that is higher than other airworthiness regulations (e.g., RBAC 23), that admit damage allowance. This approach is not consistent with the requirement of RBAC 21.17(b), which determines the application of airworthiness requirements appropriate for the aircraft and applicable to the specific type design and providing a equivalent level of safety with other RBAC.</p>	EVE.2000	<p>Partially accepted. ANAC included the definition of "Local events" and the definition of the "increased" and "essential" performance categories. Regarding the term "Flight Path Clear of Obstacles" it will be defined in the MOC. The Rejected Takeoff requirement will be maintained, and the RTO is part of the CSFL as required by 2105(f). Although the definition of CSFL in EVE.2000(b)(1) encompasses the concept after the decision point, it is understood that there will be no issues with interpretation by maintaining the harmonization of the CSFL definition for Increased Performance.</p> <p>ANAC does not agree with the inclusion of damage in the CSFL part. In RBAC 23, there is a provision to address the case of single-engine aircraft, which, in the event of an engine failure, must make an emergency landing wherever possible. The EVTOL aircraft is based on distributed propulsion, and therefore, it is not equivalent to a single-engine airplane or helicopter and must have the capability to maintain lift in cases of likely propulsion system failures. In the event of a failure where it cannot maintain lift, the CEL definition has been created to cover these scenarios, and EVE should use this provision instead of requesting a new definition of CSFL.</p>
FAA	esclarecimento	Regarding section EVE.2000, please confirm that the level of safety is similar to FAA "Increased CSFL." ANAC is setting continued safe flight and landing (CSFL) equivalent to FAA's "increased performance" definition. There appears to be no CSFL category below that provided for use. The implication is that any ANAC certified aircraft would be validated as "increased performance" aircraft only with no "essential performance" considerations.		EVE.2000	ANAC has included the categories 'essential' and 'increased' performance, aligned with the FAA's proposal.
TCCA AARDD Eng Division	alteração	<p>a) Add clarification in relevant section(s) of the cert basis that thrust / lift / flight control functions should be considered as integrated functions for compliance and, unless specifically indicated otherwise, are subject to the same compliance requirements.</p> <p>b) Requirements of the various subparts applicable to thrust / lift / flight controls and their supporting systems (e.g. electrical power) should be systematically reviewed for potential conflicts and inconsistencies amongst themselves, and with the general system / safety requirements of subpart F – which should be applicable to all integrated functions at aircraft level.</p>	<p>The electric engines and propellers on Model EVE-100 are used to generate powered lift and flight control, such that the flight control function is indissociable from the propulsion providing thrust and lift functions. As a result consistent requirements should be applied to flight control systems and propulsion systems.</p> <p>It is noted the definition of "Critical Change of Thrust" under EVE.2000(a)(5) indeed explicitly indicates it covers both flight control and propulsive systems.</p> <p>In other areas however, the proposed certification basis for EVE-100 could result in different standards applicable to flight controls versus powerplants thrust and lift functions, with resulting apparent discrepancies and conflicts, particularly where related to safety and failure cases.</p> <p>A number of such conflicts and inconsistencies are raised in other comments, against specific requirements, but the concern is broader.</p>	EVE.2000 EVE.2510 EVE.2300 EVE.2405	ANAC agrees that the integration between thrust, lift, and flight control functions should be considered throughout the certification basis. Due to the integrated nature of the flight control and propulsion systems in the EVE-100 model, we understand that the shared functions between these systems must meet both the applicable flight control and propulsion requirements, as mentioned. In case there are conflicts between these requirements, they will be analyzed and resolved. ANAC has evaluated the proposal, and this is reflected in the revision of the EVE.2500, EVE.2505, and EVE.2510 requirements.
UK CAA	inclusão	The CAA notes that ANAC has introduced under EVE.2000(b) a new definition for Continued Safe Flight & Landing (CSF&L), which requires the capability to continue on a controlled flightpath to the planned destination or an alternate landing site. The definition for Controlled Emergency Landing (CEL) implies limited control by the flight crew of the aircraft, other than directing it toward a landing site. Recognising there will be a need to transition the aircraft from wing-borne to thrust borne to achieve a touchdown, further details are needed from ANAC to understand how occupant injury and aircraft damage levels would be assessed and accepted. The CAA supports the CEL definition and guidance on compliance, contained in SC VTOL.2000 and MOC VTOL.2000.		EVE.2000(b)	ANAC agrees that additional details regarding the transition from wing-borne to thrust-borne flight, as well as the criteria for assessing and accepting levels of occupant injury and aircraft damage, are necessary to ensure a clear understanding of how these factors will be evaluated during the certification process. ANAC is currently working to further refine the Means of Compliance for these assessments.
EASA	Esclarecimento	EASA notes that the definition of Continued Safe Flight and Landing appears to be very similar to the one used by EASA.	As regards the "alternate landing" clarification is sought whether it is intended to have an operational pre- determination of these landing sites	EVE.2000(b)(1)	<p>ANAC acknowledges EASA's comment but has chosen, at this time, to maintain the current approach.</p> <p>Given the low range, especially in the event of failures, it will be addressed in the MoC that the definition of alternates must be part of the flight plan. It should also be considered an operational limitation of the aircraft that alternates exist within a defined radius. If this condition is not met, the route should not be executed.</p>

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ASD - Europe	esclarecimento	Please could you clarify the meaning of alternate landin?	Continued safe flight and landing means the aircraft is capable of climbing to a safe altitude, on a flight path clear of obstacles, and maintaining level flight to a planned destination or alternate landing, possibly using emergency procedures, without requiring exceptional pilot skill, strength, or alertness.  As the definition of Continued Safe Flight and Landing is the cornerstone of the overall safety objective, in the perspective of a mutual recognition and validation of a design between ANAC and EASA, it is important that expression "alternate landing" is understood by the aircraft community.	EVE.2000(b)(1)	Given the low range, especially in the event of failures, it will be addressed in the MoC that the definition of alternates must be part of the flight plan. It should also be considered an operational limitation of the aircraft that alternates exist within a defined radius. If this condition is not met, the route should not be executed.
TCCA AARDD Eng Division	alteração	It is recommended to update the definition of CSF&L under EVE.2000(b)(1) along the following lines: "(b)(1) Continued safe flight and landing means the aircraft is capable of climbing to a safe altitude, on a flightpath clear of obstacles, and maintaining level flight to <u>and landing at</u> , a planned destination or <u>suitable</u> alternate landing <u>site</u> , possibly using emergency procedures, without requiring exceptional pilot skill, strength, or alertness."	a) The definition of CSF&L in the proposed certification basis, compared to the corresponding definition in EASA SC-VTOL or FAA similar cert basis, replaces "... <i>controlled safe flight and landing</i> " by "... <i>climbing to a safe altitude, on a flightpath clear of obstacles, and maintaining level flight to a planned destination or alternate landing...</i> ".  While this expands on the expectations for 'continued controlled flight', as written the proposed definition appears to be missing the landing phase itself (i.e. it addresses flight to the landing site, but not landing at that site).  b) Continued safe flight and landing means the aircraft has capability for continued flight to a location intended and suitable for landing, such as a vertiport or airport. Particularly for operations in a densely populated urban area, landing at non designated / intended locations would represent unacceptable risk to the general population, and should not be considered CSF&L.  This is also consistent with interpretations agreed previously for Part 27 Cat A and Part 29 operations. For reference, here is an example of interpretation documented for a Part 27 Cat A rotorcraft via IP: " <i>Continued safe flight means that the rotorcraft retains the capability to return and land safely at the point of departure or continue and land safely at the original intended destination or a suitable alternate site.</i> " The corresponding SC-VTOL.2000(b)(3) definition specifies "continued controlled flight and landing <u>at a vertiport</u> " which reflect the above intent. The proposed definition in EVE.2000(b)(1) is less clear in referring to 'planned destination or alternate landing'.	EVE.2000(b)(1)	ANAC acknowledges TCCA's comment but has chosen, at this time, to maintain the current approach.  Given the low range, especially in the event of failures, it will be addressed in the MoC that the definition of alternates must be part of the flight plan. It should also be considered an operational limitation of the aircraft that alternates exist within a defined radius. If this condition is not met, the route should not be executed.
TCCA AARDD Eng Division	inclusão	As recommended in the comment.	The correlation between the hazard criticalities used under EVE.2510 (CAT / HAZ) and the notions of 'continued safe flight and landing' and 'controlled emergency landing' should be defined. We would expect the interpretation applicable to EVE-100 to be generally aligned with MoC VTOL.2000 for category enhanced.	EVE.2000(b)(1) EVE.2000(b)(4) EVE.2510	Regarding EVE.2510, the definition of "Catastrophic", linked to the loss of CSFL capability, will be addressed in the MoC. CEL is not within the scope of EVE.2510.
TCCA AARDD Eng Division	alteração	As recommended in the comment.	Recommend to add "taxi" to be consistent with other proposed requirements (e.g.: EVE.2155/2220/2225(b)(5)).	EVE.2000(b)(2)	ANAC understands that the term would not be necessary. It is covered by ground operations.
EASA	alteração	The definition appears to be unclear: if "predominantly" means that other thrust sources exist to a certain extent, the distinction between the three categories is blurred and might be disputed.	It is suggested to: - either remove these definitions and introduce alternative terms that e.g., introduce and address relevant "flight envelopes" for fly by wire aircraft with automated control of the configurations/thrust-lift- combinations in each flight phase and provide further clarification in related means of compliance - or to consider clarifying what is meant under "predominantly" (e.g., more than 50%) and what is meant by "combination" (e.g. when both forms of lift have a similar contribution or when both are present and none exceeds a certain percentage).	EVE.2000(b)(3)	Not accepted. ANAC believes no change is necessary at this time. However, we have considered the suggestion and would be open to modifying the term to "principally" in a future rulemaking, which aligns with the terminology adopted by the FAA. Alternatively, the adverb "predominantly" could be removed. In thrust-borne flight, where airspeed is zero, no lift is generated by the wings. Likewise, in the extreme case of wing-borne flight (with lifters stopped), no lift is generated by them. This distinction remains clear under the current definitions.
TCCA AARDD Eng Division	alteração	Recommend rewording as follows: " <i>Thrust-borne is defined as when the powered-lift is maneuvering in the vertical plane and lift is predominately from downward thrust.</i> <i>Wing-borne is defined as when the powered-lift is maneuvering in the horizontal plane and lift is predominately from fixed airfoil surfaces.</i> <i>Semi-thrust-borne is the combination of thrust-borne and wing-borne, where both forms of lift are applied.</i> "	The definition of source of lift is referenced to that supports the weight of aircraft, but weight connotes 1-g condition. Hence the definition may be narrow/restrictive.	EVE.2000(b)(3)	Not accepted. ANAC believes the current approach is sufficient and does not require modification.
EASA	Esclarecimento	The definition of Critical change of thrust appears to be close to the EASA definition of Critical Failure for Performance but limited to flight control/propulsive systems. However, it is not clear if single failures must be considered regardless of probability.	Clarification is sought whether the applicant will be requested to consider single failures regardless of probability. It is proposed to also expand the requirement to all systems affecting the ability of performing a continued safe flight and landing or to specify whether this is deemed to be covered by Subpart H EVE.3328 (f)(3) accordingly.	EVE.2000(b)(5)	Regarding the clarification requested concerning single failures, ANAC believes it is not necessary to explicitly mention single failures in EVE.2000(b)(5), but the MoC can make it clear that single failures are not accepted as extremely improbable, regardless of numerical probability. For EVE.2510, we intend to explicitly mention single failures; however, for the other requirements where reference is made to "not shown to be extremely improbable", ANAC believes that the issue of single failures can be addressed in the associated MoC.
TCCA AARDD Eng Division	alteração	Recommend clarifying per the comment in the associated MoCs. Also, the following change to the definition may help clarify: " <i>(5) Critical change of thrust means the most adverse effects on performance or handling qualities resulting from failures of the flight control or propulsive system, either singular or in combination, not shown to be extremely improbable.</i> "	The definition of "Critical Change of Thrust" covers both flight control and propulsive systems, considering the integrated nature of these systems. There would presumably be multiple different "Critical Change of Thrust" conditions to be evaluated, for example resulting from different combinations of failed electrical motors due to specific power source or control system failures. However as written, given the use of singular ('the most adverse effect'), one could understand there is a single such condition which may need to be evaluated.	EVE.2000(b)(5)	Accepted. The characteristics of propulsion/flight-controls integration and distributed propulsion can lead to significantly different scenarios, requiring evaluations beyond those ANAC typically conducts for conventional aircraft.

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EASA	alteração	ANAC seems currently not to foresee developing different safety objectives/safety levels adapted to operational safety objectives which might vary from one country to another. While possibly not relevant for domestic operations, the introduction of categories or alike, that offer a certification against different safety and performance objectives per specified categories/classes/levels, could ease the validation process by other authorities that have identified them. Such approach would mirror the current practice already established since the mid-1990s for small rotorcraft (CS- / Part 29) which can be certified in Category B and also Category A (to demonstrate airworthiness requirements stemming from CS- / Part 29), when found compliant by the domestic authority and thus allowing the validating authority to reduce its validation involvement.	It is proposed to introduce an optional path to certify to a class/category/level of higher safety objectives, accounting for relevant existing airworthiness criteria in other jurisdictions (e.g., EASA) as to enable an applicant to perform its certification accordingly and aiming at a reduced level of involvement when a validation by those foreign authorities will be sought. These categories could be also used in domestic operational rules to tailor the risk to the type of operations.	EVE.2005	ANAC has included the categories 'essential' and 'increased' performance, aligned with the FAA's proposal.
EASA	alteração	"Flight envelope", "operating envelope", "approved flight envelope",... are used in different paragraphs, resulting in potentially different interpretations.	It is suggested to perform a consistency check between the different terminologies used, and providing, where necessary, the appropriate definitions of the envelopes.	EVE.2100	Accepted. ANAC is standardizing the concept of Approved Flight Envelope for subpart B requirements and EVE.2600(a) and including the respective definition in EVE.2000.
EVE AIR MOBILITY	Alteração	EVE.2105 - Performance data Eve suggest the revision of 2105(g) to change the wording to "...by gliding or autorotation, or an equivalent means to mitigate the risk of loss of power or thrust."	The wording proposed by ANAC on EVE Airworthiness Criteria inadvertently removes the possibility of an equivalent means which mitigates the risk of loss of power or thrust. Instead, the way the requirement is currently written, it is requiring an equivalent means to gliding capability.	EVE.2105	Partially accepted. Autorotation is not an EVE design capability, however, ANAC is considering changing the wording of 2105(g) to: "Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness".
Embraer S.A.	Alteração	EVE.2105 - Performance data Embraer suggest the revision of 2105(g) to change the wording to "...by gliding or auto rotation, or an equivalent means to mitigate the risk of loss of power or thrust."	The wording proposed by ANAC on EVE Airworthiness Criteria inadvertently removes the possibility of an equivalent means which mitigates the risk of loss of power or thrust. Instead, the way the requirement is currently written, it is requiring an equivalent means to gliding capability.	EVE.2105	Partially accepted. Autorotation is not an EVE design capability, however, ANAC is considering changing the wording of 2105(g) to: "Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness".
FAA	inclusão	Regarding section EVE.2105, the FAA recommends inserting "autorotation" into the regulatory text adjacent to "gliding or an equivalent means" for clarity.		EVE.2105	Not accepted. Autorotation is not a EVE design capability.
FAA	alteração	Regarding section EVE.2105(c), consider specifying the minimum pilot capability (in this document or elsewhere). At the very least, this can be used to inform UA risk modeling. The FAA recommends clarifying what defines a pilot with average skill, and what you expect their piloting capability to be (i.e., vision/hearing, reaction time, ability to maintain a route within a certain accuracy).		EVE.2105	Not accepted. The definition of a pilot of average skill and expected capabilities depends on a series of factors such as training, experience, and physical and technical capabilities. ANAC understands that the complexity involved in establishing an accurate definition requires discussions between Civil Aviation Authorities to harmonize this topic.
Airbus Helicopters	Alteração	Comments on EVE.2105 it is proposed to delete the paragraph (f) of EVE.2105 : (f) Continued safe flight and landing must be possible from any point within the approved flight envelope following a critical change of thrust. OR alternatively, if the above paragraph is kept it is proposed to modify EVE.2510 as follows: For any aircraft system or equipment whose failure or abnormal operation has not been specifically addressed by another requirement in this regulation, except for EVE.2105(f) which applies in addition to this paragraph.[.]	Justification of Comment on Sec. EVE.2510 Equipment, Systems, and Installations and EVE.2105 - Performance data paragraph (f): The requirement of 2105(f) applicable to failure(s) corresponding to critical change of thrust should not substitute for the application of the safety assessment required to show compliance with 2510 requirement but should be considered as complementary if maintained in Subpart B. Indeed the compliance to 2510 is considered to be sufficient to ensure CSFL following combination of failures including those related to critical change of thrust.	EVE.2105	Accepted. ANAC is changing the wording of EVE.2510 to consider EVE.2105(f) as a complementary requirement.
TCCA AARDC Flight Test Division	Alteração	Recommend to align with EASA definition and add (2) "ambient atmospheric conditions within the operational flight envelope"	Aircraft performance is expected to be demonstrated over the entire flight envelope. Definition seems to be missing elements from definitions accepted by other authorities.	EVE.2105 (a)	Not accepted. Performance data have been historically obtained through flight tests in still air. The conditions of altitude and temperature that the aircraft must meet the performance requirements are established by the "unless otherwise prescribed".
TCCA AARDC Flight Test Division	Inclusão	Define terminology.	Consider including a definition of "vertiport" under EVE.2000	EVE.2105 (b)(1)	Not accepted. ANAC is removing vertiport from 2105(b)(1) to clarify that the performance data must be developed for the entire altitude envelope and not only for the takeoff and landing altitude envelope.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
AIRBUS HELICOPTERS	Alteração	<p>General Comment: Airbus helicopters is member of GAMA and ASD and has participated in the validation of the comments sent by both associations to ANAC on this consultation. The additional comments below are also submitted to ANAC.</p> <p>It is proposed to delete the paragraph (f) of EVE.2105 : (f) Continued safe flight and landing must be possible from any point within the approved flight envelope following a critical change of thrust. OR alternatively, if the above paragraph is kept it is proposed to modify EVE.2510 as follows: For any aircraft system or equipment whose failure or abnormal operation has not been specifically addressed by another requirement in this regulation, except for EVE.2105(f) which applies in addition to this paragraph, [..]</p> <p>Comment on Sec. EVE.2325 - Fire protection paragraph (e)(1): It is proposed to modify (e)(1) by Be located where a fire would be easily discovered by a crew member while at the crew member's station and be accessible for the manual extinguishing of a fire"</p> <p>Comment on EVE.3370 - Engine life-limited parts paragraph (a) Life limited parts are in CS27 and CS29 related to fatigue aspects for both metallic and composite parts. The static failure notion is only for composite parts. When considering the list of parts mentioned, leading life limit to static is questionable. Comment on EVE.3370 - Engine life-limited parts paragraph (b) The reference to static parts to be managed throughout their service life as critical or life-limited parts in this requirement is unclear and should be clarified</p>	<p>Justification of Comment on Sec. EVE.2510 Equipment, Systems, and Installations and EVE.2105 - Performance data paragraph (f): The requirement of 2105(f) applicable to failure(s) corresponding to critical change of thrust should not substitute for the application of the safety assessment required to show compliance with 2510 requirement but should be considered as complementary if maintained in Subpart B. Indeed the compliance to 2510 is considered to be sufficient to ensure CSFL following combination of failures including those related to critical change of thrust.</p> <p>Justification of Comment on Sec. 23.2510 Equipment, Systems, and Installations and EVE.2105 - Performance data paragraph (f): The requirement of 2105(f) applicable to failure(s) corresponding to critical change of thrust should not substitute for the application of the safety assessment required to show compliance with 2510 requirement but should be considered as complementary if maintained in Subpart B. Indeed the compliance to 2510 is considered to be sufficient to ensure CSFL following combination of failures including those related to critical change of thrust. Comment on Sec. EVE.2325 - Fire protection paragraph (e)(1): Comment: the requirement that " fire would be visible to the pilots " is excessive. The wording of CS27/29 §855 is more appropriate.</p> <p>Justification of Comment on EVE.3370 - Engine life-limited parts paragraph (b) Why this notion of static part right in a middle of very specific parts which can be only static loaded ? Definition of static part missing. There is a mix between critical parts (CAT failure + Critical characteristics) and Fatigue loaded parts (CAT failure + under fatigue loads). The critical parts have not systematically a service life. The notion of service life is related to fatigue aspect and a critical parts is not necessarily fatigue loaded or have a so low fatigue level that it doesn't lead to fatigue damage. EASA SC E-19 EHPS require to perform a fatigue evaluation of CRI parts (only). ANAC requirement is unclear.</p>	EVE.2105 EVE.2325 EVE.3370	<p>Partially accepted. The section of EVE.2510 that supposedly excludes other specific requirements from its scope was revised. The intent is for EVE.2510 to apply regardless of the existence of specific requirements, and any exclusion should be explicitly mentioned. It should not exclude EVE.2105.</p> <p>Regarding the other items mentioned, ANAC will address the matter in specific MoCs.</p>
ASD - Europe	alteração	<p>1. An alignment between the safety objectives of ANAC EVE Certification Basis and EASA SC-VTOL is recommended to allow mutual recognition. 2. Simply asking for a CSFL after the critical change of thrust may not be sufficient as this may be associated to a substantial change of usable energy reducing the aircraft range making the CSFL requirement ineffective.</p> <p>Here below a short summary highlighting the differences between each Certification Basis: - EASA SC-VTOL Enhanced   CFP --&gt; CSFL Vertiport - EASA SC-VTOL Basic   CFP --&gt; CEL - ANAC EVE   Critical Change of Thrust --&gt; CSFL Somewhere</p>	<p>Continued safe flight and landing must be possible from any point within the approved flight envelope following a critical change of thrust.</p> <p>1. This Paragraph requires CSFL following a critical change of thrust, which is a requirement not matching either the EASA SC-VTOL Category Enhanced or Category basic 2. This Paragraph is not considering that in an electric aircraft a change of thrust may be generated by a failure at battery level, which also leads to a change in usable energy. A substantial reduction of flight range may arise, which may reduce the safety margin.</p>	EVE.2105(f)	Not accepted. The definition of CSFL consider the capability to reach a planned destination or alternate landing and both cases are vertiports designated for landing, which is similar to the case considered by EASA as Enhanced category. Failures at battery level which lead also to a change in usable energy must be considered in the scope of EVE.2105(f) and EVE.2510.
TCCA AARDC Flight Test Division	Alteração	<p>CCOT case might not cover all catastrophic/hazardous failure modes. Expand definition to require assessment of more cases, as developed in the system safety assessment.</p>	<p>Review of the definition of 'critical change of thrust' seems to imply that impact of CCOT is only assessed as the worst case. Considering the combinations and permutations of failure modes partial degradations can also have significant impacts on handling qualities or performance.</p>	EVE.2105(f)	Not accepted. The definition of Critical Change of Thrust considers the most adverse effect on performance resulting from failures of the flight control or propulsive system, either singular or in combination, not shown to be extremely improbable. Usually, partial degradation is a mode of failure that results in less performance effects than total loss of thrust, however, if combinations of degraded propulsive units are not extremely improbable and the total loss of thrust of these propulsive units is extremely improbable, the combination of these degraded propulsive units will be accounted for as a critical change of thrust. For handling qualities, ANAC understands that all types of failure modes not extremely improbable such as partial degradation should be considered as part of the standard System Safety Assessment.
GAMA	Alteração	<p>GAMA recommends a review and potential revision of the CSFL definition to ensure that it appropriately accommodates and addresses the circumstances of a rejected takeoff. This clarification is crucial for aligning the CSFL definition with operational realities and maintaining a comprehensive and accurate understanding of the EVE-100 eVTOL airworthiness.</p>	<p>GAMA expresses caution regarding the definition of "Continued Safe Flight and Landing" (CSFL) as it pertains to rejected takeoffs. The current wording of the CSFL definition, specifically the phrases "...climbing to safe altitude...maintaining level flight," fails to allow for the scenario of a rejected takeoff.</p>	EVE.2105(f)	Not Accepted. Rejected takeoff is covered by EVE.2105(f). ANAC understands that the definition of CSFL is interpreted from the decision point on for takeoff but CSFL must be guaranteed from any point within the approved flight envelope following a critical change of thrust.
EASA	alteração	<p>The identified scenario does not further specify which kind of failures or alike shall be addressed by this requirement and how acceptability of an equivalent means will be evaluated. Some applicants will have difficulties to identify design solutions that ensure the requested capability for any kind of failure in their electrically powered VTOL aircraft. Furthermore, when being in a thrust-borne or semi-thrust-borne configuration, a glide capacity might be unavailable. Complementary guidance on the rule intent would be needed.</p>	<p>While it is understood that this requirement has been specifically developed for the airworthiness certification of the EVE-100 aircraft, it is suggested to define it in more general terms, so that it may be also used in future certification projects. For that purpose, it is suggested to rephrase the requirement as to read e.g.: "Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing." It is also suggested to develop a harmonised means of compliance with relevant international aviation authorities.</p>	EVE.2105(g)	Accepted. ANAC is changing EVE.2105(g) as follows: Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
ASD - Europe	alteração	We suggest allow an aircraft which has a Continued Safe Flight and Landing at an aerodrome capably not being required to comply with the gliding or equivalent means capability.  - EASA SC-VTOL Enhanced   CFP - CSFL, No Gliding Capability - EASA SC-VTOL Basic   CFP - CEL, Gliding Capability - ANAC EVE   Total Loss of Thrust --> CEL, Gliding Capability	The aircraft must be capable of a controlled emergency landing, following a condition when the aircraft can no longer provide the commanded power or thrust required for continued safe flight and landing, by gliding or an equivalent means to mitigate the risk of loss of power or thrust.  This paragraph requires gliding capability, which is similar but different from what EASA is asking for its SC-VTOL Category Basic in case of a 'Critical Failure for Performance'. In that case, a residual thrust may be considered in order to decrease the vertical speed and control the aircraft during the emergency landing. Moreover, Category Enhanced is not requiring the aircraft to be able to demonstrate a Controlled Emergency Landing, as a landing in a vertiport is assured for each failure condition non shown to be extremely improbable. This means that neither an aircraft certified under SC-VTOL Category Basic or Category Enhanced may be certified under this EVE Certification Basis. Paradox is that a Category Enhanced aircraft, which has to comply with more stringent requirements, may not be validated in Brazilian due to no gliding capability.	EVE.2105(g)	Partially accepted. ANAC is changing EVE 2105(g) as follows: Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness. ANAC clarifies that the conditions related to EVE.2105(g) are dispatch errors, poor fuel management, and sudden climate changes that can compromise the Continued Safe and Flight and Landing to a planned or alternate destination requiring a Controlled Emergency Landing capability. As ANAC is requiring CSFL and CEL for Increased and Essential Performance Categories, more stringent requirements are applicable under ANAC's criteria.
TCCA AARDC Flight Test Division	Alteração	Provide clarity for the introduction of this phrase.	The requirement quotes "loss of power or thrust" which is not defined in the document. This paragraph seems to be inconsistent with previous use of CCOT. CCOT really seems like a subset of "loss of power or thrust". We need to better understand the strategy for using CCOT which is a single unique case (maybe we misunderstand and there can be multiple different failure modes cover under CCOT), i.e CCOT is the <u>effect</u> , which could have multiple <u>causes</u> .	EVE.2105(g)	Partially accepted. ANAC is removing <b>loss of power or thrust</b> of the requirement. Consequently, the inclusion of the definition is no longer required. ANAC considered this comment to rewrite EVE 2105(g) as follows: Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness. ANAC confirms that the concept of CCOT has the most adverse effect from multiple causes.
GAMA	Alteração	GAMA recommends a modification in language to enhance clarity. The suggested revision is to change the wording to "...by gliding or autorotation, or an equivalent means to mitigate the risk of loss of power or thrust." This minor adjustment is critical to ensure that the equivalent means are associated explicitly with mitigating the risk of loss of power or thrust, eliminating any potential confusion related to the gliding aspect. Clarity in this context is essential for the accurate interpretation and implementation of the EVE-100 eVTOL airworthiness criteria.  In the context of the EVE-100 airworthiness criteria, we point out potential contradictions in EVE.2105(g), suggesting that a controlled emergency landing should not be considered part of CSFL for both "essential" and "increased performance" aircraft. Additionally, we seek clarification on the intended "condition" addressed by this rule, highlighting the comprehensive coverage already provided by EVE.2105(f) for failure conditions.	GAMA expresses caution about the potential conflation of failure scenario criteria in EVE.2105(g). The concern with .2105(g) lies in the ambiguity surrounding included conditions, particularly given that 2105(f) appears to cover all failure conditions. It is unclear which additional conditions fall within or outside the scope of a .2105(g) analysis. Does (g) aim to address failure conditions beyond extremely improbable, necessitating that the aircraft, even in scenarios beyond 10-9 probability, must still execute a controlled emergency landing? While this might not be the current intent, there is potential for future reinterpretation, raising uncertainties. The current wording may also inadvertently link the equivalent means in "...by gliding , or an equivalent means to mitigate the risk of loss of power or thrust" specifically to gliding, vs. an equivalent means to mitigate the risk.	EVE.2105(g)	Partially accepted. Autorotation is not an EVE design capability, however, ANAC is considering changing the wording of 2105(g) to: "Following a condition when the aircraft can no longer provide the commanded power or thrust to continue safe flight and landing, the aircraft must be capable of a controlled emergency landing without requiring exceptional pilot skill, strength, or alertness". ANAC clarifies that the conditions related to EVE.2105(g) are dispatch errors, poor fuel management, and sudden climate changes that can compromise the Continued Safe and Flight and Landing to a planned or alternate destination requiring a Controlled Emergency Landing capability.
EASA	alteração	The requirement to identify the minimum safe speed seems to imply that the pilot has to perform related actions. On the other hand, for an aircraft with distributed propulsion and multiple lift thrust units, their individual control is likely to be performed by automation, including flight envelope protections to avoid entering uncontrolled flight conditions. Beyond the wing-borne flight phases, the thrust-borne or semi-thrust borne phases could e.g. encounter vortex ring states, which are dependent also on the permissible descent rate. In that case, it could be more relevant to identify all relevant parameters and translate them into respective flight envelope protections.	It is suggested to replace wing-borne lift-oriented terminologies by more general terms e.g., flight envelopes, and to adjust other requirements accordingly.	EVE.2110	Not accepted. There is a parallel between EVE.2110 and 2150. ANAC is proposing to maintain the same terminology in both requirements for consistency. Vortex Ring is covered by EVE.2135(a)(7) as follows: (7) The aircraft must be able to safely complete a landing using the steepest approach gradient procedures.
TCCA AARDC Flight Test Division	Inclusão	Rationale provided in comment.	"Flight Condition" Recommend adding configuration (ie. for each flight condition <b>and configuration</b> ) to ensure minimum safe speeds are determined for each distinct, selectable configuration (if applicable), similar to stall speeds for each flap setting on a conventional fixed wing aircraft.	EVE.2110	Not accepted. ANAC understands that flight condition and phases of flight include the configuration. Moreover, the EVE design has a fixed landing gear and no flap settings.
EVE AIR MOBILITY	Exclusão	EVE.2115 - Takeoff performance  To exclude 2115(c)(1). If the contributions to EVE.2000(b)(1) are adopted, we understand that the concern is addressed and the exclusion would not be necessary.	2105(f) requires CSFL following critical change of thrust, but 2115(c)(1) requires takeoff performance to be determined for a rejected takeoff to safe stop/landing. These requirements, as the rules are proposed, are seemingly contradictory as CSFL would require fly away performance since, as proposed, it does not allow for a rejected takeoff.	EVE.2115	Not Accepted. Rejected takeoff is covered by EVE 2105(f). ANAC understands that the definition of CSFL is interpreted from the decision point on for takeoff but CSFL must be guaranteed from any point within the approved flight envelope following a critical change of thrust.
Embraer S.A.	Exclusão	EVE.2115 - Takeoff performance.  To Exclude 2115(c)(1). If the contributions to EVE.2000(b)(1) are adopted, we understand that the concern is addressed and the exclusion would not be necessary.	2105(f) requires CSFL following critical change of thrust, but 2115(c)(1) requires takeoff performance to be determined for a rejected takeoff to safe stop/landing. These requirements, as the rules are proposed, are seemingly contradictory as CSFL would require fly away performance since, as proposed, it does not allow for a rejected takeoff.	EVE.2115	Not Accepted. Rejected takeoff is covered by EVE 2105(f). ANAC understands that the definition of CSFL is interpreted from the decision point on for takeoff but CSFL must be guaranteed from any point within the approved flight envelope following a critical change of thrust.
FAA	inclusão	Regarding section EVE.2115, please confirm that the level of safety is similar to FAA "Increased Performance." The FAA also recommends inserting minimum control speeds back into EVE.2115, and identifying which specific performance criteria ANAC intends to require for All Engine Operating / Critical Change of Thrust takeoff for the EVE-100.		EVE.2115	ANAC confirms the proposal covers just Increased Performance implying that the critical case for performance determination is the case with a critical change of thrust. So, for an Increased Performance aircraft, the more degraded trajectory (with a critical change of thrust) must be determined and determined for obstacle clearance. ANAC is including the Essential Performance Category in the Criteria and harmonizing AEO performance requirements. ANAC understands that Minimum Control Speeds are not applicable for EVE design. The aircraft is monopusher and the failure of the pusher does not generate asymmetry. For the forward flight scenario with the lifters, in case of lifter failure, the aircraft must be capable of performing a safe vertical landing as per EVE.2130(c).

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
GAMA	Alteração	GAMA recommends a focused emphasis on ensuring that aircraft are able to be designed for essential and increased performance comprehensive takeoff performance metrics (refer to GAMA comment to EVE.2000), enabling them to execute a rejected takeoff and ensure a safe landing in response to critical thrust changes.	GAMA provides input on EVE.2115 – Takeoff Performance, specifically focusing on point (c).  In point (c), GAMA suggests that the takeoff performance must be determined so that, following a critical change of thrust, specific considerations are made. The EVE-100 proposal implies a nuanced approach to takeoff performance requirements for aircraft designed for increased performance after a critical change in thrust.  2105(f) requires CSFL following critical change of thrust, but 2115(c)(1) requires takeoff performance to be determined for a rejected takeoff to safe stop/landing. These requirements, as the rules are proposed, are seemingly contradictory as CSFL would require fly away performance since, as proposed, it does not allow for a rejected takeoff.	EVE.2115	Partially Accepted. ANAC is including the Essential and Increased Performance Categories in the criteria. Rejected takeoff is covered by EVE 2105(f). ANAC understands that the definition of CSFL is interpreted from the decision point on but CSFL must be guaranteed from the decision point on for takeoff but CSFL must be guaranteed from any point within the approved flight envelope following a critical change of thrust according to EVE.2105(f).
TCCA AARDC Flight Test Division	Alteração	Suggest that a minimum wind requirement be introduced, since the authority must set the required level of safety, not the applicant based on the capability of their aircraft design. Recommend the currently accepted 17 knots be reutilized for any hover takeoff.	The stated rule is too vague. There should be a minimum crosswind limit established similar to the 17 knots all azimuth described in Part27/29, which the manufacturer can extend based on their aircraft. This is an acceptable minimum disturbance level that has been established as required to ensure controllability for helicopters during normal operations. This new class of vehicle will be exposed to these normal winds during standard operations and can be expected to be subject to higher crosswinds and turbulence in the rooftop vertiport scenarios.	EVE.2115 Take Off EVE.2135 (a)(6)	Partially accepted. Performance data have been historically obtained through flight tests in still air. To cover controllability aspects ANAC is inserting the value of 17 knots in EVE.2135(a)(6).
TCCA AARDC Flight Test Division	Inclusão	Suggest that a minimum wind requirement be introduced, since the FAA must set the required level of safety, not the applicant based on the capability of their aircraft design.	The requirement does not specify a minimum wind speed that the aircraft must be able to cope with. Part 27/29 require that the aircraft be able to take- off, land and maneuver near the ground in winds of at least 17 knots.	EVE.2115 Take Off JS4.2135 (a)(6)	Partially accepted. Performance data have been historically obtained through flight tests in still air. To cover controllability aspects ANAC is inserting the value of 17 knots in EVE.2135(a)(6).
EASA	alteração	Further details on the expected performance minima would be expected either in the comment resolution or in future information on acceptable means of compliance, which should be harmonised with expected performance requirements in the operational rules.	It is suggested to provide further details on the expected performance minima and harmonise an acceptable means of compliance with the expected performance requirements in the operational rules.	EVE.2120	Not accepted. The proposal is to include the criteria suggested in the comment in a harmonized interpretive document.
FAA	alteração	Regarding section EVE.2120, please confirm that the level of safety is similar to FAA "Increased Performance." The FAA also recommends identifying which specific performance criteria ANAC intends to require for All Engine Operating or Critical Change of Thrust climb for the EVE-100.		EVE.2120	ANAC confirms the proposal covers just Increased Performance implying that the critical case for performance determination is the case with a critical change of thrust. So, for an Increased Performance aircraft, the more degraded trajectory (with a critical change of thrust) must be determined for obstacle clearance. ANAC is including the Essential Performance Categories in the Criteria and harmonizing AEO performance requirements.
TCCA AARDC Flight Test Division	Alteração	It is not clear what the minimum climb performance requirement is as written. Since the minimum climb performance may need to be a limitation used to determine whether the vehicle can safely operate into and out of various vertiports it must be explicit.	What is this minimum climb performance value? Part 23 prescribe minimum required performance in the form of gradients. Part 27 prescribe minimum climb required in terms of a vertical rate. Is it up to each individual applicant to determine minimum climb performance based on their operational need?	EVE.2120 (a)	Not accepted. Minimum performance criteria will be established in a harmonized interpretive document.
TCCA AARDC Flight Test Division	Inclusão	FAR 23/27/29 requires performance to be determined out of ground effect for conservatism (as drag is lower, and climb performance is improved in ground effect). The absence of this requirement could result in applicants attempting to utilize ground effect to obtain improved performance.	In ground effect, out of ground effect, or both?	EVE.2120 (a)	Accepted. ANAC is changing 2120(a) as follows: The applicant must demonstrate minimum climb performance out of ground effect at each weight, altitude, and ambient temperature within the operating limitations using the procedures published in the flight manual.
TCCA AARDC Flight Test Division	Alteração	The term sufficient must be explicitly defined. Recommend aligning with previous industry standards and require 15 foot clearance above obstacles.	This requirement describes the equivalent of helicopter category A performance but states that the trajectory must clear all obstacles by sufficient margins for takeoff. Sufficient is a highly subjective term that is open for debate.	EVE.2120 (d)(1)(i)	Not accepted. Interpretative material will establish what is considered sufficient by ANAC.
EVE AIR MOBILITY	Exclusão	EVE.2125 - Climb information  To remove EVE.2125(c).	ANAC introduced EVE.2125(c) to evaluate performance without aligning with the minimum standards required for Continued Safe Flight and Landing (CSFL). As outlined in EVE.2000(b)(4), the controlled emergency landing capability mandated by EVE.2105(g) pertains to scenarios where the aircraft can no longer provide the necessary power or thrust for safe flight and landing. This specifically involves allowing the crew to choose the direction and touchdown area as a last resort, prioritizing occupant and ground safety while accepting potential vehicle damage. This scenario extends beyond the certified operational envelope, akin to addressing situations such as fuel exhaustion in traditional aircraft.	EVE.2125	Not accepted. The concept behind EVE.2105(g) is to cover scenarios such as dispatch errors, poor fuel management, and sudden climate changes that can compromise the Continued Safe and Flight and Landing to a planned destination or alternate landing requiring a Controlled Emergency Landing capability. EVE.2125(c) is required to determine the performance associated with the condition defined in EVE.2105(g).
Embraer S.A.	Exclusão	EVE.2125 - Climb information  To remove EVE.2125(c).	ANAC introduced EVE.2125(c) to evaluate performance without aligning with the minimum standards required for Continued Safe Flight and Landing (CSFL). As outlined in EVE.2000(b)(4), the controlled emergency landing capability mandated by EVE.2105(g) pertains to scenarios where the aircraft can no longer provide the necessary power or thrust for safe flight and landing. This specifically involves allowing the crew to choose the direction and touchdown area as a last resort, prioritizing occupant and ground safety while accepting potential vehicle damage. This scenario extends beyond the certified operational envelope, akin to addressing situations such as fuel exhaustion in traditional aircraft.	EVE.2125	Not accepted. The concept behind EVE.2105(g) is to cover scenarios such as dispatch errors, poor fuel management, and sudden climate changes that can compromise the Continued Safe and Flight and Landing to a planned destination or alternate landing requiring a Controlled Emergency Landing capability. EVE.2125(c) is required to determine the performance associated with the condition defined in EVE.2105(g).
FAA	inclusão	Regarding section EVE.2125, the FAA recommends inserting "autorotation" into the regulatory text adjacent to "gliding or an equivalent means" for clarity.		EVE.2125	Not accepted. ANAC is removing "autorotation and gliding" from EVE.2105(g). Consequently these terms will be removed from 2125(c) also.



Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDC Flight Test Division	Alteração	<p>If the aircraft is unable to autorotate, it would appear as though the only alternative is to glide to a landing should an engine fail. As such, glide performance should be determined and made available to the crew for flight planning purposes.</p> <p>If applicable, submit definition for a <u>wing-borne</u> glide and one for an <u>autorotative glide</u>. Maybe it's the same and if so, it should be specified.</p> <p>Recommend that the requirement specify best range and best endurance be established. This should be its own para (not as part of Climb Information)</p>	<p>Why is glide performance per 23.2125 not included here? If the aircraft is unable to autorotate, gliding may be the only other option, and that glide performance data would be appropriate for inclusion in the AFM.</p> <p>The paragraph of EVE.2125 (c) requests gliding performance but does not specify the parameters to define.</p>	EVE.2125 (b)	Not accepted. ANAC is removing "autorotation and gliding" from EVE.2105(g). Consequently, these terms will be removed from 2125(c) also. According to the solution presented by EVE to comply with EVE.2105(g) the associated performance must be determined as required by EVE.2125(c) and specific criteria will be established in interpretative material. Related to range and endurance, the proposal is to ensure that the energy quantity indication system provides accurate and consistent information to the pilot. Range and endurance are not certified parameters for a transport category aircraft (Part 25) and ANAC is not creating additional requirements in the airworthiness criteria.
EASA	Esclarecimento	The request to "determine the performance accordingly for the appropriate sources of lift for gliding or by equivalent means applicable to the condition defined in EVE.2105(g)." is not fully understood. It is unclear whether it is required to determine glide ratios, remaining flight ranges achievable in failure conditions, etc.	Clarification is sought on the safety intend and design objective to be demonstrated with this requirement.	EVE.2125 (c)	Not accepted. The concept behind EVE.2105(g) is to cover scenarios such as dispatch errors, poor fuel management, and sudden climate changes that can compromise the Continued Safe and Flight and Landing to a planned destination or alternate landing requiring a Controlled Emergency Landing capability. EVE.2125(c) is required to determine the performance associated with the condition defined in EVE.2105(g).
GAMA	Remoção	GAMA recommends the removal of EVE.2125(c), questioning its necessity within the broader scope and potential ambiguity of EVE.2105(g). This comment underscores the importance of ensuring clarity and consistency in performance requirements. GAMA encourages consideration of whether the proposed climb information requirement aligns with historical approaches, urging ANAC to evaluate the broader context and industry standards in shaping these criteria for enhanced effectiveness and regulatory harmony.	<p>GAMA expresses concern regarding the novelty of EVE.2125(c), specifically pertaining to climb information, which is distinct from corresponding regulations in both the FAA and EASA frameworks.</p> <p>ANAC introduced EVE.2125(c) to evaluate performance without aligning with the minimum standards required for Continued Safe Flight and Landing (CSFL). As outlined in EVE.2000(b)(4), the controlled emergency landing capability mandated by EVE.2105(g) pertains to scenarios where the aircraft can no longer provide the necessary power or thrust for safe flight and landing. This specifically involves allowing the crew to choose the direction and touchdown area as a last resort, prioritizing occupant and ground safety while accepting potential vehicle damage. This scenario extends beyond the certified operational envelope, akin to addressing situations such as fuel exhaustion in traditional aircraft.</p>	EVE.2125(c) – Climb Information	Not accepted. What is required by ANAC in EVE.2125(c) is also required by FAA for Joby and Archer in 2120(e). The concept behind EVE.2105(g) is to cover scenarios such as dispatch errors, poor fuel management, and sudden climate changes that can compromise the Continued Safe and Flight and Landing to a planned destination or alternate landing requiring a Controlled Emergency Landing capability. EVE.2125(c) is required to determine the performance associated with the condition defined in EVE.2105(g).
EVE AIR MOBILITY	Alteração	EVE.2130 - Landing	There is a typo in paragraph EVE.2130(a)(2), with the word "and" in the end of the frase without a paragraph EVE.2130(a)(3).	EVE.2130	Accepted. ANAC is removing the typo identified in EVE.2130(a)(2).
Embraer S.A.	Alteração	EVE.2130 - Landing.	There is a typo in paragraph EVE.2130(a)(2), with the word "and" in the end of the phrase without a paragraph EVE.2130(a)(3).	EVE.2130	Accepted. ANAC is removing the typo identified in EVE.2130(a)(2).
FAA	inclusão	Regarding section EVE.2130, please confirm that the level of safety is similar to FAA "Increased Performance." The FAA also recommends inserting minimum control speeds back into EVE.2130.		EVE.2130	Not accepted. ANAC confirms the proposal covers just the Increased Performance category. ANAC understands that Minimum Control Speeds are not applicable for EVE design. The aircraft is a monopusher and the failure of the pusher does not generate asymmetry. For the forward flight scenario with the lifters, in case of lifter failure, the aircraft must be capable of performing a safe vertical landing as per EVE.2130(c).
TCCA AARDC Flight Test Division	Alteração	Should also address case of failure after LDP.	Agree with this section being akin to category A verbiage.	EVE.2130(c) (2)	Accepted. ANAC is changing EVE.2130(c)(2) to consider a critical change of thrust occurring after the Landing Decision Point (LDP) and requiring that the aircraft must land and stop safely on the landing surface .
EVE AIR MOBILITY	Alteração	EVE.2135 - Controllability	<p>The original intent of the requirement is based on demonstrating the controllability of the aircraft for the different operating modes available and not on general failures of the FCS and propulsion system as the text published by ANAC suggests.</p> <p>The controllability of the aircraft subjected to failure conditions is already covered by Safety Assessment procedures, within the scope of the EVE.2510 requirement; the incorporation of failure conditions in the requirement EVE.2135 is therefore redundant, in addition to generating doubts in demonstrating compliance with the same.</p>	EVE.2135	Partially accepted.  ANAC considers that a requirement to show that aircraft is controllable and maneuverable in degraded flight operating modes is completely covered by the requirement to show that aircraft is controllable and maneuverable with flight controls or propulsion control system failures since a degraded operating mode is only expected to be activated in case of a failure occurs and the control system strategy needs to be changed to a degraded condition. Even though ANAC considers it is redundant, ANAC opted to adopt it for harmonization purposes, including not only flight control system failures but also propulsion system failures in the EVE.2135(a)(5) requirement and the requirement linked to failures was moved to EVE.2135(a)(3).
Embraer S.A.	Alteração	EVE.2135 - Controllability	<p>The original intent of the requirement is based on demonstrating the controllability of the aircraft for the different operating modes available and not on general failures of the FCS and propulsion system as the text published by ANAC suggests.</p> <p>The controllability of the aircraft subjected to failure conditions is already covered by Safety Assessment procedures, within the scope of the EVE.2510 requirement; the incorporation of failure conditions in the requirement EVE.2135 is therefore redundant, in addition to generating doubts in demonstrating compliance with the same.</p>	EVE.2135	Partially accepted.  ANAC considers that a requirement to show that aircraft is controllable and maneuverable in degraded flight operating modes is completely covered by the requirement to show that aircraft is controllable and maneuverable with flight controls or propulsion control system failures since a degraded operating mode is only expected to be activated in case of a failure occurs and the control system strategy needs to be changed to a degraded condition. Even though ANAC considers it is redundant, ANAC opted to adopt it for harmonization purposes, including not only flight control system failures but also propulsion system failures in the EVE.2135(a)(5) requirement and the requirement linked to failures was moved to EVE.2135(a)(3).

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FAA	Inclusão	Regarding section EVE.2135, the FAA recommends defining a criterion for all azimuth wind controllability of 17 knots. The FAA also recommends inserting likely propulsion system and flight control failures into EVE.2135, especially to clarify the difference between (3) and (5).		EVE.2135	Partially accepted.  ANAC accepted to include a minimum speed of 17kt to wind from any azimuth as a minimum criterion for controllability. For the suggestion to include likely propulsion system and flight control failures into EVE.2135(a)(3), ANAC agreed to move flight control system and propulsion system failures to EVE.2135(a)(3), however, ANAC does not concur with the proposed text because of the following reasons (i) ANAC understands that failures must be firstly evaluated under EVE.2510 airworthiness criteria and that if there are additional requirements from handling qualities perspective, this evaluation is complementary to the EVE.2510 compliance demonstration. It should be noted that the EVE.2510 has a limitation in its scope to include only failure or abnormal operation that has not been specifically addressed by another requirement, therefore, the proposed EVE.2135(a)(3) as proposed by FAA would result in a condition that EVE.2510 would not be applicable for likely propulsion system and flight controls failures. (ii) The word likely is excessively vague for an airworthiness criterion. Therefore, ANAC adapted the text of the airworthiness criteria to make clear that failure cases should be evaluated for handling qualities aspects in addition to the aspects that are already part of EVE.2510.
FAA	Inclusão	Regarding section EVE.2135(a), the FAA recommends inserting the following language: "in all degraded flight control system operating modes not shown to be extremely improbable."  The FAA also recommends inserting the following language: "The aircraft must be able to safely complete a landing using the steepest approach gradient for which approval is sought." Ensuring adequate controllability and handling qualities as a result of the steepest approach gradient is a critical requirement due to avoidance of such areas as vortex ring state, winds, and control power margin. Due to its importance, the FAA recognizes such and intends to incorporate it into the airworthiness criteria.		EVE.2135	Partially accepted. ANAC considers that a requirement to show that aircraft is controllable and maneuverable in degraded flight operating modes is completely covered by the requirement to show that aircraft is controllable and maneuverable with flight controls or propulsion control system failures since a degraded operating mode is only expected to be activated in case of a failure occurs and the control system strategy needs to be changed to a degraded condition. Even though ANAC considers it is redundant, ANAC opted to adopt it for harmonization purposes, including not only flight control system failures but also propulsion system failures in the EVE.2135(a)(5) requirement and the requirement linked to failures was moved to EVE.2135(a)(3).  Regarding the second suggestion, ANAC agrees to incorporate EVE.2135(a)(7) as proposed: "The aircraft must be able to safely complete a landing using the steepest approach gradient for which approval is sought."
TCCA AARDC Flight Test Division	Alteração	Envelopes need to be clarified. Recommend aligning with EASA's corresponding 2135(a)."	The use of the term "approved envelope" is unclear. FAA uses 'operating envelope' only. EASA uses 'operational flight envelope' and 'limit flight envelope. If referring only to the envelope as approved by the flight manual, this does not provide adequate criteria to define envelope within which C&M needs to be evaluated.	EVE.2135(a)	ANAC maintains "approved envelope" and notes that FAA uses the same terminology. However, ANAC agrees to include the definition of "approved envelope" as part of the airworthiness criterion EVE.2000 as follows "Approved flight envelope means the flight envelope composed of (i) the flight envelope associated to routine operational and/or prescribed conditions and (ii) the flight envelope associated to warning onset cases excluding situations associated to aircraft design limits or hard protection limits."
TCCA AARDC Eng Division	alteração	Recommend rewording as follows: "(a) "The aircraft must be controllable and manoeuvrable, (...) (5) In all <u>degraded flight and propulsion control system operating modes</u> failures not shown to be extremely improbable; and"	"(5) In all flight and propulsion control system failures not shown to be extremely improbable;" a) It would be preferable to refer to 'failure conditions' rather than 'failures'. b) The intent of this paragraph, as written, appears to differ from that of corresponding requirements in either VTOL.2135(a)(5) or in corresponding FAA certification basis. In these, the requirement instead refers to "all degraded flight control system operating modes", which we understand as defining C&M expectations for all degraded operational mode implemented in the design (e.g. Alternate or Direct CLaws, or other degraded operational modes). These should be evaluated regardless of probability.	EVE.2135(a)(5)	Not accepted. ANAC considers that both "failures" or "failure conditions" can be used and notes that FAA has used "failures" in its published airworthiness criteria, therefore, it is better to use the same harmonized notation. For the degraded mode of operation subject, ANAC considers that a requirement to show that aircraft is controllable and maneuverable in degraded flight operating modes is completely covered by the requirement to show that aircraft is controllable and maneuverable with flight controls or propulsion control system failures since a degraded operating mode is only expected to be activated in case of a failure occurs and the control system strategy needs to be changed to a degraded condition. Even though ANAC considers it is redundant, ANAC opted to adopt it for harmonization purposes, including not only flight control system failures but also propulsion system failures in the EVE.2135(a)(5) requirement and the requirement linked to failures was moved to EVE.2135(a)(3).
GAMA	Alteração	GAMA recommends substituting the proposed text with: "in any degraded flight control system operating modes that are not demonstrated to be extremely improbable; and"	GAMA raises concerns about EVE.2135(a)(5) mentioning "In all flight and propulsion control system failures...". GAMA proposes using the language "flight-control-system operating modes," consistent with its usage in other certification programs, specifically referring to the operating modes of the fly-by-wire system. This aligns with the original intent of the requirement, focusing on demonstrating aircraft controllability across different operating modes rather than general failures of the flight-control-system and propulsion system, as implied by ANAC's published text. GAMA recognizes that safety assessment procedures already cover aircraft controllability in failure conditions within the scope of EVE.2510. Therefore, the inclusion of failure conditions in EVE.2135(a)(5) appears redundant and may create uncertainties in demonstrating compliance	EVE.2135(a)(5) - Controllability	Partially accepted.  ANAC considers that a requirement to show that aircraft is controllable and maneuverable in degraded flight operating modes is completely covered by the requirement to show that aircraft is controllable and maneuverable with flight controls or propulsion control system failures since a degraded operating mode is only expected to be activated in case of a failure occurs and the control system strategy needs to be changed to a degraded condition. Even though ANAC considers it is redundant, ANAC opted to adopt it for harmonization purposes, including not only flight control system failures but also propulsion system failures in the EVE.2135(a)(5) requirement and the requirement linked to failures was moved to EVE.2135(a)(3).
TCCA AARDC Flight Test Division	Alteração	Expand requirement to encompass all landing methodologies.	The limitation to 'thrust borne' only is not understood. The aircraft will be able to land by other means. Thrust borne is commonly understood to be RW related operations. What about a FW type of landing?	EVE.2135(a)(6)	Not accepted.  The aircraft has only vertical landing capability according to the manufacturer design with no landing capability for the fix wing configuration.
TCCA AARDC Flight Test Division	Alteração	Envelope needs to be clarified. Recommend aligning with EASA's definition of envelopes.	The use of the term "approved envelope" is unclear. FAA uses 'operating envelope' only. EASA uses 'operational flight envelope' and 'limit flight envelope. Similar to item EVE.2135(a) above. The current approach appears to be not as conservative as other authorities.	EVE.2135(c).	Not accepted. ANAC maintains "approved envelope" and notes that FAA uses the same terminology. However, ANAC agrees to include the definition of "approved envelope" as part of the airworthiness criterion EVE.2000 as follows "Approved flight envelope means the flight envelope composed of (i) the flight envelope associated to routine operational and/or prescribed conditions and (ii) the flight envelope associated to warning onset cases excluding situations associated to aircraft design limits or hard protection limits."

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TCCA AARDD Eng Division	alteração	Recommend rewording as noted in comment.	Specific references to 'primary flight controls' in this application do not seem appropriate. Referring to the cockpit pilot controls, the term 'inceptor' would be more accurate and consistent with terminology used in FBW applications. Also since the design integrates flight and propulsion control system (integration of thrust / lift / flight control functions), the reference to 'primary flight controls' could be misleading on intended scope.	EVE.2140(a)(b)	Accepted. ANAC agrees to replace "primary flight controls" by "inceptor". In addition, the airworthiness criterion should be further simplified as there are no trim controls and all aircraft trimming is performed by the flight controls systems.
TCCA AARDC Flight Test Division	Alteração	It is not clear to the reader what suitable characteristics are, and how they relate to classic static longitudinal, lateral, directional and stability. An authority definition for what establishes stability is required.	What are "suitable stability" characteristics, and how do they relate to classical static longitudinal, lateral and directional stability? Why was the requirement for stable control force feedback from 23.2145(a)(3) removed? SC- VTOL.2145(a) requires "suitable stability and control feel, in all axes", which would appear to be appropriate here.	EVE.2145	Not accepted.  Suitable stability will be defined in the guidance material for the EVE-100 project. In summary, suitable stability is understood as positive or neutral stability for static stability and reasonably damped response for dynamic stability. Negative stability or reasonably undamped aircraft response which can increase the pilot's workload or otherwise endanger the aircraft and its occupants are considered unsuitable stability. Regarding the specific control force feedback comment, this is not understood by ANAC as the proposed requirement is strictly based on the current EASA VTOL.2145(a) and requires suitable control feel, in all axes.
TCCA AARDC Flight Test Division	Inclusão	Suggest including dynamic stability requirements that can be measured. Some are included in Part 29.	Is there a requirement for positive static stability? Can more measurable criteria for dynamic stability not be expressed?	EVE.2145	Not accepted.  Suitable stability will be defined in the guidance material for the EVE-100 project. In summary, suitable stability is understood as reasonably damped response for dynamic stability. Reasonably undamped aircraft response which can increase the pilot's workload or otherwise endanger the aircraft and its occupants is considered unsuitable stability.
FAA	alteração	Regarding section EVE.2145, the FAA recommends providing a more descriptive requirement or detailed methods of compliance such that the level of safety and means are well understood, especially addressing "likely failures."		EVE.2145	Not accepted.  A descriptive requirement for suitable stability will be defined in the guidance material for the EVE-100 project. In summary, suitable stability is understood as positive or neutral stability for static stability and reasonably damped response for dynamic stability. Negative stability or reasonably undamped aircraft response which can increase the pilot's workload or otherwise endanger the aircraft and its occupants are considered unsuitable stability.  ANAC does not agree either with the imposition of stability requirements for failure scenarios as this is not required for none of the main airworthiness requirements set for fixed wing aircraft and rotary wing aircraft, including transport category aircraft. In the presence of failures, the aircraft should present continued safe flight and landing capability, but it is impractical to demand the same prescriptive full up aircraft stability requirement for all possible failure conditions. ANAC considers failure scenarios are already fully addressed by the airworthiness criteria EVE.2135(a)(3) and EVE.2510.
EVE AIR MOBILITY	Alteração	EVE.2150 - Minimum safe speed characteristics and warning  To change the paragraph EVE.2150(b) from "For wing borne and semi-thrust-borne operations, the aircraft must not have a tendency to inadvertently depart controlled safe flight." to "For all sources of lift, the aircraft must not have the tendency to inadvertently depart controlled safe flight after a sudden change of thrust."	The suggested contribution for paragraph EVE.2150(b) maintain the objective of ANAC proposal, while sets out the applicability for the specific case of "critical change of thrust", clarifying the demonstration of this requirement.	EVE.2150	Partially accepted.  The airworthiness criterion EVE.2150(b) was proposed based on the requirement 23.2150(b) which is defined for single engine airplanes. Given that when EVE-100 operates in wing born configuration, its propulsion is provided by a single pusher, 23.2150(b) was considered more suitable to be applied for EVE-100 than 23.2150(c), which is defined for multi engine airplanes, and this is the requirement that has specific guidance for not having a tendency to depart after a critical loss of thrust. Because EVE-100 is more similar to a single engine aircraft when operating in wing born configuration, ANAC considers the more general requirement that is provided in 23.2150(b) should still be used. However, ANAC agrees to modify the requirement to emphasize that critical loss of thrust is one of the scenarios that needs to be evaluated for departure tendency evaluation.  ANAC also believes that EVE.2150 should be focused on flight phases that depend on lift generated by the wing as this is the concern that 23.2150 was developed for. Therefore, it is ANAC preference to restrict the applicability of this airworthiness criterion to semi-thrust-borne and wing borne. For thrust born operation, the aircraft should be able to fly in zero airspeed condition and it seems to be inappropriate to define a minimum safe speed airworthiness criteria for this phase of flight. Aspects related to aircraft control, including critical change of thrust, for the thrust borne phase should be evaluated in the scope of EVE.2135.
Embraer S.A.	Alteração	EVE.2150 - Minimum safe speed characteristics and warning.  To change the paragraph EVE.2150(b) from "For wing borne and semi-thrust-borne operations, the aircraft must not have a tendency to inadvertently depart controlled safe flight." to "For all sources of lift, the aircraft must not have the tendency to inadvertently depart controlled safe flight after a sudden change of thrust."	The suggested contribution for paragraph EVE.2150(b) maintain the objective of ANAC proposal, while sets out the applicability for the specific case of "critical change of thrust", clarifying the demonstration of this requirement.	EVE.2150	Partially accepted.  The airworthiness criterion EVE.2150(b) was proposed based on the requirement 23.2150(b) which is defined for single engine airplanes. Given that when EVE-100 operates in wing born configuration, its propulsion is provided by a single pusher, 23.2150(b) was considered more suitable to be applied for EVE-100 than 23.2150(c), which is defined for multi engine airplanes, and this is the requirement that has specific guidance for not having a tendency to depart after a critical loss of thrust. Because EVE-100 is more similar to a single engine aircraft when operating in wing born configuration, ANAC considers the more general requirement that is provided in 23.2150(b) should still be used. However, ANAC agrees to modify the requirement to emphasize that critical loss of thrust is one of the scenarios that needs to be evaluated for departure tendency evaluation.  ANAC also believes that EVE.2150 should be focused on flight phases that depend on lift generated by the wing as this is the concern that 23.2150 was developed for. Therefore, it is ANAC preference to restrict the applicability of this airworthiness criterion to semi-thrust-borne and wing borne. For thrust born operation, the aircraft should be able to fly in zero airspeed condition and it seems to be inappropriate to define a minimum safe speed airworthiness criteria for this phase of flight. Aspects related to aircraft control, including critical change of thrust, for the thrust borne phase should be evaluated in the scope of EVE.2135.

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FAA	alteração	Regarding section EVE.2150, the FAA recommends inserting the following language: "The aircraft must not have the tendency to inadvertently depart controlled safe flight after a sudden change of thrust." The FAA requires similarly as for Part 23 that sudden changes of thrust do not cause the aircraft to depart controlled safe flight. The FAA's expectation is that this level of safety established under Part 23 is maintained regardless of the operation or source of lift.		EVE.2150	Partially accepted.  The airworthiness criterion EVE.2150(b) was proposed based on the requirement 23.2150(b) which is defined for single engine airplanes. Given that when EVE-100 operates in wing born configuration, its propulsion is provided by a single pusher, 23.2150(b) was considered more suitable to be applied for EVE-100 than 23.2150(c), which is defined for multi engine airplanes, and this is the requirement that has specific guidance for not having a tendency to depart after a critical loss of thrust. Because EVE-100 is more similar to a single engine aircraft when operating in wing born configuration, ANAC considers the more general requirement that is provided in 23.2150(b) should still be used. However, ANAC agrees to modify the requirement to emphasize that critical loss of thrust is one of the scenarios that needs to be evaluated for departure tendency evaluation.  ANAC also believes that EVE.2150 should be focused on flight phases that depend on lift generated by the wing as this is the concern that 23.2150 was developed for. Therefore, it is ANAC preference to restrict the applicability of this airworthiness criterion to semi-thrust-borne and wing borne. For thrust born operation, the aircraft should be able to fly in zero airspeed condition and it seems to be inappropriate to define a minimum safe speed airworthiness criterion for this phase of flight. Aspects related to aircraft control, including critical change of thrust, for the thrust borne phase should be evaluated in the scope of EVE.2135.
FAA	alteração	Regarding section EVE.2150(b), the FAA recommends adding thrust borne operations. For wing borne, semi-thrust borne and thrust borne operations, the aircraft must not have the tendency to depart controlled safe flight.		EVE.2150	Not accepted.  ANAC believes that EVE.2150 should be focused on flight phases that depend on lift generated by the wing as this is the concern that 23.2150 was developed for. Therefore, it is ANAC preference to restrict the applicability of this airworthiness criterion to semi-thrust-borne and wing borne. For thrust born operation, the aircraft should be able to fly in zero airspeed condition and it seems to be inappropriate to define a minimum safe speed airworthiness criterion for this phase of flight. Aspects related to aircraft control, including critical change of thrust, for the thrust borne phase should be evaluated in the scope of EVE.2135.
TCCA AARDC Flight Test Division	Alteração	Should be something like "In case (...), there must be a clear and distinctive..."	Editorial: The second sentence is incomplete (missing a verb).	EVE.2150(a)	Accepted.  ANAC agrees that the sentence is missing a verb and it corrected it as needed.
EVE AIR MOBILITY	Alteração	EVE.2160 - Vibration, buffeting, and high-speed characteristics  To change the paragraph EVE.2160(b) from " The aircraft must be recoverable to its approved flight envelope in the case of a reasonable speed exceedance, and must not have adverse recovery characteristics that result in structural damage or loss of control." to the following text: "For inadvertent excursions beyond the maximum approved speed, the aircraft must be able to safely recover back to its approved flight envelope without requiring exceptional piloting skill, strength, or alertness. This recovery may not result in structural damage or loss of control".	The suggested contribution for paragraph EVE.2160(b) maintain the objective of ANAC proposal. For a better harmonization and reuse of means of compliance solution, is request that the EVE.2160(b) text follows the same words published by FAA on final rule of docket number FAA-2021-0638-0055.	EVE.2160	Accepted.  ANAC agrees to change the sentence of the airworthiness criterion EVE.2160(b) as proposed as there is no difference in the meaning of both sentences and it allows harmonization considering the airworthiness criteria issued by FAA.
Embraer S.A.	Alteração	EVE.2160 - Vibration, buffeting, and high-speed characteristics  To change the paragraph EVE.2160(b) from " The aircraft must be recoverable to its approved flight envelope in the case of a reasonable speed exceedance, and must not have adverse recovery characteristics that result in structural damage or loss of control." to the following text: "For inadvertent excursions beyond the maximum approved speed, the aircraft must be able to safely recover back to its approved flight envelope without requiring exceptional piloting skill, strength, or alertness. This recovery may not result in structural damage or loss of control".	The suggested contribution for paragraph EVE.2160(b) maintain the objective of ANAC proposal. For a better harmonization and reuse of means of compliance solution, is request that the EVE.2160(b) text follows the same words published by FAA on final rule of docket number FAA-2021-0638-0055.	EVE.2160	Accepted.  ANAC agrees to change the sentence of the airworthiness criterion EVE.2160(b) as proposed as there is no difference in the meaning of both sentences and it allows harmonization considering the airworthiness criteria issued by FAA.
FAA	esclarecimento	Regarding section EVE.2160, please confirm that the level of safety expectations is the same as that defined in section EVE.2160(a).		EVE.2160	Not possible to provide the requested clarification. Comment is not clear to what is the safety expectation that is referred by the commenter.  However, ANAC believes that the intention of the comment is that the demonstration of vibration and buffeting is not interfering with the control of the aircraft should be performed up to VD/MD. If this is the comment point, ANAC has changed its text to let it clear this should be demonstrated up to the limit conditions. It is noted that the demonstration up to VD/MD in this type of aircraft has some challenges as noted below: a) The maximum operating altitude of the vehicle is limited when compared to conventional aircraft. Therefore, there are some limitation to maximum nose down dive maneuver that can be made to make the aircraft accelerate. b) It is likely not possible to achieve the maximum operating altitude of the aircraft departing from a low altitude aerodrome due to the limited autonomy of the aircraft. The typical mission profile is a flight at an altitude of 1000ft AGL and the aircraft is expected to be close to maximum operating altitude when it is flying from a high altitude aerodrome to another high altitude aerodrome. This further reduces the altitude available to attempt to reach the Vd/Md airspeed. c) It is believed the pusher is sized to no provide extra power to allow the aircraft to reach an airspeed above VNE in leveled flight. d) There will be high speed protection control laws in place. Therefore, excursion up to VD/MD are expected to happen only in case of external gusts. The protections are normally disabled in speed excursions tests in standar aircraft tests, but, it should be considered that range of altitude is very limited in this category of aircraft as explained in the items (a) and (b).

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FAA	alteração	Regarding section EVE.2160(b), the FAA recommends inserting the following language: "For inadvertent excursions beyond the maximum approved speed, the aircraft must be able to safely recover to the approved flight envelope without requiring exceptional piloting skill, strength, or alertness. This recovery may not result in an unsafe condition, structural damage, or loss of control."		EVE.2160	Accepted.  ANAC agrees to change the sentence of the airworthiness criterion EVE.2160(b) as proposed as there is no difference in the meaning of both sentences and it allows harmonization considering the airworthiness criteria issued by FAA.
TCCA AARDC Flight Test Division	Inclusão	Requirements for recirculating snow need to be included.	Smaller rotors and airfoils are known to be highly susceptible to the deleterious effects of snow and icing.	EVE.2165(a)	Not accepted.  This comment seems to be more applicable to the capability of propellers and engines to properly operate under icing and snow conditions. Therefore, it is more related to EVE.2415 than to EVE.2165. It is noted though that the initial scope of EVE certification process is no operation under icing/snow conditions as there is no suitable standard to approve an EVTOL developed for these conditions yet. EVE and ANAC are currently discussing ways positively prevent operation in icing conditions.
TCCA AARDC Flight Test Division	Inclusão	Recommend including a similar section to establish the operating limitation requirements.	The EVE certification basis appears to have omitted the equivalent EASA section VTOL.2170.	EVE.2170	Not accepted. EVE.2620 covers the intent of EASA VTOL.2170.
FAA	alteração	Regarding section EVE.2215(c), FAA recommends clarifying what constitutes a likely failure. Please specify the failure probability for a likely failure.		EVE.2215	Accepted. ANAC has actually replaced EVE.2215(c) by the EVE.2215(a)(3), which is harmonized with 14 CFR/RBAC 23.2215. Thus, the term "likely" is not present anymore and the failure to be considered for flight load conditions is limited to the asymmetric thrust due to powerplant failure. Regarding the system failures that affect structures, ANAC considers the probabilities according to the interaction of systems and structures requirement of 23/EVE.2205.
FAA	alteração	Regarding section EVE.2215(c), the FAA recommends considering asymmetric thrust resulting from the failure of a powerplant unit. Please also clarify what ANAC considers to be part of the "lift thrust unit." EVE.2215(c) includes failures of the system, component, or lift/thrust unit, which is a broader requirement than §23.2215(c). Is there a difference in applicability between EVE.2215(c) and EVE.2205?		EVE.2215	Accepted. ANAC has replaced EVE.2215(c) by the EVE.2215(a)(3), which is harmonized with 14 CFR/RBAC 23.2215 and considers asymmetric thrust resulting from the failures of a powerplant unit. The "lift thrust unit" term was taken out of EVE.2215. There is no intention to require specific structural or system failures for loads determination, such as propeller blade failures, if they are already addressed by the structures durability requirements of EVE.2240, design and construction principles of EVE.2250(c) or by the interaction of systems and structures of EVE.2205.
TCCA AARDD Eng Division	inclusão	Consider incorporating this under EVE.2235.	This an element in the requirement of Strength and Deformation (23.2235). It is not a load condition. It appears to be a misfit under 2215.	EVE.2215(b)	Not accepted. ANAC understands that vibration and buffeting must not result in structural damage. Thus, to keep consistency with FAA eVTOL Airworthiness Criteria (FAA AC 21.17-4 DRAFT), ANAC will keep this requirement in Flight Loads Condition paragraph.
TCCA AARDD Eng Division	alteração	a) Consider wording such as "not shown to be extremely improbable". b) Consider restore/modify 23.2215(c) to cover asymmetric thrust due to powerplant failure condition and have EVE.2205 cover the remainder of the failure conditions.	a) The word "likely" appears to be colloquial in this context. b) Is this not already covered under EVE.2205 Interaction of Systems and Structures? Also, system failure case treated as a regular design load case distorts the probability-SF relationship under 23.2205.	EVE.2215(c)	Accepted. ANAC has replaced EVE.2215(c) by the EVE.2215(a)(3), which is harmonized with 14 CFR/RBAC 23.2215 and considers asymmetric thrust resulting from the failures of a powerplant unit. Thus, the term "likely" is not used anymore, and ANAC concurs with TCCA that the rest of system failure conditions are already covered by the EVE.2205 Interaction of Systems and Structures.
TCCA AARDD Eng Division	remoção	Consider removing this requirement.	"Effect of ground gust on loads must be considered." Isn't this a duplication of EVE.2225(b)(5)?	EVE.2220	Accepted. ANAC agrees this aspect is already covered by EVE.2225(b)(5), thus this sentence has been removed from the EVE.2220.
FAA	alteração	Regarding section EVE.2220, the FAA recommends removing the following language: "Effects of ground gusts on loads must be considered." This will allow for harmonization with §23.2220.		EVE.2220	Accepted. To enable harmonization with §23.2220 and to avoid redundancy with EVE.2225(b)(5) this sentence has been removed from the EVE.2220.
TCCA AARDD Eng Division	alteração	Recommended change as noted below, to capture all phases of flight: "(c) Engine-driven lifting-device assemblies, considering loads resulting from flight (including transitional flight mode) and ground conditions, as well limit input torque at any lifting-device rotational speed."	Currently: "EVE.2225 The applicant must determine the structural design loads acting on: ... (c) Engine-driven lifting-device assemblies, considering loads resulting from flight and ground conditions, as well limit input torque at any lifting-device rotational speed. " Through the transitional phase the special class aircraft transfigures between the Part 23 and Part 27 type. This is the critical link that underlays the special class aircraft, without which the vehicle is either Part 23 or Part 27. This is the defining feature that necessitates this requirement for this type of special type of aircraft. Yet, to many practitioners in the classical aircraft industry recognition of the transitional phase as a flight mode may not be quite as natural as when the vehicle is in Part 23 or Part 27 mode of flight. Hence it would be necessary, and appropriate, to accentuate this important yet unfamiliar mode of flight. In terms of specificity, such an accentuation does not overstep the granularity of the phrase that follows (as well limit input torque at any lifting-device rotational speed).	EVE.2225(d)	Not accepted. ANAC agrees that the EVE-100 configurations need clarification for the calculation of structural design loads for transitional flight phases, and that this is an important phase of flight for loads evaluation. On the other hand, ANAC understands that the current requirement EVE.2200(g) which reads "The applicant must determine the structural design envelope (...) (g)Thrust-borne, wing-borne, and semi-thrust-borne flight configurations, with associated flight load envelopes." already addresses the transitional flight phase by the term "semi-thrust-borne flight configuration".

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDD Eng Division	alteração	It is recommended to adopt the same language as EASA's SC-VTOL Category Enhanced requirement of VTOL.2240(e): “(e) ... provisions for in-service monitoring of parts having an important bearing on safety in operations must be established.”	The intended use of this aircraft will have it flying over populated areas to an extent not typical of General Aviation aircraft. For example, it is conceivable that every phase of flight of this aircraft occurs over densely populated areas, as it flies passengers from one part of a congested city to another. As such, it would be prudent to impose requirements similar to EASA's SC-VTOL Category Enhanced requirement of VTOL.2240(e).	EVE.2240	<p>[EN] Not accepted. Anac made no change as a result of this comment. Anac is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. Currently, Anac does not require in-service monitoring for critical parts of other aircraft types. Thus, Anac does not plan to require in-service monitoring of critical parts for powered-lift at this moment. As a reference, Anac's airworthiness criteria for EVE Model EVE-100 are harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001 regarding not requiring in-service monitoring of critical parts.</p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário. A Anac é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. Atualmente, a Anac não exige o monitoramento em serviço para partes críticas de outros tipos de aeronaves. Assim, a Anac não planeja nesse momento exigir esse monitoramento de aeronaves de sustentação por potência. Como referência, os critérios de aeronavegabilidade da Anac para o modelo EVE EVE-100 estão harmonizados com os critérios de aeronavegabilidade da FAA para os modelos JAS4-1 da Joby bem como o M001 da Archer no que diz respeito à não exigência de monitoramento em serviço de peças críticas.</p>
EVE AIR MOBILITY	Exclusão	EVE.2240 - Structural durability  Comment 1: Remove the paragraph EVE.2240(b).  Comment 2: Replace, in paragraph EVE.2240(a), the reference to the requirement "23.1529" for a reference to the requirement "EVE.1529".	<p>Comment 1: We understand that the requirement in the proposed EVE.2240(b) is already covered in the requirement in item EVE.2240(a), since EVE.2240(b) states that, if a fail-safe concept is used to comply with EVE.2240(a), the structure must be also damage tolerant. As EVE.2240(a) requires the structure to be damage tolerant, a fail-safe design is already not sufficient to comply with that requirement. Therefore, we understand that requiring the structure to be damage tolerant in addition to being fail-safe is just repeating what is already required by EVE.2240(a), and, thus, EVE.2240(b) is redundant and unnecessary.</p> <p>Comment 2: Typo correction.</p>	EVE.2240	<p>[EN] Comment 1. Not accepted. ANAC made no change as a result of this comment. Damage tolerance is one available option to use when complying with EVE.2240(a). Other options include safe-life and fail-safe methodologies. There are long-standing and known deficiencies with fail-safe methodologies. For instance, the FAA identified potential shortcomings in the ability to detect all possible failure scenarios and ensure that all structural failures would be immediately obvious and corrected before further flight [NPRM for amendment 64 of 14 CFR Part 23, AC 23-13A]. Structural durability requirements (such as RBAC 27.571(d))—concomitant with associated guidance material (such as AC 27-1B, AC 23-13A, and AC 91-82A)—overcome these deficiencies by requiring appropriate inspections when fail-safe methodologies are used. These inspections are based on damage tolerance evaluations, for instance. These inspections intend to ensure that a fail-safe structure maintains the required safety margins without extended periods of operation with reduced safety margins. EVE.2240(b) reflects this intent on powered-lift aircraft. This approach is consistent with RBAC 21.17(b), which directs ANAC to use the requirements from existing airworthiness standards, as appropriate, to determine the equivalent level of safety for the aircraft. As a reference, ANAC's EVE.2240(b) is harmonized with FAA's JS4.2240(b) and FAA's AM1.2240(b).</p> <p>[PT] Comentário 1. Não aceito. Não houve alteração como resultado desse comentário. A tolerância ao dano é uma opção disponível para uso ao cumprir com EVE.2240(a). Outras opções incluem a metodologia de vida segura (safe-life) e a de falha segura (fail-safe). Deficiências da metodologia de falha segura são conhecidas de longa data. Por exemplo, a FAA identificou possíveis lacunas na capacidade de detectar todos os cenários de falha possíveis e garantir que todas as falhas estruturais fossem imediatamente óbvias e corrigidas antes do próximo voo [NPRM para emenda 64 do 14 CFR Parte 23, AC 23-13A]. Os requisitos de durabilidade estrutural (e.g., RBAC 27.571(d)), juntamente com os materiais de orientação associados (e.g., AC 27-1B, AC 23-13A e AC 91-82A), superam essas deficiências ao exigir inspeções apropriadas quando metodologias de falha segura são utilizadas. Essas inspeções são baseadas em avaliações de tolerância a danos, por exemplo. Elas visam garantir que uma estrutura por falha segura mantenha as margens de segurança necessárias sem períodos prolongados de operação com margens de segurança reduzidas. EVE.2240(b) reflete essa intenção no contexto das aeronaves de sustentação por potência. Essa abordagem é consistente com RBAC 21.17(b), o qual orienta a ANAC a usar os requisitos aeronavegabilidade existentes, conforme apropriado, para determinar o nível equivalente de segurança para a aeronave. Como referência, o EVE.2240(b) da ANAC está harmonizado com o JS4.2240(b) e o AM1.2240(b) da FAA.</p> <p>[EN] Comment 2. Accepted. Anac made changes as a result of this comment. The revision to EVE-2240(a) replaces "section 23.1529" with "EVE.1529".</p> <p>[PT] Comentário 2. Aceito. Houve alteração como resultado desse comentário. A revisão do EVE-2240(a) substitui a "seção 23.1529" por "EVE.1529".</p>

Relatório de Análise de Contribuições

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Embraer S.A.	Exclusão	EVE.2240 - Structural durability.  Comment 1: Remove the paragraph EVE.2240(b).  Comment 2: Replace, in paragraph EVE.2240(a), the reference to the requirement "23.1529" for a reference to the requirement "EVE.1529".	Comment 1: We understand that the requirement in the proposed EVE.2240(b) is already covered in the requirement in item EVE.2240(a), since EVE.2240(b) states that, if a fail-safe concept is used to comply with EVE.2240(a), the structure must be also damage tolerant. As EVE.2240(a) requires the structure to be damage tolerant, a fail-safe design is already not sufficient to comply with that requirement. Therefore, we understand that requiring the structure to be damage tolerant in addition to being fail-safe is just repeating what is already required by EVE.2240(a), and, thus, EVE.2240(b) is redundant and unnecessary.  Comment 2: Type correction.	EVE.2240	<b>[EN] Comment 1.</b> Not accepted. ANAC made no change as a result of this comment. Damage tolerance is one available option to use when complying with EVE.2240(a). Other options include safe-life and fail-safe methodologies. There are long-standing and known deficiencies with fail-safe methodologies. For instance, the FAA identified potential shortcomings in the ability to detect all possible failure scenarios and ensure that all structural failures would be immediately obvious and corrected before further flight [NPRM for amendment 64 of 14 CFR Part 23, AC 23-13A]. Structural durability requirements (such as RBAC 27.571(d))—concomitant with associated guidance material (such as AC 27-1B, AC 23-13A, and AC 91-82A)—overcome these deficiencies by requiring appropriate inspections when fail-safe methodologies are used. These inspections are based on damage tolerance evaluations, for instance. These inspections intend to ensure that a fail-safe structure maintains the required safety margins without extended periods of operation with reduced safety margins. EVE.2240(b) reflects this intent on powered-lift aircraft. This approach is consistent with RBAC 21.17(b), which directs ANAC to use the requirements from existing airworthiness standards, as appropriate, to determine the equivalent level of safety for the aircraft. As a reference, ANAC's EVE.2240(b) is harmonized with FAA's JS4.2240(b) and FAA's AM1.2240(b). <b>[PT] Comentário 1.</b> Não aceito. Não houve alteração como resultado desse comentário. A tolerância ao dano é uma opção disponível para uso ao cumprir com EVE.2240(a). Outras opções incluem a metodologia de vida segura (safe-life) e a de falha segura (fail-safe). Deficiências da metodologia de falha segura são conhecidas de longa data. Por exemplo, a FAA identificou possíveis lacunas na capacidade de detectar todos os cenários de falha possíveis e garantir que todas as falhas estruturais fossem imediatamente óbvias e corrigidas antes do próximo voo [NPRM para emenda 64 do 14 CFR Parte 23, AC 23-13A]. Os requisitos de durabilidade estrutural (e.g., RBAC 27.571(d)), juntamente com os materiais de orientação associados (e.g., AC 27-1B, AC 23-13A e AC 91-82A), superam essas deficiências ao exigir inspeções apropriadas quando metodologias de falha segura são utilizadas. Essas inspeções são baseadas em avaliações de tolerância a danos, por exemplo. Elas visam garantir que uma estrutura por falha segura mantenha as margens de segurança necessárias sem períodos prolongados de operação com margens de segurança reduzidas. EVE.2240(b) reflete essa intenção no contexto das aeronaves de sustentação por potência. Essa abordagem é consistente com RBAC 21.17(b), o qual orienta a ANAC a usar os requisitos aeronavegabilidade existentes, conforme apropriado, para determinar o nível equivalente de segurança para a aeronave. Como referência, o EVE.2240(b) da ANAC está harmonizado com o JS4.2240(b) e o AM1.2240(b) da FAA. <b>[EN] Comment 2.</b> Accepted. Anac made changes as a result of this comment. The revision to EVE-2240(a) replaces "section 23.1529" with "EVE.1529". <b>[PT] Comentário 2.</b> Aceito. Houve alteração como resultado desse comentário. A revisão do EVE-2240(a) substitui a "seção 23.1529" por "EVE.1529".
GAMA	Inclusão	GAMA recommends that Anac establishes explicit and unambiguous criteria for high-energy fragments to enhance the consistency and effectiveness of assessing structural durability.	GAMA expresses concern regarding the absence of established criteria for "high energy fragment." Industry also underscores caution regarding considerations related to "containment." GAMA highlights the lack of a standard position on what components would qualify as high energy fragments, particularly in the context of the reduced rotational speeds and kinetic energy levels of electric engine designs.	EVE.2240 – Structural Durability	<b>[EN] Not Accepted.</b> ANAC made no change as a result of this comment. Noted. This topic is an ongoing discussion with foreign certification authorities. For the EVE-100, aircraft rotating parts, except for propeller blades or rotors, should be evaluated using typical rotor burst methods, including shielding where practical. EVE.2240(d) is performance-based. Anac will clarify the means of compliance with EVE.2240(d) with the applicant, as needed. As a reference, ANAC's EVE.2240(d) is harmonized with FAA's JS4.2240(c) and FAA's AM1.2240(c).  <b>[PT] Não Aceito.</b> Não houve alteração como resultado desse comentário. Anotado. Este tópico é uma discussão em andamento com autoridades de certificação estrangeiras. Para o EVE-100, partes giratórias da aeronave, exceto pás de hélices ou rotores, devem ser avaliadas usando métodos típicos de explosão de rotor, incluindo blindagem quando aplicável. O EVE.2240(d) é baseado em desempenho. A Anac esclarecerá os meios de cumprimento com o EVE.2240(d) com o requerente, conforme necessário. Como referência, o EVE.2240(d) da ANAC está harmonizado com o JS4.2240(c) e o AM1.2240(c) da FAA.
EASA	alteração	EVE.2240(b) refers to damage tolerance to reliably detect structural damage before it could result in structural failure.	It is recommended to clarify in the requirement, in the response to the comments or in means of compliance that damage tolerance includes fatigue evaluation for metallic structure (similar to 29.571).	EVE.2240(b)	<b>[EN] Not accepted.</b> Anac made no change as a result of this comment. Noted. Anac will clarify the means of compliance with EVE.2240(b) with the applicant, as needed.  <b>[PT] Não aceito.</b> Não houve alteração como resultado desse comentário. Anotado. A Anac esclarecerá os meios de conformidade com o EVE.2240(b) com o requerente, conforme necessário.

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TCCA AARDD Eng Division	alteração	It is recommended to adopt the same language as EASA's SC-VTOL Category Enhanced requirement of VTOL.2240(b).	Imposing DTA may be too prescriptive. For example, it is possible that some failures are immediately obvious to the crew, either when the failure occurs, or on the crew's next walkaround. In those cases, a traditional limit load check for fail-safety could be acceptable, as no crack growth is expected. Of course, arguments as to the "obviousness" of the failure (Probability of Detection) would have to be discussed at the MOC level, but setting DTA as the expectation at the rule level would remove this option.	EVE.2240(b)	<p>[EN] Not accepted. Anac made no change as a result of this comment. Damage tolerance is one available option to use when complying with EVE.2240(a). Other options include safe-life and fail-safe methodologies.</p> <p>There are long-standing and known deficiencies with fail-safe methodologies. For instance, the FAA identified potential shortcomings in the ability to detect all possible failure scenarios and ensure that all structural failures would be immediately obvious and corrected before further flight [NPRM for amendment 64 of 14 CFR Part 23, AC 23-13A]. Structural durability requirements (such as RBAC 27.571(d))—concomitant with associated guidance material (such as AC 27-1B, AC 23-13A, and AC 91-82A)—overcome these deficiencies by requiring appropriate inspections when fail-safe methodologies are used. These inspections are based on damage tolerance evaluations, for instance. These inspections intend to ensure that a fail-safe structure maintains the required safety margins without extended periods of operation with reduced safety margins.</p> <p>EVE.2240(b) reflects this intent on powered-lift aircraft. This approach is consistent with RBAC 21.17(b), which directs Anac to use the requirements from existing airworthiness standards, as appropriate, to determine the equivalent level of safety for the aircraft.</p> <p>As a reference, Anac's EVE.2240(b) is harmonized with FAA's JS4.2240(b) and AM1.2240(b).</p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário. A tolerância ao dano é uma opção disponível para uso ao cumprir com EVE.2240(a). Outras opções incluem a metodologia de vida segura (safe-life) e a de falha segura (fail-safe). Deficiências da metodologia de falha segura são conhecidas de longa data. Por exemplo, a FAA identificou possíveis lacunas na capacidade de detectar todos os cenários de falha possíveis e garantir que todas as falhas estruturais fossem imediatamente óbvias e corrigidas antes do próximo voo [NPRM para emenda 64 do 14 CFR Parte 23, AC 23-13A]. Os requisitos de durabilidade estrutural (e.g., RBAC 27.571(d)), juntamente com os materiais de orientação associados (e.g., AC 27-1B, AC 23-13A e AC 91-82A), superam essas deficiências ao exigir inspeções apropriadas quando metodologias de falha segura são utilizadas. Essas inspeções são baseadas em avaliações de tolerância a danos, por exemplo. Elas visam garantir que uma estrutura por falha segura mantenha as margens de segurança necessárias sem períodos prolongados de operação com margens de segurança reduzidas.</p> <p>EVE.2240(b) reflete essa intenção no contexto das aeronaves de sustentação por potência. Essa abordagem é consistente com RBAC 21.17(b), o qual orienta a Anac a usar os requisitos aeronavegabilidade existentes, conforme apropriado, para determinar o nível equivalente de segurança para a aeronave.</p> <p>Como referência, o EVE.2240(b) da Anac está harmonizado com o JS4.2240(b) e o AM1.2240(b) da FAA.</p>
ASD - Europe	esclarecimento	To allow mutual recognition between Anac and EASA, please could you clarify the meaning of minimization and consider a possible alignment of this requirement to that of EASA MOC 2240(d) and Eurocae ED-306.  - EASA SC-VTOL Enhanced   No CAT - EASA SC-VTOL Basic   Up to 6 Pax - Nothing to do - EASA SC-VTOL Basic   7-9 Pax - Minimization - Anac EVE   Minimization	<p>The aircraft must be designed to minimize hazards to the aircraft due to structural damage caused by high-energy fragments from an uncontained engine or rotating machinery failure.</p> <p>This Paragraph is syntactically identical to the EASA SC-VTOL one. However, in the European regulation this has different implication depending on the Category and the number of passengers. For Cat. Enhanced VTOLs this means that no Catastrophic events are allowed following the first high-energy fragment release, and that there are allowed residual risks for subsequent failures and at aircraft level. On the other side, Category Basic aircraft Level 1 and 2 (up to 6 passengers) are not required to demonstrate any compliance to this requirement. As an example EVE-100 will not be able to be certified in the Category Enhanced. A minimization exercise is required for Level 3 aircraft, using guidelines such as the AMC20-128A. Considering that other EVE-100 requirements are aligned to FAR23 Level 3 &amp; 4 aircraft, this may imply that only a minimization will be required. This is a major misalignment which has a huge implications on the aircraft architecture and may not allow mutual recognition between the authorities. If the above is confirmed, the minimization criteria for distributed thrust is questionable regarding the risk to occupants, including in commercial air transport. In particular the risk is increased on the distributed thrust architecture compared to current aeroplane and helicopter design. Therefore maintaining this requirement would possibly allow for in a "regression" on the overall level of safety.</p>	EVE.2240(d)	<p>[EN] Noted. ANAC made no change as a result of this comment. This topic is an ongoing discussion with foreign certification authorities. For the EVE-100, aircraft rotating parts, except for propeller blades or rotors, should be evaluated using typical rotor burst methods, including shielding where practical. EVE.2240(d) is performance-based. Anac will clarify the means of compliance with EVE.2240(d) with the applicant, as needed. As a reference, ANAC's EVE.2240(d) is harmonized with FAA's JS4.2240(c) and FAA's AM1.2240(c).</p> <p>[PT] Anotado. Não houve alteração como resultado desse comentário. Este tópico é uma discussão em andamento com autoridades de certificação estrangeiras. Para o EVE-100, partes giratórias da aeronave, exceto pás de hélices ou rotores, devem ser avaliadas usando métodos típicos de explosão de rotor, incluindo blindagem quando aplicável. O EVE.2240(d) é baseado em desempenho. A Anac esclarecerá os meios de cumprimento com o EVE.2240(d) com o requerente, conforme necessário. Como referência, o EVE.2240(d) da ANAC está harmonizado com o JS4.2240(c) e o AM1.2240(c) da FAA.</p>



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Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EASA	Inclusão	There is no equivalence to SC-VTOL 2240(e) in Anac airworthiness criteria for the Model EVE-100. EASA identifies in SC-VTOL 2240(e) the need for higher safety objectives compared to RBAC 23. Therefore, the EASA Special Condition includes the requirement: "For Category Enhanced, provisions for in-service monitoring of parts having an important bearing on safety in operations must be established." Due to the novelty, operation and potential high number of aircraft that could be in-service, monitoring of parts is considered an important safety improvement.	It is proposed to include a requirement for in-service monitoring of parts having an important bearing on safety in operations.	EVE.2240(e) and EVE.2510(c).	[EN] Not accepted. Anac made no change as a result of this comment. Anac is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. Currently, Anac does not require in-service monitoring for critical parts of other aircraft types. Thus, Anac does not plan to require in-service monitoring of critical parts for powered-lift at this moment. As a reference, Anac's airworthiness criteria for EVE Model EVE-100 are harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001 regarding not requiring in-service monitoring of critical parts.  [PT] Não aceito. Não houve alteração como resultado desse comentário. A Anac é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. Atualmente, a Anac não exige o monitoramento em serviço para partes críticas de outros tipos de aeronaves. Assim, a Anac não planeja nesse momento exigir esse monitoramento de aeronaves de sustentação por potência. Como referência, os critérios de aeronavegabilidade da Anac para o modelo EVE-100 estão harmonizados com os critérios de aeronavegabilidade da FAA para os modelos JAS4-1 da Joby bem como o M001 da Archer no que diz respeito à não exigência de monitoramento em serviço de peças críticas.
TCCA AARDD Eng Division	alteração	Recommend rewording as follows: "EVE.2241 – Ground and Air Resonance The aircraft must be free from ground and air resonances for any configuration and condition of operation on the ground and in flight."	It is surprising to see a reference to Aeromechanical stability. Aeromechanics is a branch of physics that is rarely, if at all, mentioned in the civil aviation airworthiness standards unlike Aeroelasticity or Vibration, for example. Among aeromechanical instabilities are rotary-wing phenomena of flap-lag or pitch-flap rotor flutter and ground resonance. But these instabilities are already considered in the helicopter flutter and ground resonance airworthiness standards. Since, in the proposed eVTOL criteria, the aircraft performance-based rules are used as the starting point, it is necessary to add to them the ground and air resonance considerations. But identifying these considerations clearly and similarly (where it is possible) to the helicopter and aircraft standards in the eVTOL criteria would be consistent with these already existing airworthiness standards. Additionally, this introduction of the Aeromechanical stability would avoid creating an ambiguity about the location of the rotor flutter consideration that should remain to be a part of the well-established Aeroelastic stability requirement (EVE.2245 – Aeroelasticity).	EVE.2241	Not accepted. ANAC understands that there is a clear distinction between aeroelastic instabilities that are addressed under EVE.2245 and the purely dynamic instabilities (without aerodynamic influence) such as ground and air resonance addressed by EVE.2241. ANAC considers that the term "aeromechanical instability" encompasses not only ground and air resonance effects, but also instabilities such as fly by wire control systems interaction with the structural modes. To conclude, it is expected that by the term "dangerous oscillations" in EVE.2241 the applicant will perform ground/flight test to verify the absence of harmful oscillations.
FAA	alteração	Regarding section EVE.2241, the FAA recommends adding "dangerous oscillations and" so that the section reads: "The aircraft must be free from dangerous oscillations and aeromechanical instabilities for any configuration and condition of operation on the ground and in flight."  This would allow the regulation to handle the ground resonance criteria of EVE.2170 or 27.241.		EVE.2241	Accepted. The term "dangerous oscillations" has been added to EVE.2241 coming from the 14 CFR/RBAC 27.241 to address possible ground (and air) resonance due to the rotating lifters and possible lifter/fuselage interaction. It also provides a harmonized requirement with FAA AC 21.17-4 DRAFT.
TCCA AARDD Eng Division	Alteração	Recommend rewording as follows: "EVE.2245 - Aeroelasticity (a) ... (3) Accounting for critical degrees of freedom; and..."	The proposed change from "accounting for critical degrees of freedom" in the aircraft performance based Aeroelasticity rule to "accounting for critical structural modes" in EVE.2245 is not needed. The intent behind accounting for critical degrees of freedom is to consider all possible aeroelastic instabilities for the type design by thinking about those aircraft displacements that are potentially capable to affect aeroelastic stability. The method or how this evaluation should be accomplished, e.g., by obtaining the structural modes or not, is not prescribed in the rule. A structural mode is a vibrational or natural mode of the structure. It is a distribution of displacements along the aircraft structure that is independent from others for a certain criterion. It is always associated with a corresponding frequency of the displacement, and it is usually obtained with a finite element model-based aircraft modal analysis. These modes are then employed in a flutter analysis to determine the flutter criticality. Considering structural modes is not necessary in the static aeroelastic stability analyses, although knowing them sometimes could be helpful to recognize the potential for divergence. In conclusion, having determined all the structural modes may or may not aid the aeroelastic stability analysis. Thus, the existing requirement to be able to account for critical degrees of freedom is notably better.	EVE.2245	Not accepted. ANAC agrees with TCCA that there is no need to find critical structural modes when evaluating the static aeroelastic stability. On the other hand, for the dynamic aeroelastic stability analysis, ANAC understands one will have to find the critical structural modes to investigate all the flutter modes. Moreover, ANAC seeks harmonization with the FAA (AC 21.17-4 DRAFT) whenever possible.
EDUARDO LOBATO SALLES MOULIN LOUZADA	Inclusão	CARENAR...	SEGURANÇA...	EVE.2250	[EN] Not Accepted. ANAC made no change as a result of this comment. This comment was deemed incomplete/out of scope.  [PT] Não aceito. Não houve alteração como resultado desse comentário. Este comentário foi considerado incompleto/fora do escopo.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDD Eng Division	Inclusão	Recommend adding the following to EVE.2250(c), in line with VTOL.2250(c): "A single failure must not have a catastrophic effect upon the aircraft."	The intended use of this aircraft will have it flying over populated areas to an extent not typical of General Aviation aircraft. For example, it is conceivable that every phase of flight of this aircraft occurs over densely populated areas, as it flies passengers from one part of a congested city to another. As such, it would be prudent to impose requirements similar to EASA's SC-VTOL Category Enhanced requirement of VTOL.2250(c) regarding single failures.	EVE.2250(c)	<p>[EN] <b>Accepted.</b> Anac made changes as a result of this comment. In 2023, EASA and FAA met concerned harmonization activities on the requirements and means of compliance for type certification of powered-lift/VTOL aircraft generally [Docket No. FAA-2021-0638]. As a result of this meeting, and for consistency with the harmonized general criteria, the FAA added the sentence "The applicant must prevent single failures from resulting in a catastrophic effect upon the aircraft" to JS4.2250(c). The revision to Anac's EVE.2250(c) includes this sentence. Anac's EVE.2250(c) is then harmonized with FAA's JS4.2250(c), FAA's AM1.2250(c), FAA's AM1.2250(c), and EASA VTOL.2250(c) (Issue 2).</p> <p>This sentence aims to clarify that while single point failures are allowed in the design, they must be prevented from resulting in a catastrophic effect on the aircraft. For structural elements, the use of multiple-load path (MLP) structures should be given high priority while single-load path (SLP) structures are acceptable where necessary, provided specific considerations (e.g., on design, materials, process control, tests, maintenance) are in place [AC 25.571-1D, TAMCSWG Report*]. This approach is consistent with RBAC 21.17(b), which directs Anac to use existing airworthiness requirements and associated guidance material, as appropriate, to determine the equivalent level of safety for the aircraft.</p> <p>* Transport Airplane Metallic and Composite Structures Working Group (TAMCSWG) – Recommendation report to FAA: Single-Load Path Structures <a href="https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information?documentID=5463">https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information?documentID=5463</a></p> <p>[PT] <b>Aceito.</b> Houve alteração como resultado desse comentário. Em 2023, a EASA e a FAA se reuniram para discutir atividades de harmonização sobre os requisitos e meios de conformidade gerais para a certificação de tipo de aeronaves de sustentação por polhência [Docket No. FAA-2021-0638]. Como resultado dessa reunião, e para consistência com os critérios gerais harmonizados, a FAA adicionou a frase "O requerente deve impedir que falhas pontuais resultem em um efeito catastrófico na aeronave" ao JS4.2250(c). A revisão do EVE.2250(c) da Anac inclui esta frase. O EVE.2250(c) da Anac está então harmonizado com o JS4.2250(c) e o AM1.2250(c) da FAA e o VTOL.2250(c) da EASA.</p> <p>Essa frase visa esclarecer que, embora falhas pontuais sejam permitidas no projeto, elas devem ser evitadas para não resultar em um efeito catastrófico na aeronave. Para elementos estruturais, deve-se dar alta prioridade ao uso de estruturas de caminho múltiplo de carga, enquanto estruturas de caminho único de carga são aceitáveis onde necessário, desde que considerações específicas (por exemplo, em projeto, materiais, controle de processo, testes, manutenção) estejam em vigor [AC 25.571-1D, Relatório TAMCSWG*]. Esta abordagem está em conformidade com o RBAC 21.17(b), que orienta a Anac a usar os requisitos de aeronavegabilidade existentes e materiais orientativos associados, conforme apropriado, para determinar o nível equivalente de segurança para a aeronave.</p> <p>* Grupo de Trabalho de Estruturas Metálicas e Compostas de Aviação de Transporte (TAMCSWG) – Relatório de Recomendação à FAA: Estruturas de Caminho Único de Carga <a href="https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information?documentID=5463">https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information?documentID=5463</a></p>
ASD - Europe	alteração	A clarification at requirement level is recommended.	Out of thermal effect, some environmental conditions may also affect the strength of components (humidity for composites for ex). Anac requirement is not explicit enough to indicate other than thermal effects need to be accounted for.	EVE.2260(e)	<p>[EN] Not accepted. Anac made no change as a result of this comment. Environmental effects are addressed in EVE.2260(a). EVE.2260 is harmonized with RBAC 23.2260 and 14 CFR 23.2260.</p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário. Os efeitos ambientais são tratados no EVE.2260(a). O EVE.2260 está harmonizado com o RBAC 23.2260 e o 14 CFR 23.2260.</p>
TCCA AARDD Eng Division	Alteração	Recommend replacing "thermal effects" by "environmental effects".	EASA's SC-VTOL changes "thermal effects" to "environmental effects", which is meant to account for the fact that moisture/UV also affects critical properties of polymer matrix composites.	EVE.2260(e)	<p>[EN] Not accepted. Anac made no change as a result of this comment. Environmental effects are addressed in EVE.2260(a). EVE.2260 is harmonized with RBAC 23.2260 and 14 CFR 23.2260.</p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário. Os efeitos ambientais são tratados no EVE.2260(a). O EVE.2260 está harmonizado com o RBAC 23.2260 e o 14 CFR 23.2260.</p>
TCCA AARDD Eng Division	Alteração	Recommend rewording to align with VTOL.2270(a)(3), i.e. "Items of mass (...) within or adjacent to aft of the cabin, that could injure an occupant..."	"Items of mass (...) within or aft of the cabin, that could injure an occupant..." Given the nature of VTOL, and potential aircraft trajectory in the event of an emergency landing, compliance with this requirement should also include consideration for items of mass located above the cabin (not just within or aft of the cabin). VTOL.2270(a)(3) uses wording "within or adjacent to the cabin" which covers the intent.	EVE.2270(a)(3)	<p>Partially Accepted. The comment highlight that compliance with this requirement should also consider mass items located above the cabin (not just inside or behind it) and suggested using the term "adjacent" from EASA's VTOL.2270(a)(3) requirement. ANAC partially agreed with this comment and modified paragraph EVE.2270(a)(3) to better reflect the intent of the rule. ANAC replaced the term "aft of" with "external to." With this change, the requirement now considers mass items coming from different directions, which, in emergency conditions, may injure an occupant. It is worth noting that this change makes the requirement EVE.2270(a)(3) more similar to EASA's VTOL.2270(a)(3) requirement.</p>
TCCA AARDD Eng Division	Alteração	The requirements of EVE.2300 should be harmonized with those applicable for powerplants (lift and thrust), as well as all supporting systems. We strongly recommend all these integrated functions be covered under the EVE.2510 overarching safety requirements, including a general 'no single failure' requirement applicable to all systems (see also separate comment against EVE.2500 / .2505 / .2510).	Between paragraph 23.2510 and JS4.2300, there is currently no requirement to ensure single failures in flight control functions would not prevent CSF&L. This is a significant concern. Since the flight control functions are indissociable from the propulsion providing thrust and lift functions, the 'no single failure' safety objectives – along with the other safety objectives of EVE.2510 – should be applicable to flight control systems and propulsion systems, and should preferably be addressed under EVE.2510, at aircraft level, for the integrated systems.	EVE.2300	<p>Accepted. ANAC revised the EVE.2510(a) to cover this concern.</p>

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDD Eng Division	outros	Comment only.	TCCA's expectation is that the requirements and MoCs applicable to the FBW flight control systems on model EVE-100 aircraft would be consistent with those issued for previous FBW certifications. While of different types of aircraft, these reflect design and safety objectives which are commensurate with the anticipated use of model EVE-100 for commercial air-taxi operations, and generally operations in urban densely populated areas. TCCA considers MoCs defined for EASA SC VTOL.2300 generally meet these expectations.	EVE.2300	ANAC understands that most of the FBW requirements and MoCs are applicable to flight control systems regardless of the aircraft category. Considering that the EVE-100 proposed certification basis is based on the new Part 23 Amdt. 64, which requirements are performance based, most of the FBW requirements for Part 25 airplanes will be considered MoCs for EVE-100 model. The EVE-100 requirements and MoCs shall keep the same level of safety of a Part 23 airplane and a Part 27 rotorcraft to be operated over urban densely populated area.
EVE AIR MOBILITY	Exclusão	EVE.2300 - Flight Control Systems  To remove EVE.2300(b).	EVE-100 does not have Trim System, therefore, the requirement of paragraph EVE.2300(b) is not applicable to the project and it is unnecessary.	EVE.2300	Not accepted. Although the current design of EVE-100 does not have a Trim System or a Trim Function, ANAC understands that keeping EVE.2300(b) requirement avoids the issuance of a special condition in the event of a change in the design during the certification process. If the project does not change, this requirement will not be applicable and Eve will not have to demonstrate compliance with it.
Embraer S.A.	Exclusão	EVE.2300 - Flight Control Systems  To remove EVE.2300(b).	EVE-100 does not have Trim System, therefore, the requirement of paragraph EVE.2300(b) is not applicable to the project and it is unnecessary.	EVE.2300	Not accepted. Although the current design of EVE-100 does not have a Trim System or a Trim Function, ANAC understands that keeping EVE.2300(b) requirement avoids the issuance of a special condition in the event of a change in the design during the certification process. If the project does not change, this requirement will not be applicable and Eve will not have to demonstrate compliance with it.
TCCA AARDD Eng Division	Alteração	Recommend avoiding reference to 'primary flight controls', or clarifying how the term would relate to integrated thrust / lift / flight control functions. Using more generic wording similar to that of VTOL.2300(a)(3) could also be an avenue.	<i>"Ensure that the flightcrew is made suitably aware whenever the means of primary flight control approaches the limits of control authority."</i> Since the design integrates flight and propulsion control system (integration of thrust / lift / flight control functions), the reference to 'primary flight controls' is confusing in this context, and the intended scope would be unclear.	EVE.2300(a)(3)	Accepted.
TCCA AARDD Eng Division	inclusão	Add requirement, either as new paragraph or added to EVE.2305(b), similar to that in VTOL.2305(b): <i>"The aircraft must have a reliable means of (...) holding the aircraft in position when parked."</i>	Paragraph EVE.2305 is missing a requirement addressing ability to hold the aircraft in position when parked (parking brake).	EVE.2305	Not accepted. The FAA NPRM Docket No. FAA-2015-1621, Notice No. 16-01, addresses the safety intent of the rule § 23.735, paragraph (b), and subsequently reflects the existing requirement in § 23.2305(b) for a reliable means of stopping the aircraft in the FAA Final Rule Docket No. FAA-2015-1621 that ANAC understands as acceptable. Following this discussion, no modifications were implemented in response to the comment.
EVE AIR MOBILITY	Alteração	EVE.2305 - Landing gear systems  In EVE.2305(b), to change "aircraft" for "Aircraft". In the end of EVE.2305(c)(2) is missing the Period mark.	Typo correction.	EVE.2305	Accepted. The typos of the requirement must be corrected.
Embraer S.A.	Alteração	EVE.2305 - Landing gear systems  In EVE.2305(b), to change "aircraft" for "Aircraft". In the end of EVE.2305(c)(2) is missing the Period mark.	Typo correction.	EVE.2305	Accepted. The typos of the requirement must be corrected.
UK CAA	inclusão	EVE. 2311. The CAA agrees that this category of aircraft and its intended operations will place it at increased risk from bird strike, so the inclusion of specific criteria for CSF&L following a strike from a 1kg bird is supported. It is however noted that Anac has not included any criteria for the evaluation of the effects of a multiple bird strike, as described in MOC to SC.VTOL.2250(f). While the ARAC RBSWG report did not recommend multiple bird strike evaluation criteria for classic rotorcraft, the intended operational environment and low noise signature of these new aircraft, means that the historic data for rotorcraft bird strikes may not be directly applicable.		EVE.2311	[EN] Not accepted. ANAC made no change as a result of this comment. ANAC is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. Currently, ANAC does not require multiple bird strike evaluation for other aircraft types. The safety level obtained with the single 2.2-lb (1.0-kg) bird strike requirement for transport category rotorcraft (as established in RBAC 29.631) has been demonstrated in service to be sufficient. After reviewing the FAA's National Wildlife Strike Database, the ARAC RBSWG report* recommended a novel single 2.2-lb (1.0-kg) bird strike requirement for normal category rotorcraft. ARAC RBSWG report* did not recommend rule changes to address multiple bird strikes. ANAC's EVE.2311 was based on the increased exposure to birds in the environment in which the Model EVE-100 is expected to operate, the expectation of public safety, the recommendations presented in the ARAC RBSWG report*, and RBAC 29.631. As a reference, ANAC's EVE.2311 is harmonized with FAA's JS4.2311 and FAA's AM1.2311. EVE.3377(b) addresses ingestion from likely sources such as foreign objects, birds, ice, and hail, and is intended to capture engine effects from any ingestion source determined to be applicable to the EVE-100 electric engine design. Common cause effects across multiple systems are addressed under applicable aircraft-level requirements, including EVE.2510. * Rotorcraft Bird Strike Working Group (RBSWG) Recommendations to the Aviation Rulemaking Advisory Committee (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a>  [PT] Não aceito. Não houve alteração como resultado desse comentário. A ANAC é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. Atualmente, a ANAC não requer a consideração de múltiplos impactos de pássaros em outros tipos de aeronaves. O nível de segurança obtido com a exigência de único impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria de transporte (conforme estabelecido no RBAC 29.631) demonstrou ser suficiente em serviço. Após revisar o Banco de Dados Nacional de Colisão com Vida Selvagem da FAA, o relatório ARAC RBSWG* recomendou um novo requisito de único impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria normal. O relatório do ARAC RBSWG* não recomendou mudanças na regulamentação para tratar de múltiplos impactos de pássaros. A EVE.2311 da ANAC foi baseada na maior exposição a pássaros no ambiente em que se espera que o modelo EVE-100 opere, na expectativa de segurança operacional da sociedade, nas recomendações apresentadas no relatório do ARAC RBSWG*, e no RBAC 29.631. Como referência, o EVE.2311 da ANAC está harmonizado com o JS4.2311 e o AM1.2311 da FAA. O EVE.3377(b) aborda a ingestão de fontes prováveis como objetos estranhos, pássaros, gelo e grânulo, e tem como objetivo capturar os efeitos no motor de qualquer fonte de ingestão que seja determinada como aplicável ao projeto do motor elétrico EVE-100. Efeitos de causa comum em múltiplos sistemas são tratados sob requisitos aplicáveis ao nível da aeronave, incluindo o EVE.2510. * Recomendações do Grupo de Trabalho de Colisão de Pássaros em Aeronaves de Asa Rotativas (RBSWG) para o Comitê Consultivo de Regulamentação da Aviação (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a>

Relatório de Análise de Contribuições

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Eduardo Moraes Arraut - ITA	Alteração	<p>Change criteria: EVE.2311 - Bird Strike.</p> <p>Current form: The aircraft must be capable of continued safe flight and landing after a bird strike with a 2.2-lb (1.0 kg) bird.</p> <p>Suggested change: The aircraft must be capable of continued safe flight and landing after a bird strike with a 6.6 lb (3.0 kg) bird.</p> <p>Annex: Journal of Applied Ecology - 2021 - Arrondo - Use of avian GPS tracking to mitigate human fatalities from bird strikes</p>	<p>Unlike airplanes, eVTOLs will not only land and take-off within the altitude ranges of birds, but will also cruise in similar altitude ranges and at similar times of the day. This dramatically increases the potential for accidents, which may commonly have an even greater societal and economic impact than airplane crashes because of the fall within populated urban environments - in fact, considering particularly the current impact of social media on public opinion, a single serious eVTOL accident in a densely populated urban zone like São Paulo city may end up resulting in the collapse of an entire eVTOL manufacturing company.</p> <p>As many scientific studies have shown, the masses of birds that commonly fly at altitudes in which eVTOLs will take-off, land or cruise extrapolate by up to a factor of three the mass currently suggested in EVE.2311. For example, Black vulture (<i>Coragyps atratus</i>) weight on average 1,64 kg, with large individuals reaching 3 kg, while frigates (<i>Fregata magnificens</i>) weights on average 1,59kg, Turkey vultures (<i>Cathartes aura</i>) weight on average 1.4 kg and crested caracara (<i>Caracara plancus</i>) weights on average 1.34 kg (Bovo, A.A.A., Abra, F.D., Medolago, C.A.B. et al. Traffic in the sky: ranking the hazard bird species to aircraft-collision in Brazil. <i>Ornithol. Res.</i> (2024), <a href="https://doi.org/10.1007/s43388-023-00165-x">https://doi.org/10.1007/s43388-023-00165-x</a>). Complementing the mass information above, the attached paper (in Anexo) shows that flight altitudes of several of these birds coincides with the cruising altitudes planned for eVTOLs.</p> <p>Importantly, the above facts will likely also influence other certification parameters, like EVE.3377 - Ingestion (b), "Ingestion from other likely sources (birds, induction system ice, foreign objects, ice) must not result in hazardous engine effects defined by EVE.3375(d)(2), or unacceptable power loss."</p> <p>I understand that this is a delicate issue for the company, so if there is interest on EVE's side we could meet to discuss this bird strike issue in greater depth.</p>	EVE.2311	<p>[EN] Not accepted. ANAC made no change as a result of this comment.</p> <p>ANAC is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. The safety level obtained with the 2.2-lb (1.0-kg) bird strike requirement for transport category rotorcraft (as established in RBAC 29.631) has been demonstrated in service to be sufficient. After reviewing the FAA's National Wildlife Strike Database, the ARAC RBSWG report* recommended a novel 2.2-lb (1.0-kg) bird strike requirement for normal category rotorcraft.</p> <p>ANAC's EVE.2311 was based on the increased exposure to birds in the environment in which the Model EVE-100 is expected to operate, the expectation of public safety, the recommendations presented in the ARAC RBSWG report*, and RBAC 29.631. As a reference, ANAC's EVE.2311 is harmonized with FAA's JS4.2311 and FAA's AM1.2311 and is similar to EASA's MOC VTOL.2250(f) for single bird impact evaluation.</p> <p>* Rotorcraft Bird Strike Working Group (RBSWG) Recommendations to the Aviation Rulemaking Advisory Committee (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a></p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário.</p> <p>A ANAC é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. O nível de segurança obtido com a exigência de impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria de transporte (conforme estabelecido no RBAC 29.631) demonstrou ser suficiente em serviço. Após revisar o Banco de Dados Nacional de Colisão com Vida Selvagem da FAA, o relatório ARAC RBSWG* recomendou um novo requisito de impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria normal.</p> <p>A EVE.2311 da ANAC foi baseada na maior exposição a pássaros no ambiente em que se espera que o modelo EVE-100 opere, na expectativa de segurança operacional da sociedade, nas recomendações apresentadas no relatório do ARAC RBSWG*, e no RBAC 29.631.</p> <p>Como referência, o EVE.2311 da ANAC está harmonizado com o JS4.2311 e o AM1.2311 da FAA e assemelha-se ao MOC VTOL.2250(f) da EASA para avaliação de impacto de único pássaro.</p> <p>* Recomendações do Grupo de Trabalho de Colisão de Pássaros em Aeronaves de Asa Rotativas (RBSWG) para o Comitê Consultivo de Regulamentação da Aviação (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a></p>
EASA	Esclarecimento	<p>EVE.2311 requires that the aircraft must be capable of continued safe flight and landing after a bird strike with a 2.2-lb (1.0 kg) bird.</p> <p>In urban operations, a flock of birds may constitute a realistic threat.</p>	<p>Clarification is sought how the threat of a multiple bird impact will be addressed during airworthiness certification.</p>	EVE.2311	<p>[EN] Not accepted. ANAC made no change as a result of this comment.</p> <p>ANAC is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. Currently, ANAC does not require multiple bird strike evaluation for other aircraft types. The safety level obtained with the single 2.2-lb (1.0-kg) bird strike requirement for transport category rotorcraft (as established in RBAC 29.631) has been demonstrated in service to be sufficient. After reviewing the FAA's National Wildlife Strike Database, the ARAC RBSWG report* recommended a novel single 2.2-lb (1.0-kg) bird strike requirement for normal category rotorcraft. ARAC RBSWG report* did not recommend rule changes to address multiple bird strikes.</p> <p>ANAC's EVE.2311 was based on the increased exposure to birds in the environment in which the Model EVE-100 is expected to operate, the expectation of public safety, the recommendations presented in the ARAC RBSWG report*, and RBAC 29.631. As a reference, ANAC's EVE.2311 is harmonized with FAA's JS4.2311 and FAA's AM1.2311.</p> <p>EVE.3377(b) addresses ingestion from likely sources such as foreign objects, birds, ice, and hail, and is intended to capture engine effects from any ingestion source determined to be applicable to the EVE-100 electric engine design. Common cause effects across multiple systems are addressed under applicable aircraft-level requirements, including EVE.2510.</p> <p>* Rotorcraft Bird Strike Working Group (RBSWG) Recommendations to the Aviation Rulemaking Advisory Committee (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a></p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário.</p> <p>A ANAC é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. Atualmente, a ANAC não requer a consideração de múltiplos impactos de pássaros em outros tipos de aeronaves. O nível de segurança obtido com a exigência de único impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria de transporte (conforme estabelecido no RBAC 29.631) demonstrou ser suficiente em serviço. Após revisar o Banco de Dados Nacional de Colisão com Vida Selvagem da FAA, o relatório ARAC RBSWG* recomendou um novo requisito de único impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria normal. O relatório do ARAC RBSWG* não recomendou mudanças na regulamentação para tratar de múltiplos impactos de pássaros.</p> <p>A EVE.2311 da ANAC foi baseada na maior exposição a pássaros no ambiente em que se espera que o modelo EVE-100 opere, na expectativa de segurança operacional da sociedade, nas recomendações apresentadas no relatório do ARAC RBSWG*, e no RBAC 29.631.</p> <p>Como referência, o EVE.2311 da ANAC está harmonizado com o JS4.2311 e o AM1.2311 da FAA.</p> <p>O EVE.3377(b) aborda a ingestão de fontes prováveis como objetos estranhos, pássaros, gelo e grânulo, e tem como objetivo capturar os efeitos no motor de qualquer fonte de ingestão que seja determinada como aplicável ao projeto do motor elétrico EVE-100. Efeitos de causa comum em múltiplos sistemas são tratados sob requisitos aplicáveis ao nível da aeronave, incluindo o EVE.2510.</p> <p>* Recomendações do Grupo de Trabalho de Colisão de Pássaros em Aeronaves de Asa Rotativas (RBSWG) para o Comitê Consultivo de Regulamentação da Aviação (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a></p>

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EVE AIR MOBILITY	Alteração	EVE.2311 - Bird Strike  To reevaluate the requirement, furnishing data-based justifications or aligning it with established international standards to establish an equivalent level of safety.	There is apprehension regarding the proposed analysis of the entire aircraft to demonstrate that a collision with a 2.2lb bird will not hinder continued safe flight and landing. Given statements from FAA and NTSB assert that the risk is not substantiated for this class of aircraft, considering the altitudes and speeds operated by it.  Eve recommends a careful reevaluation of this requirement, with Anac to furnishing data-based justifications or aligning it with established international standards to establish an equivalent level of safety, emphasizing the necessity for collaborative efforts among aviation authorities to harmonize standards for aircraft with comparable risk exposure.	EVE.2311	[EN] Not accepted. Anac made no change as a result of this comment. Anac is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. The safety level obtained with the 2.2-lb (1.0-kg) bird strike requirement for transport category rotorcraft (as established in RBAC 29.631) has been demonstrated in service to be sufficient. Anac's EVE.2311 was based on the increased exposure to birds in the environment in which the Model EVE-100 is expected to operate, the expectation of public safety, the recommendations presented in the ARAC RBSWG report*, and RBAC 29.631. After reviewing the FAA's National Wildlife Strike Database, the ARAC RBSWG report* recommended a novel 2.2-lb (1.0-kg) bird strike requirement for normal category rotorcraft. As a reference, Anac's EVE.2311 is harmonized with FAA's JS4.2311 and FAA's AM1.2311 is similar to EASA's MOC VTOL.2250(f) for single bird impact evaluation. * Rotorcraft Bird Strike Working Group (RBSWG) Recommendations to the Aviation Rulemaking Advisory Committee (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a>  [PT] Não aceito. Não houve alteração como resultado desse comentário. A Anac é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. O nível de segurança obtido com a exigência de impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria de transporte (conforme estabelecido no RBAC 29.631) demonstrou ser suficiente em serviço. Após revisar o Banco de Dados Nacional de Colisão com Vida Selvagem da FAA, o relatório ARAC RBSWG* recomendou um novo requisito de impacto de ave de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria normal. A EVE.2311 da Anac foi baseada na maior exposição a pássaros no ambiente em que se espera que o modelo EVE-100 opere, na expectativa de segurança operacional da sociedade, nas recomendações apresentadas no relatório do ARAC RBSWG*, e no RBAC 29.631. Como referência, o EVE.2311 da Anac está harmonizado com o JS4.2311 e o AM1.2230 da FAA e assemelha-se ao MOC VTOL.2250(f) da EASA para avaliação de impacto de único pássaro. * Recomendações do Grupo de Trabalho de Colisão de Pássaros em Aeronaves de Asa Rotativas (RBSWG) para o Comitê Consultivo de Regulamentação da Aviação <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a>
Embraer S.A.	Alteração	EVE.2311 - Bird Strike.  To reevaluate the requirement, furnishing data-based justifications or aligning it with established international standards to establish an equivalent level of safety.	There is apprehension regarding the proposed analysis of the entire aircraft to demonstrate that a collision with a 2.2lb bird will not hinder continued safe flight and landing. Given statements from FAA and NTSB assert that the risk is not substantiated for this class of aircraft, considering the altitudes and speeds operated by it.  Embraer recommends a careful reevaluation of this requirement, with Anac to furnishing data-based justifications or aligning it with established international standards to establish an equivalent level of safety, emphasizing the necessity for collaborative efforts among aviation authorities to harmonize standards for aircraft with comparable risk exposure.	EVE.2311	[EN] Not accepted. Anac made no change as a result of this comment. Anac is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. The safety level obtained with the 2.2-lb (1.0-kg) bird strike requirement for transport category rotorcraft (as established in RBAC 29.631) has been demonstrated in service to be sufficient. Anac's EVE.2311 was based on the increased exposure to birds in the environment in which the Model EVE-100 is expected to operate, the expectation of public safety, the recommendations presented in the ARAC RBSWG report*, and RBAC 29.631. After reviewing the FAA's National Wildlife Strike Database, the ARAC RBSWG report* recommended a novel 2.2-lb (1.0-kg) bird strike requirement for normal category rotorcraft. As a reference, Anac's EVE.2311 is harmonized with FAA's JS4.2311 and FAA's AM1.2311 is similar to EASA's MOC VTOL.2250(f) for single bird impact evaluation. * Rotorcraft Bird Strike Working Group (RBSWG) Recommendations to the Aviation Rulemaking Advisory Committee (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a>  [PT] Não aceito. Não houve alteração como resultado desse comentário. A Anac é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. O nível de segurança obtido com a exigência de impacto de pássaro de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria de transporte (conforme estabelecido no RBAC 29.631) demonstrou ser suficiente em serviço. Após revisar o Banco de Dados Nacional de Colisão com Vida Selvagem da FAA, o relatório ARAC RBSWG* recomendou um novo requisito de impacto de ave de 2,2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria normal. A EVE.2311 da Anac foi baseada na maior exposição a pássaros no ambiente em que se espera que o modelo EVE-100 opere, na expectativa de segurança operacional da sociedade, nas recomendações apresentadas no relatório do ARAC RBSWG*, e no RBAC 29.631. Como referência, o EVE.2311 da Anac está harmonizado com o JS4.2311 e o AM1.2230 da FAA e assemelha-se ao MOC VTOL.2250(f) da EASA para avaliação de impacto de único pássaro. * Recomendações do Grupo de Trabalho de Colisão de Pássaros em Aeronaves de Asa Rotativas (RBSWG) para o Comitê Consultivo de Regulamentação da Aviação <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a>

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
FAA	Inclusão	Regarding section EVE.2311, consider incorporating drone strikes into the certification basis. AAM vehicles are expected to share the same airspace as UA, thus making a collision between the two a possibility.		EVE.2311	<p>[EN] Not accepted. Anac made no change as a result of this comment. Anac is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. Currently, Anac does not require drone strike evaluation for other aircraft types. Thus, Anac does not plan to require drone strike evaluation for powered-lift at this moment. As a reference, Anac's airworthiness criteria for EVE Model EVE-100 are harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001 and EASA special condition SC-VTOL regarding not requiring drone strike evaluation.</p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário. A Anac é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. Atualmente, a Anac não exige a avaliação de impacto de drones de outros tipos de aeronaves. Assim, a Anac não planeja nesse momento exigir essa avaliação de aeronaves de sustentação por potência. Como referência, os critérios de aeronavegabilidade da Anac para o modelo EVE EVE-100 estão harmonizados com os critérios de aeronavegabilidade da FAA para os modelos Joby JAS4-1 e Archer M001 e a condição especial da EASA SC-VTOL no que diz respeito à não exigência de avaliação de impacto de drones.</p>
GAMA	Esclarecimento	GAMA recommends Anac to furnish data-based justifications or align with established international standards to establish an equivalent level of safety, emphasizing the necessity for collaborative efforts among aviation authorities to harmonize standards for aircraft with comparable risk exposure.	GAMA members express apprehension regarding the required analysis of the entire aircraft to demonstrate that a collision with a 2.2lb bird will not hinder continued safe flight and landing. Given statements from the FAA and NTSB asserting that the risk is not substantiated for this class of aircraft operating routinely at these altitudes and speeds, GAMA recommends a careful reevaluation of this requirement.	EVE.2311	<p>[EN] Not accepted. Anac made no change as a result of this comment. Anac is charged under RBAC 21.17(b) to provide an equivalent level of safety to the existing airworthiness requirements established in applicable RBACs. The safety level obtained with the 2.2-lb (1.0-kg) bird strike requirement for transport category rotorcraft (as established in RBAC 29.631) has been demonstrated in service to be sufficient. Anac's EVE.2311 was based on the increased exposure to birds in the environment in which the Model EVE-100 is expected to operate, the expectation of public safety, the recommendations presented in the ARAC RBSWG report*, and RBAC 29.631. After reviewing the FAA's National Wildlife Strike Database, the ARAC RBSWG report* recommended a novel 2.2-lb (1.0-kg) bird strike requirement for normal category rotorcraft. As a reference, Anac's EVE.2311 is harmonized with FAA's JS4.2311 and FAA's AM1.2311 is similar to EASA's MOC VTOL.2250(f) for single bird impact evaluation. * Rotorcraft Bird Strike Working Group (RBSWG) Recommendations to the Aviation Rulemaking Advisory Committee (ARAC) <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a></p> <p>[PT] Não aceito. Não houve alteração como resultado desse comentário. A Anac é responsável, sob o RBAC 21.17(b), por estabelecer um nível equivalente de segurança aos requisitos de aeronavegabilidade existentes nos RBACs aplicáveis. O nível de segurança obtido com a exigência de impacto de pássaro de 2.2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria de transporte (conforme estabelecido no RBAC 29.631) demonstrou ser suficiente em serviço. Após revisar o Banco de Dados Nacional de Colisão com Vida Selvagem da FAA, o relatório ARAC RBSWG* recomendou um novo requisito de impacto de ave de 2.2 lbs (1,0 kg) para aeronaves de asas rotativas da categoria normal. A EVE.2311 da Anac foi baseada na maior exposição a pássaros no ambiente em que se espera que o modelo EVE-100 opere, na expectativa de segurança operacional da sociedade, nas recomendações apresentadas no relatório do ARAC RBSWG*, e no RBAC 29.631. Como referência, o EVE.2311 da Anac está harmonizado com o JS4.2311 e o AM1.2311 da FAA e assemelha-se ao MOC VTOL.2250(f) da EASA para avaliação de impacto de único pássaro. * Recomendações do Grupo de Trabalho de Colisão de Pássaros em Aeronaves de Asa Rotativas (RBSWG) para o Comitê Consultivo de Regulamentação da Aviação <a href="https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf">https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/ARAC%20RBSWG%20Final%20Report%20Rev.%20B.pdf</a></p>
EASA	Esclarecimento	ANAC specifically excludes ditching to be considered when designing the means of egress and emergency exits. Stemming from rotorcraft certification, emergency flotation devices of different capabilities are a means to enhance crew and passenger survivability in non-hostile sea/water entry conditions. Does ANAC plan to offer respective optional certification of such systems in the future, when certain flight routes could include flying across/along rivers or lakes?	Clarification is sought about airworthiness requirements to address ditching.	EVE.2315(a)(1)	[EN] Accepted. Anac made changes as a result of this comment. Anac agrees with EASA and will review the requirement EVE.2315 to include the option for designs with emergency flotation system.
FAA	exclusão	Regarding section EVE.2315(a)(1), the FAA recommends removing the reference to "excluding ditching." If EVE is not requesting ditching then this should not be listed in the regulation.		EVE.2315(a)(1)	[EN] Accepted. Anac made changes as a result of this comment. Anac agrees with FAA and understands that removing the text "excluding ditching" will avoid confusion.
TCCA AARDD Eng Division	esclarecimento	As recommended in the comment.	Please confirm protection against risk of electrical shock to aircraft occupant (covering high and low voltage) is covered by the following requirements, otherwise the EVE.2320 and EVE.2335 requirements could be updated to add the protection: - EVE.2500(a)(1): covers protection against risk of electrical shock for critical systems (except power plant) - EVE.2500(b): covers protection against risk of electrical shock for the remaining systems (except power plant) - EVE.2400(c)(3): covers protection against risk of electrical shock for the power plant and ESS systems.	EVE.2320	[EN] Not accepted. Anac made no change as a result of this comment. The Anac understands the this concern is adequately addressed by proposed EVE.2335(b), which requires the appropriate protection against hazardous effects caused by accumulation of electrostatic charge.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Embraer S.A.	Alteração	EVE.2320 - Occupant physical environment.  To change EVE.2320(a)(2) from "Protect the occupants and flight controls from propellers; and" to "Protect the pilot and flight controls from propellers; and".	Considering the final Airworthiness Criteria published by the FAA for another powered-lift aircraft (i.e., FAA-2021-0638-0055), where the FAA states that the occupant protection is already addressed by .2315, Embraer suggests to harmonize the EVE.2320(a)(2) with RBAC/14 CFR 23.2315(a)(2). Further, in the aforementioned reference, FAA also states that .2320 purpose "is to protect the pilot and systems so the pilot can land the aircraft in the event of a propeller failure".	EVE.2320	[EN] <b>Accepted.</b> Anac made change as a result of this comment. Protection of the occupants embarking and disembarking is required by EVE.2315.
EVE AIR MOBILITY	Alteração	EVE.2320 - Occupant physical environment  To change EVE.2320(a)(2) from "Protect the occupants and flight controls from propellers; and" to "Protect the pilot and flight controls from propellers; and".	Considering the final Airworthiness Criteria published by the FAA for another powered-lift aircraft (i.e., FAA-2021-0638-0055), where the FAA states that the occupant protection is already addressed by .2315, Eve suggests to harmonize the EVE.2320(a)(2) with RBAC/14 CFR 23.2315(a)(2). Further, in the aforementioned reference, FAA also states that .2320 purpose "is to protect the pilot and systems so the pilot can land the aircraft in the event of a propeller failure".	EVE.2320(a)(2)	Accepted
EASA	Esclarecimento	As regards the occupant physical environment, it is unclear if this requirement would also address hazards while embarking/disembarking and also if ANAC intends to address potential threats derived from the novel technologies.	Clarification is sought if also phases of passenger/crew embarking/disembarking and other risks are included.	EVE.2320(a)(2)	Noted. EVE.2315 should ensure that aircraft doors are not located at positions where they may represent a risk to persons using the door. The intent of EVE.2320(a)(2) is to protect the pilot and systems so the pilot can land the aircraft in the event of a propeller failure. For this reason, EVE.2320(a)(2) is being revised to mention "pilot" instead of "occupants". Additionally, safety aspects of embarking and disembarking operations should also be addressed in operational requirements.
TCCA AARDD Eng Division	Alteração	Recommend using wording similar to that of VTOL.2320(a)(2), i.e. "(a)(2) <i>Protect the occupants against serious injury due to hazards originating from high energy, associated with systems and equipment, including while embarking and disembarking</i> "	The requirement "Protect pilot and flight controls from propellers" seems too narrow and not addressing all relevant hazards to occupants from propellers, in particular for configurations other than conventional fixed wing. It is noted VTOL.2320(a)(2) covers such hazards more broadly.	EVE.2320(a)(2)	Not accepted. EVE.2315 should ensure that aircraft doors are not located at positions where they may represent a risk to persons using the door. The intent of EVE.2320(a)(2) is to protect the pilot and systems so the pilot can land the aircraft in the event of a propeller failure. For this reason, EVE.2320(a)(2) is being revised to mention "pilot" instead of "occupants". Additionally, safety aspects of embarking and disembarking operations should also be addressed in operational requirements.
Paulo Rodrigo Britto coelho	Inclusão	Necessidade de sensor e alarme de proximidade de pessoas quando veículo estiver em funcionamento. Alarme sonoro alto quando houver movimentação de pessoas próximas em função de risco de traumas por proximidade do rotor ou do movimento de decolagem do veículo.	Sendo uma proposta de mobilidade de médio a alto volume de passageiros, entende-se que muitos deles não terão o treinamento e/ou entendimento necessário por isso a necessidade de controle autônomo.	EVE.2320(a)(2)	Não aceito. Aspectos de segurança nas operações de embarque e desembarque estarão no escopo do EVE.2315 e dos requisitos operacionais.
Leopoldo Alfredo Ambrosio Bruck	Alteração	FIRE AND HIGH ENERGY PROTECTION EVE.2325 - Fire protection. (a) The following materials must be self extinguishing (2) Materials in the baggage, BATTERY and cargo compartments inaccessible in flight;	I read this design requirements as the same way ADC FAA P8110-2 was developed. The contribution in EVE 2325(a)(2) takes into account a battery fire possibility, considering battery for electrical propulsion. It has been seen how serious are electrical cars battery fire events. The aim here is to address the relative protection to the battery compartment components (when applicable), excluding the compartment itself.	EVE.2325(a)	[EN] Not accepted. Anac made no change as a result of this comment. The requirements EVE.2330 and EVE.2240 address the battery used as source of energy to powerplant. As a reference, the wording of this requirement of the Anac's airworthiness criteria for EVE Model EVE-100 is harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001.
Leopoldo Alfredo Ambrosio Bruck	Alteração	FIRE AND HIGH ENERGY PROTECTION EVE.2325 - Fire protection. (b) The following materials must be flame-resistant: (3) battery compartment	I read this design requirements as the same way ADC FAA P8110-2 was developed. The contribution in EVE 2325(b) takes into account a battery fire possibility, considering battery for electrical propulsion. It has been seen how serious are electrical cars battery fire events. The aim here is to address the protection to the battery compartment itself.	EVE.2325(b)	Not accepted. 2330 and 2440 covers the battery used as a "fuel". As a reference, the wording of this requirement of the Anac's airworthiness criteria for EVE Model EVE-100 is harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001.
Airbus Helicopters	Alteração	Comment on Sec. EVE 2325 - Fire protection paragraph (e)(1): It is proposed to modify (e)(1) by Be located where a fire would be easily discovered by a crew member while at the crew member's station and be accessible for the manual extinguishing of a fire"	Justification of Comment: the requirement that " fire would be visible to the pilots " is excessive. The wording of CS27/29 §855 is more appropriate.	EVE.2325(e)	Not accepted. The EVE 100 has just one crew which is the only crew. ANAC understands that the requirement as it is appropriate to that e-vtol and it is Harmonized with FAA. As a reference, the wording of this requirement of the Anac's airworthiness criteria for EVE Model EVE-100 is harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001.
Leopoldo Alfredo Ambrosio Bruck	Outros	EVE2325(e) Each baggage, BATTERY and cargo compartment must -	I wish to remark that it would be beneficial to also include BATTERY to EVE2325(e) BUT, considering some "type of battery" used for electrical propulsion, we know that HALON is not effective to some battery fire events. So, (e)(1) would or would not be applicable because opening some type/kind of battery compartment during a battery fire for manual extinguishing is unthinkable. Battery (depend of battery type) fire is an emergency condition that has to be AFM well described as "land as soon as possible". Battery fire event may be uncontrollable and catastrophic. It also depends on where battery(ies) are located, example: under the floor line.	EVE.2325(e)	Not accepted. Battery in the baggage is treated as dangerous goods and the operational requirements may address this item. on the other hand, battery as fuel is covered by 2330 and 2340. As a reference, the wording of this requirement of the Anac's airworthiness criteria for EVE Model EVE-100 is harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001.
EVE AIR MOBILITY	Alteração	EVE.2325 - Fire protection  To change the EVE.2325(f) from:  "(f) There must be a means to extinguish any fire in the cabin such that: (1) The pilot, while seated, can easily access the fire extinguishing means; and"  to:  "(f) There must be a means to extinguish any fire in the cabin such that the pilot, while seated, can easily access the fire extinguishing means."	The division is not necessary for paragraph EVE.2325(f).	EVE.2325(f)	[EN] <b>Accepted.</b> Anac made change as a result of this comment. Anac agrees that this subdivision is not necessary for paragraph EVE.2325(f). As a reference, the wording of this requirement of the Anac's airworthiness criteria for EVE Model EVE-100 is harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Embraer S.A.	Alteração	EVE.2325 - Fire protection.  To change the EVE.2325(f) from:  "(f) There must be a means to extinguish any fire in the cabin such that: (1) The pilot, while seated, can easily access the fire extinguishing means; and"  to:  "(f) There must be a means to extinguish any fire in the cabin such that the pilot, while seated, can easily access the fire extinguishing means."	The division is not necessary for paragraph EVE.2325(f).	EVE.2325(f)	[EN] <b>Accepted.</b> Anac made change as a result of this comment. Anac agrees that this subdivision is not necessary for paragraph EVE.2325(f). As a reference, the wording of this requirement of the Anac's airworthiness criteria for EVE Model EVE-100 is harmonized with FAA's airworthiness criteria for Joby model JAS4-1 and for Archer model M001.
TCCA AARDD Eng Division	Inclusão	Recommend adding a new paragraph under EVE.2325 aligned with VTOL.2325(a)(1) to address more broadly fire hazards related to energy and heat dissipation, i.e. "(a) The aircraft must be designed to minimise the risk of fire initiation due to: (1) anticipated heat or energy dissipation or system failures or overheat that are expected to generate heat sufficient to ignite a fire;"	Fire protection - The wording of EVE.2325(g) is specific to flammable fluids and vapors ignition, and does not adequately address hazards relevant to an electrically powered aircraft.	EVE.2325(g)	Accepted. Considering that EVE.2440 is restricted to propulsion system and that other aircraft systems may also utilize high voltage / high power energy from the main batteries, ANAC agrees that EVE.2325 should be complemented to address this issue.
EVE AIR MOBILITY	Exclusão	EVE.2330 - Fire Protection in Fire Zones and Adjacent Areas  To exclude EVE.2330(d).	ANAC states, in section 5.6.4 of the Public Consultation Justification, that the reason to include the requirement in paragraph EVE.2330(d) is to protect the aircraft and occupants in an event of fire in the battery. However, our understanding, and as stated by FAA in the final publication of an Airworthiness Criteria published for another powered-lift aircraft (i.e., FAA-2021-0638-0055), protection of flight critical systems other than flight controls and ensuring CSFL after a fire or release of stored energy are addressed in EVE.2440 and EVE.2510. Therefore, the requirement is redundant and, thus, it is not necessary.	EVE.2330	Accepted. ANAC agrees and has revised the EVE.2330 accordingly.
Embraer S.A.	Exclusão	EVE.2330 - Fire Protection in Fire Zones and Adjacent Areas  To exclude EVE.2330(d).	ANAC states, in section 5.6.4 of the Public Consultation Justification, that the reason to include the requirement in paragraph EVE.2330(d) is to protect the aircraft and occupants in an event of fire in the battery. However, our understanding, and as stated by FAA in the final publication of an Airworthiness Criteria published for another powered-lift aircraft (i.e., FAA-2021-0638-0055), protection of flight critical systems other than flight controls and ensuring CSFL after a fire or release of stored energy are addressed in EVE.2440 and EVE.2510. Therefore, the requirement is redundant and, thus, it is not necessary.	EVE.2330	Accepted. ANAC agrees and has revised the EVE.2330 accordingly.
FAA	exclusão	Regarding section EVE.2330(d), the FAA recommends removing this requirement, as it exceeds current normal category requirements.		EVE.2330	Accepted. ANAC agrees and has revised the EVE.2330 accordingly.
EASA	alteração	EASA considers compliance to lightning requirements is not necessary if it is demonstrated that exposure to lightning is unlikely.	It is suggested to consider unlikely exposure to lightning, similar as in RBAC 23.2515.	EVE.2335 EVE.2515	Not accepted. For failures that would prevent the continued safe flight and landing of the aircraft, ANAC considers that the probability of lightning strikes should not be taken in account to exempt the requirement application.
TCCA AARDD Eng Division	Alteração	Recommend rewording as follows: "The aircraft must be protected against catastrophic and hazardous effects caused by an accumulation of electrostatic charge."	As static electricity could potentially lead to catastrophic severity events, the protection should be against Hazardous and Catastrophic effects.	EVE.2335(b)	Not accepted. The current text is intended to include events with hazardous and greater criticalities, thereby already covering catastrophic events.
FAA	esclarecimento	Regarding section Rationale 5.7.2, please clarify why a lightning strike is not considered catastrophic, or providing support for the claim. These vehicles have batteries which would catch on fire and thus be unable to power the craft. Please also clarify how many and what type of contingencies the energy reserves must account for.		EVE.2430	Clarification:  Regarding EVE.2430(a)(2): the rationale regarding lightning strikes, related to EVE.2430(a)(2), intended to express that no credit from lightning strikes probability can be taken to exempt the requirement. So the intent of the requirement is the same of the correspondent requirement in PL.2430 of Draff AC 21.17-4. Nevertheless, for the sake of clarity and harmonization, ANAC update the text of the requirement to be the same as PL.2430.  Regarding requirements EVE.2430(b)(3) and EVE.2430(b)(4), please refer to the answer of the specific comments.
FAA	Inclusão	Regarding section EVE.2400(b), consider including an appendix I for the propeller requirements to allow the option to certify the propeller as part of the aircraft. Currently, EVE.2400(b) does not include a reference to subpart I in the ANAC version of the requirements, but instead requires a propeller type certificate per (c).		EVE.2400	Not accepted. According to the applicant the propeller will be certified separately.
TCCA AARDC Flight Test Division	Alteração	It is suggested that the System Safety process be referenced here since the complexity of the aircraft is well beyond what Part 23 wording can address.	It is expected that the power to each propeller is controlled based on primary flight control inputs (pitch, roll yaw, height/altitude). So the loss of control of power to a propeller will have a controllability component in addition to a loss of power control. The use of terms like extremely remote imply that loss of control could be a higher probability event than extremely improbable.	EVE.2405	Accepted. EVE.2405 (d) will be removed.



Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EVE AIR MOBILITY	Exclusão	EVE.2405 - Power or Thrust Control System  To remove EVE.2405(d).	EVE 2405(d) specifies the acceptable probability for automatic power or thrust control failure. However, Eve understands, aligned with FAA (ref. FAA-2021-0638-0055), that the airworthiness criteria should not specify an acceptable failure probability for power or thrust controls systems on a distributed propulsion powered-lift. Additionally, to specify the power or thrust control system failure probability as extremely remote may be inconsistent with the extremely improbable requirement in EVE.2135.  Eve understands that, following the performance-based approach, this requirement should not dictate the alternate means for equivalent design characteristics, and that the appropriate hazard classification and the failure probability for power or thrust control systems will be determined using the aircraft-level system safety process in §23.2510, as well as JS4.2135, if controllability is affected.	EVE.2405	Accepted. EVE.2405 (d) will be removed.
Embraer S.A.	Exclusão	EVE.2405 - Power or Thrust Control System  To remove EVE.2405(d).	EVE 2405(d) specifies the acceptable probability for automatic power or thrust control failure. However, Embraer understands, aligned with FAA (ref. FAA-2021-0638-0055), that the airworthiness criteria should not specify an acceptable failure probability for power or thrust controls systems on a distributed propulsion powered-lift. Additionally, to specify the power or thrust control system failure probability as extremely remote may be inconsistent with the extremely improbable requirement in EVE.2135.  Embraer understands that, following the performance-based approach, this requirement should not dictate the alternate means for equivalent design characteristics, and that the appropriate hazard classification and the failure probability for power or thrust control systems will be determined using the aircraft-level system safety process in §23.2510, as well as JS4.2135, if controllability is affected.	EVE.2405	Accepted. EVE.2405 (d) will be removed.
FAA	alteração	Regarding section EVE.2405(d), the FAA recommends against adopting the proposed paragraph (d) which specifies "extremely remote" as an acceptable probability of failure for power or thrust control systems, assuming manual backup capability. The appropriate hazard classification and failure probability for power or thrust control systems should be determined using the aircraft-level system safety process in § 23.2510, as well as EVE.2135, if controllability is affected. The airworthiness criteria should not specify an acceptable failure probability for power or thrust controls systems on a distributed propulsion powered-lift. Additionally, control of distributed propulsion powered-lift, using manual control of individual engines and propellers, should not be assumed.		EVE.2405	Accepted. EVE.2405 (d) will be removed.
TCCA AARDD Eng Division	Alteração	The requirement of EVE.2405(b) should be harmonized with those applicable for flight controls, as well as all supporting systems. We strongly recommend all these integrated functions be covered under the EVE.2510 overarching safety requirements, including a general 'no single failure' requirement applicable to all systems (see separate comment).	These specific safety objectives, applicable to power / thrust control systems only, are not consistent with those currently defined for flight control functions. Since the flight control functions are indissociable from the propulsion providing thrust and lift functions, the same requirements should be applicable to flight control systems and propulsion systems, and should preferably be addressed under EVE.2510 for the integrated systems.	EVE.2405(b)	Accepted. All safety objectives will be covered by EVE.2510.
TCCA AARDD Eng Division	Alteração	Recommend aligning with VTOL.2415 requirements.	The requirements under EVE.2415 address accumulation of ice or snow, but is missing explicit reference to shedding.	EVE.2415	Accepted. EVE.2415 (b) will be removed and EVE.2415 (a) will be updated accordingly. The aircraft will not be certified under icing conditions, but must prevent foreseeable accumulation of ice in cases of inadvertent ice encounters.
Leopoldo Alfredo Ambrosio Bruck	Alteração	A seção EVE.2415 estabelece: Powerplant ice protection. (a) The aircraft design, including the induction and inlet system, must prevent foreseeable accumulation of ice or snow that adversely affects powerplant operation. (b) The powerplant installation design must prevent any accumulation of ice or snow that adversely affects powerplant operation, in those icing conditions for which certification is requested. Acredito que seria melhor estabelecer da seguinte forma: Powerplant ice protection. If ice conditions certification is requested: (a) The aircraft design, including the induction and inlet system, must prevent foreseeable accumulation of ice or snow that adversely affects powerplant operation. (b) The powerplant installation design must prevent any accumulation of ice or snow that adversely affects powerplant operation,	Não vi justificativa para considerar os impecios da formação de gelo de forma separada.	EVE.2415	Accepted. EVE.2415 (b) will be removed and EVE.2415 (a) will be updated accordingly. The aircraft will not be certified under icing conditions, but must prevent foreseeable accumulation of ice in cases of inadvertent ice encounters.
EASA	alteração	The restart may not be necessary for VTOL aircraft.	It is proposed to consider VTOL.24.25 (b) wording from EASA SC-VTOL	EVE.2425(b)	Not accepted. The design operating characteristics will require provision for the shutdown and restart of the powerplant in flight.
Raul Fernando Beck	Inclusão	As baterias utilizadas na propulsão do eVTOL devem ser ensaiadas para comprovar o atendimento dos requisitos de missão da aeronave, pelo menos em termos de capacidade nominal, regime de potência e regime de torque conforme o drive cycle de missão típica estabelecida para a aeronave.	Os ensaios nas baterias de propulsão da aeronave visa assegurar seu adequado projeto visando atender o desempenho de torque, potência e autonomia durante a execução das missões de voo da aeronave, sem que a mesma apresente indicações de falha ou condições inseguras de operação.	EVE.2430	<b>NOT ACCEPTED:</b> The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EVE AIR MOBILITY	Exclusão	EVE.2430 - Energy Systems  Comment 1: To change EVE.2430(a)(3) from: "Provide the energy necessary to ensure each powerplant and auxiliary power unit functions properly in all likely operating conditions;" to "Provide the energy necessary to ensure each powerplant functions properly in all likely operating conditions;"  Comment 2: To remove EVE.2430(b)(3) and (4).	Comment 1:EVE-100 is not equipped with an auxiliary power unit. Therefore, aligned with RBAC 21.17(b) concept, Eve suggest to remove the mention to APU from EVE.2430(a)(3).  Comment 2:The ANAC requirement in EVE.2430(b)(3) and (4) are already addressed in their requirements (e.g. EVE 2430(a)(1) and EVE.2510) and, therefore, the maintenance of these requirements would unnecessarily increase the demonstration effort.  In addition, ANAC states, in Public Consultation Justification, that this requirements are also expected to be ruled in operational requirements. However, Eve understands that the consideration of this requirements in the type design would prevent the flexibility between the different type of operations (e.g. RBAC 91 and RBAC 135), creating a scenario of regulatory uncertainty.	EVE.2430	Comment 1: <b>Accepted</b>  Comment 2: <b>Accepted</b>
Embraer S.A.	Exclusão	EVE.2430 - Energy Systems  Comment 1: To change EVE.2430(a)(3) from: "Provide the energy necessary to ensure each powerplant and auxiliary power unit functions properly in all likely operating conditions;" to "Provide the energy necessary to ensure each powerplant functions properly in all likely operating conditions;"  Comment 2: To remove EVE.2430(b)(3) and (4).	Comment 1: EVE-100 is not equipped with an auxiliary power unit. Therefore, aligned with RBAC 21.17(b) concept, Embraer suggest to remove the mention to APU from EVE.2430(a)(3).  Comment 2: The ANAC requirement in EVE.2430(b)(3) and (4) are already addressed in their requirements (e.g. EVE 2430(a)(1) and EVE.2510) and, therefore, the maintenance of these requirements would unnecessarily increase the demonstration effort.  In addition, ANAC states, in Public Consultation Justification, that this requirements are also expected to be ruled in operational requirements. However, Embraer understands that the consideration of this requirements in the type design would prevent the flexibility between the different type of operations (e.g. RBAC 91 and RBAC 135), creating a scenario of regulatory uncertainty.	EVE.2430	Comment 1: <b>Accepted</b>  Comment 2: <b>Accepted</b>
FAA	esclarecimento	Regarding section EVE.2430, the FAA recommends clarifying whether there is an expectation for eVTOL vehicles to have two (or more) separate batteries, both equally capable of providing energy in case of failure.		EVE.2430	The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined. All the characteristics of the propulsion batteries will be taken in account before the means and method of compliance be set.
FAA	exclusão	Regarding section EVE.2430(b)(3) and (b)(4), the FAA recommends removing these requirements. These requirements are either not applicable or are already covered by another requirement such as an operational requirement regarding minimum endurance.		EVE.2430	<b>Accepted</b>
Edmundo Ortiz	Esclarecimento	Primeiramente, parabéns ao trabalho estruturado neste processo!  Deixem-me saber se entre os requisitos para Certificação de Tipo para VTOL com pacote de baterias há necessidade de parede barreira de fogo ... se sim, qual requisito? ... fire-barrier ou fire-proof?		EVE.2430	The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined. All the characteristics of the propulsion batteries will be taken in account before the means and method of compliance be set.
ASD - Europe	inclusão	Considering the novelties and threats introduced by the new high-voltage propulsion systems, dedicated requirements should be introduced.	No specific requirement is mentioned for aircraft batteries, in particular for fire protection, fire propagation, crashworthiness, high-voltage current disconnection means	EVE.2430	<b>NOT ACCEPTED:</b> The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined. All the characteristics of the propulsion batteries will be taken in account before the means and method of compliance be set.
TCCA AARDD Eng Division	Alteração	Recommend rewording as follows: "Be designed and arranged to provide independent multiple energy storage and supply systems, including the control and management functions, so that failure of any one component in one system will not result in loss of energy storage or supply of another system;"	a) Recommend the following reword to provide more clarity in the requirement intent (the independence is not between energy-storage and supply, it is between the systems responsible for energy-storage and supply): "Be designed and arranged to provide independent multiple energy storage and supply..."  b) Electrical energy systems include control and management systems (for example Battery Management System) that need to be included in this sub-paragraph. We suggest the following wording for this requirement: "Be designed and arranged to provide independent multiple energy storage and supply systems, including the control and management functions, so that failure of any one component in one system will not result in loss of energy storage or supply of another system;"	EVE.2430(a)(1)	<b>NOT ACCEPTED:</b> The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined. More information or clarification will be provided by the means and methods of compliance for this requirement.
TCCA AARDD Eng Division	Alteração	It is recommended to clarify the definition.	What is the definition of auxiliary power unit in the context of electric propulsion aircraft?	EVE.2430(a)(3)	<b>ACCEPTED:</b> The requirement will be removed of the certification basis.
TCCA AARDD Eng Division	Alteração	It is recommended to clarify the definition.	Assuming EVE only contains batteries as ESS, please clarify the intent of this item.	EVE.2430(b)(3)	<b>ACCEPTED:</b> The requirement will be removed of the certification basis.

Relatório de Análise de Contribuições

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EVE AIR MOBILITY	Exclusão	EVE.2435 - Powerplant induction and exhaust systems  To remove EVE.2435	Powerplant induction and exhaust requirements on subpart E are related to the combustion engines, where the intent is to assure that the adequate supply of air for the engine combustion in different maneuvers and prevent that the hot exhaust gases affect the safe operation, by reaching any part of the aircraft not properly designed for it. EVE understands that this requirement is not applicable to electric engine and, therefore, requests removal from the EVE-100 certification basis.  Eve also notes that FAA recently removed, for the same reason, a similar requirement from another electric powered-lift aircraft Airworthiness Criteria (i.e., FAA-2021-0638-0055).	EVE.2435	Accepted. EVE.2435 will be removed.
Embraer S.A.	Exclusão	EVE.2435 - Powerplant induction and exhaust systems.  To remove EVE.2435.	Powerplant induction and exhaust requirements on subpart E are related to the combustion engines, where the intent is to assure that the adequate supply of air for the engine combustion in different maneuvers and prevent that the hot exhaust gases affect the safe operation, by reaching any part of the aircraft not properly designed for it. Embraer understands that this requirement is not applicable to electric engine and, therefore, requests removal from the EVE-100 certification basis.  Embraer also notes that FAA recently removed, for the same reason, a similar requirement from another electric powered-lift aircraft Airworthiness Criteria (i.e., FAA-2021-0638-0055).	EVE.2435	Accepted. EVE.2435 will be removed.
FAA	exclusão	Regarding section EVE.2435, the FAA recommends removing this requirement. These products don't have traditional induction and exhaust systems.		EVE.2435	Accepted. EVE.2435 will be removed.
GAMA	Remoção	As the EVE-100 eVTOL uses an electric engine and not combustion engines, GAMA kindly requests the deletion of the requirement from EVE airworthiness criteria. GAMA members also note that the FAA recently removed, for the same reason, a similar requirement from its recently published special class powered-lift airworthiness criteria (FAA docket. FAA-2021-0638-0055).	The powerplant induction and exhaust requirements of subpart E are related to combustion engines. The intent is to assure the adequate supply of air for engine combustion throughout different maneuvers and to prevent hot exhaust gases from reaching any part of the aircraft not appropriately designed for it.	EVE.2435	Accepted. EVE.2435 will be removed.
TCCA AARDD Eng Division	inclusão	As recommended in the comment.	Concern: high voltage and batteries introduces new fire threats and requirement(s) should address them. - Does this req also addresses ESS? - In case high voltage is used beyond to power plant functions (e.g.: used to power air conditioning compressors; heaters; flight control surfaces; ...) it is recommended the creation of a similar requirement to this one to address those new threats.	EVE.2440	First Comment: "EVE.2330 and EVE.2440 mandate the assessment of novel fire hazards posed by high-voltage and batteries (ESS) within fire zones."  Second Comment: "ANAC does not agree with the introduction of additional requirement for the use of high voltage beyond powerplant system, such as for operating air conditioning compressors, heaters, or flight control surfaces, as this risk (fire) is already encompassed by new EVE.2325(i). (Ref. line 137)"
TCCA AARDC Flight Test Division	Inclusão	Recommend capturing the requirements as established in Amdt 64 as a minimum.	Powerplant Fire Protection – The aspects of fire protection are lacking sufficient details to inform the design. The new cert basis has stripped away the requirements identified in the Amdt 64 version (which were already pretty generic).	EVE.2440	Not accepted. EVE.2440 is more performance based, allowing for all powerplant related fire protection concerns to be covered by a singular airworthiness criteria.
Leonardo Helicopters	Esclarecimento	Please clarify the safety objective and the type of operation will be accepted for a possible basic category that will operate in Brasil environment.	EVE-100, ANAC proposed these airworthiness criteria taking into account that the aircraft will be used for commercial operations in urban centers, equivalent to what is currently known as enhanced or advanced category. The category will be named in the future, when operational requirements will be developed for the operations of this type of aircraft. ANAC seems to be aligned with two possible certified categories as EASA. Enhanced one (e.g EVE 100 Certification basis) and a Basic one.	EVE.2500	EVE.2510 is a performance-based requirement that establishes, in qualitative terms, an inverse relationship between probability and severity. The corresponding quantitative probabilities as well as Development Assurance Level for each failure condition classification will be defined at the next phase as part of the Means of Compliance definition. ANAC is planning to submit to public consultation the Means of Compliance document related to Safety Objectives.
TCCA AARDD Eng Division	alteração	Recommend updating wording of EVE.2500 and EVE.2510 to ensure the intent from 23.1309 pre-Amt 64 is maintained. The following is proposed (it could be simplified and combined, similar to what is documented in VTOL.2500):  <b>EVE.2500 and .2505</b> "Sections EVE.2500, EVE.2505 and EVE.2510 are general requirements applicable to systems and equipment installed in the aircraft. They apply in addition to specific design requirements for pieces of equipment and systems, and should not be used to supersede any requirements contained in another section of this part." <input type="checkbox"/> We would not anticipate 23.2500 and 23.2505 to conflict with any other requirement. If any is anticipated, the ANAC is requested to clarify the rationale. <b>EVE.2510</b> "This section is a general requirement applicable to systems and equipment installed in the aircraft. It applies in addition to specific design requirements for pieces of equipment and systems, and should not be used to supersede any requirements contained in another section of this part." "For any airplane system or equipment whose failure or abnormal operation has not been specifically addressed by another requirement in this part, the applicant must design and install each system and equipment..." If there are specific anticipated exceptions to the above, i.e. systems / equipment not subject to safety requirements of EVE.2510, they should be clearly specified. The ANAC is requested to clarify which these are, if any, and the rationale for excluding them.	As requirements of general applicability, the intent should be for paragraphs 2500, 2505 and 2510 to apply to any equipment or system installed on the aircraft – unless specific elements are exempted from compliance to these requirements. The proposed certification basis currently makes no such explicit exemption.  Instead, as written, the requirements of EVE.2500 and EVE.2510 would be applicable only where systems are not specifically addressed by another requirement. This is inadequate, and will result in compliance gaps and inconsistencies. This is also inconsistent with previous understanding of scope of applicability of 23.1309, i.e. pre Amt. 64, which read: "The requirements of this section, except as identified in paragraphs (a) through (d), are applicable, in addition to specific design requirements of part 23, to any equipment or system as installed in the airplane. This section is a regulation of general requirements and does not supersede any requirements contained in another section of part 23." The intent of 23.1309 compliance remains as it was prior to Amt 64. Particularly for a design with complex and highly integrated systems such as the EVE-100, compliance with safety requirements must apply to the integrated systems at aircraft level, and must therefore be consistent across all systems. As currently presented, the certification basis for EVE-100 reflects different safety levels for different systems / functions, which is not only inadequate but would not be applicable in practice on a highly integrated design. The wording used in VTOL.2500 and VTOL.2510 is clearer in this regard.	EVE.2500 EVE.2505 EVE.2510	Partially Accepted. ANAC agrees that EVE.2500 and EVE.2510 should be adapted to ensure clarity indicating they should be considered as well as specific requirements. No exceptions are being considered. ANAC understands that EVE.2505 doesn't need that same clarification.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDC Flight Test Division	Esclarecimento	How will this affect perf and flight planning? HMI considerations?	Function and installation. There doesn't seem to be a clear discussion on the effects of cold upon electric systems nor batteries in particular. How are we going to address the significant impact of temperature?	EVE.2505	This concern is primarily covered by EVE.2500(a)(2), which should apply to electric systems and batteries. It establishes that these systems/equipment must perform their intended function throughout the operating and environmental limits for which the aircraft is certificated, which should include consideration of low temperatures.
TCCA AARDD Eng Division	outros	Note only for Certification Basis. The FAA is requested to consider in establishing corresponding acceptable MoCs.	Of particular importance, but not captured at requirement level in this certification basis, we would like to strongly emphasize the expectation that the safety objectives (target probabilities and DAL levels) used as MoC to this requirement are aligned with those of VTOL.2510 for category Enhanced. These are commensurate with the anticipated use of such aircraft for commercial air-taxi operations, and generally operations in urban densely populated areas.	EVE.2510	Noted.
EASA	Esclarecimento	This performance-based requirement does not allow to understand what safety objectives levels (failure probabilities, DAL) are actually expected.	Clarification is sought, which safety levels are expected to be demonstrated for this aircraft?	EVE.2510	EVE.2510 is a performance-based requirement that establishes, in qualitative terms, an inverse relationship between probability and severity. The corresponding quantitative probabilities as well as Development Assurance Level for each failure condition classification will be defined at the next phase as part of the Means of Compliance definition. ANAC is planning to submit to public consultation the Means of Compliance document related to Safety Objectives.
TCCA AARDD Eng Division	alteração	Paragraph EVE.2510 should be reworded as follows: “(a) Each catastrophic failure condition is extremely improbable <u>and does not result from a single failure</u> ”	The requirements of 23.2510(a) addressing CAT failure conditions should include a “no single failure” criteria, in addition to be shown extremely improbable. This would align with other similar requirements applying to specific systems (EVE.2405(b), EVE.2525(b)...), and would also align with VTOL.2510. Particularly for a design with complex and highly integrated systems such as the EVE-100, compliance with safety requirements must apply to the integrated systems at aircraft level, and must therefore be consistent across all systems. Despite the aircraft relatively small size and number of passengers, the intended use in operations as air-taxi in and around urban, densely populated areas, drives the need for higher safety standards than would be otherwise applicable to general aviation Part 23 aircraft.	EVE.2510	Accepted.
ASD - Europe	inclusão	As this parameters are fundamental to evaluate the safety objective the Authority is considering for this kind of aircraft, we ask to include the risk matrix associated to Requirement 2510.	The document does not includes the risk matrix, and in particular the probability of failure associated to catastrophic events. The associated probabilities to extremely improbable events are assumed to be those of the ANAC transposition of FAA AC 23.1309-1E Class IV with <10-9 objective for catastrophic failure conditions. If not, safety level are considered as not acceptable considering the risk of fatalities of persons on ground over congested area.	EVE.2510	Not accepted. EVE.2510 is a performance-based requirement that establishes, in qualitative terms, an inverse relationship between probability and severity. The corresponding quantitative probabilities as well as Development Assurance Level for each failure condition classification will be defined at the next phase as part of the Means of Compliance definition. ANAC is planning to submit to public consultation the Means of Compliance document related to Safety Objectives.
UK CAA	outros	the UK does not have Pt 91 or 135 operations framework, thus aircraft in this new sector are being considered as commercial air transport. The ANAC proposal does not quantify the target level of safety in numerical terms under EVE.2510, or state whether the model EVE-100 is considered to be analogous to a level 4 aircraft per RBAC 23.2005. The CAA considers that for powered lift vehicles undertaking commercial passenger operations over densely populated urban areas, the safety targets prescribed for level 4 aircraft would be appropriate for these special certification category aircraft. This aligns broadly with category Enhanced under SC.VTOL.	The ANAC rationale document describes the complexities associated with this new aviation sector; and highlights the novel design of the EVE-100, its VTOL capability, intended operations under RBAC 91 and 135, and the need to ensure a level of safety commensurate with such operations and risks.	EVE.2510	Noted.
Guilherme Pennachin Sakamiti	Inclusão	Inclusion of a “dead man’s switch” type security system. A dead man’s switch is a switch that is designed to be activated or deactivated if the human operator becomes incapacitated, such as through death, loss of consciousness, or being bodily removed from control. These switches are usually used as a form of fail-safe where they stop a machine with no operator from a potentially dangerous action or incapacitate a device as a result of accident, malfunction, or misuse. They are common in such applications in locomotives, freight elevators, lawn mowers, tractors, etc. In this particular case, if activated or deactivated, the switch will be responsible for land the “EVE-100” in a secure pre determined area.	Por ser um “eVTOLs” e ter como objetivo realizar voos urbanos, possivelmente todo o trajeto terá população abaixo e qualquer emergência com o piloto trará grandes riscos às pessoas em uma eventual queda.	EVE.2510	Not accepted. The expressed concerns related to pilot incapacitation are addressed primarily by ANAC pilot licensing and required medical exams regulations (Ref. RBAC 61 and 67) and operational regulations, as applicable depending of the intended aircraft operation (Ref. RBAC 91, 121 and 135). The possible need for additional crew members or any type of emergency autoland system to mitigate pilot incapacitation risk will be evaluated and determined by operational regulations.
Guilherme Pennachin Sakamiti	Inclusão	Inclusion of a “dead man’s switch” type security system. A dead man’s switch is a switch that is designed to be activated or deactivated if the human operator becomes incapacitated, such as through death, loss of consciousness, or being bodily removed from control. These switches are usually used as a form of fail-safe where they stop a machine with no operator from a potentially dangerous action or incapacitate a device as a result of accident, malfunction, or misuse. They are common in such applications in locomotives, freight elevators, lawn mowers, tractors, etc. In this particular case, if activated or deactivated, the switch will be responsible for land the “EVE-100” in a secure pre determined area.	Por ser um “eVTOLs” e ter como objetivo realizar voos urbanos, possivelmente todo o trajeto terá população abaixo do veículo elétrico e qualquer emergência com o piloto trará grandes riscos às pessoas em uma eventual queda, por isso se faz necessário o “pedal do homem morto”.	EVE.2510	Not accepted. The expressed concerns related to pilot incapacitation are addressed primarily by ANAC pilot licensing and required medical exams regulations (Ref. RBAC 61 and 67) and operational regulations, as applicable depending of the intended aircraft operation (Ref. RBAC 91, 121 and 135). The possible need for additional crew members or any type of emergency autoland system to mitigate pilot incapacitation risk will be evaluated and determined by operational regulations.
Guilherme Pennachin Sakamiti	Inclusão	Inclusion of a “dead man’s switch” type security system. A dead man’s switch is a switch that is designed to be activated or deactivated if the human operator becomes incapacitated, such as through death, loss of consciousness, or being bodily removed from control. These switches are usually used as a form of fail-safe where they stop a machine with no operator from a potentially dangerous action or incapacitate a device as a result of accident, malfunction, or misuse. They are common in such applications in locomotives, freight elevators, lawn mowers, tractors, etc. In this particular case, if activated or deactivated, the switch will be responsible for land the “EVE-100” in a secure pre determined area.	Por ser um “eVTOLs” e ter como objetivo realizar voos urbanos, possivelmente todo o trajeto terá população abaixo do veículo elétrico e qualquer emergência com o piloto trará grandes riscos às pessoas em uma eventual queda, por isso se faz necessário o “pedal do homem morto”.	EVE.2510	Not accepted. The expressed concerns related to pilot incapacitation are addressed primarily by ANAC pilot licensing and required medical exams regulations (Ref. RBAC 61 and 67) and operational regulations, as applicable depending of the intended aircraft operation (Ref. RBAC 91, 121 and 135). The possible need for additional crew members or any type of emergency autoland system to mitigate pilot incapacitation risk will be evaluated and determined by operational regulations.

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ASD - Europe	Inclusão	It is proposed to introduce explicitly this criteria on single failures to ensure clarity on the intent of the rule.	The absence of the no single failure catastrophic criteria that is present in SC VTOL.2510 (a)(1) is questioned. A requirement that a catastrophic failure condition shall not result from a single failure exists for other aircraft categories such as large aeroplanes and it is a standard design practice in industry.	EVE.2510 (a)	Accepted.
EASA	Esclarecimento	It is unclear if ANAC intends to address in future means of compliance that no single failure should lead to a catastrophic event.	Clarification is sought, if ANAC is expecting that the applicant will have to demonstrate that no single failure may lead to a catastrophic event.	EVE.2510 EVE.2250(c)	ANAC has accepted comments to include the "no single failure" requirement for catastrophic failure conditions in EVE.2510 instead of addressing this concern only as part of the means of compliance with EVE.2510.
ASD - Europe	esclarecimento	Please confirm this understanding is correct. If not, safety level are considered as not acceptable for the risk of injuries of persons on ground over congested area.	The associated probabilities to extremely improbable are assumed to be those of the ASTM F3230-17 Class IV with <10-7 objective for hazardous failure conditions.	EVE.2510(b)	The required numerical probabilities for hazardous failure conditions will be defined as part of the means of compliance documentation.
ASD - Europe	esclarecimento	Please confirm this understanding is correct.	The associated probabilities to extremely improbable are assumed to be those of the ASTM F3230-17 Class IV with <10-5 objective for major failure conditions.	EVE.2510(c)	The required numerical probabilities for major failure conditions will be defined as part of the means of compliance documentation.
EVE AIR MOBILITY	Exclusão	EVE.2515 - Electrical and Electronic-System Lightning Protection  To remove EVE.2515(a)(2).	Eve proposes that this requirement should be limited to long-range aircraft and not extended to those operating in urban air environments. For vehicles performing short flights, near alternate vertiports, it seems reasonable to only necessitate a safe landing post-lightning without a mandate for systems or structures to return to normal operation, as the order of magnitude of the diversion time is close to the system recovery time.	EVE.2515	Not accepted. The intent is of the requirement is to preserve the normal operation of the functions necessary for CSFL (continued safe flight and landing).
Embraer S.A.	Exclusão	EVE.2515 - Electrical and Electronic-System Lightning Protection  To remove EVE.2515(a)(2).	Embraer proposes that this requirement should be limited to long-range aircraft and not extended to those operating in urban air environments. For vehicles performing short flights, near alternate vertiports, it seems reasonable to only necessitate a safe landing post-lightning without a mandate for systems or structures to return to normal operation, as the order of magnitude of the diversion time is close to the system recovery time.	EVE.2515	Not accepted. The intent is of the requirement is to preserve the normal operation of the functions necessary for CSFL (continued safe flight and landing).
GAMA	Remoção	GAMA recommends the removal of item (a)(2).	GAMA notes concern regarding EVE.2515. The provision mandates that electric or electronic systems recover to normal operation after any failure following exposure to lightning, in a timely manner. GAMA proposes this requirement should be limited to long-range aircraft and not extended to those operating in urban air environments. For vehicles performing short flights, near alternate vertiports, it is reasonable to only necessitate a safe landing post-lightning without a mandate for systems or structures to return to normal operation, as the order of magnitude of the diversion time is close to the system recovery time.	EVE.2515 – Electrical and Electronic System Lightning Protection	Not accepted. The intent is of the requirement is to preserve the normal operation of the functions necessary for CSFL (continued safe flight and landing).
TCCA AARDD Eng Division	alteração	We suggest this requirement to be re-worded to require the system to return to its state of availability after exposure to lightning and its recovery to actively provide the function only when its recovery does not conflict with other operational or functional requirements of the system. If pertinent, the same provision should also apply to the systems with hazardous criticality addressed in EVE.2515(b).	"... unless the system's recovery conflicts with other operational or functional requirements of the system." This portion of the requirement could be incorrectly interpreted as: if there are operational or functional requirements of the system that conflict with the system recovery after upset, the system then can be allowed to fail when exposed to lightning without recovery after the exposure. It should be clarified what are these possible functional or operational requirements that need this provision. We believe this requirement does not accurately state the intent. After aircraft exposure to lightning, and in a timely manner the system should be available for ensuring the function, and whether to be re-engaged and actively provide the function will depend on any associated operational or functional requirements. Additionally, why does this provision only apply to systems with catastrophic criticality and not included in EVE.2515(b) to be applied in the same manner to systems with hazardous criticality?	EVE.2515(a)(2)	Not accepted. Regarding EVE.2515(a)(2), the main intent of the requirement is that the normal operation of the function be recovered, either manually or automatically. The exception intends to preclude a situation where the recovery would create a hazard due to a conflict in the system.  Regarding EVE.2515(b), if a conflict could create a hazard due to interfacing with a level A system, it should be treated under EVE.2515(a).
EVE AIR MOBILITY	Alteração	EVE.2520 - High-intensity Radiated Fields (HIRF) protection  To change EVE.2520(b) from: "(b) Each electrical and electronic system that performs a function, the failure of which would reduce the capability of the aircraft or the ability of the flightcrew to respond to an adverse operating condition, must be designed and installed such that the system recovers normal operation of that function in a timely manner after the aircraft is exposed to the HIRF environment." To: "(b) For aircraft approved for IFR operations, each electrical and electronic system that performs a function, the failure of which would reduce the capability of the aircraft or the ability of the flightcrew to respond to an adverse operating condition, must be designed and installed such that the system recovers normal operation of that function in a timely manner after the aircraft is exposed to the HIRF environment."	In a recently published airworthiness criteria for a powered-lift aircraft (ref. FAA-2021-0638-0055), FAA limited the application of .2520(b) requirement to IFR operations. The maintenance of this requirement for EVE-100 VFR operations would adversely affect the level playing field. Therefore, Eve suggests the harmonization of the requirements.	EVE.2520	Not accepted. For HIRF, VFR operation of an eVTOL may present a scenario of high exposure to interference due to operation at lower altitudes and closer distances to RF transmitters. Therefore, unlike the lightning protection requirement, ANAC does not consider it reasonable to limit protection against Hazardous and Major events only to IFR operations. The application of less stringent environments, to be defined in the MoC, will already provide the necessary alleviation for the lower criticalities.

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Embraer S.A.	Alteração	EVE.2520 - High-intensity Radiated Fields (HIRF) protection  To change EVE.2520(b) from:  "(b) Each electrical and electronic system that performs a function, the failure of which would reduce the capability of the aircraft or the ability of the flightcrew to respond to an adverse operating condition, must be designed and installed such that the system recovers normal operation of that function in a timely manner after the aircraft is exposed to the HIRF environment."  To:  "(b) For aircraft approved for IFR operations, each electrical and electronic system that performs a function, the failure of which would reduce the capability of the aircraft or the ability of the flightcrew to respond to an adverse operating condition, must be designed and installed such that the system recovers normal operation of that function in a timely manner after the aircraft is exposed to the HIRF environment."	In a recently published airworthiness criteria for a powered-lift aircraft (ref. FAA-2021-0638-0055), FAA limited the application of .2520(b) requirement to IFR operations. The maintenance of this requirement for EVE-100 VFR operations would affect adversely the level playing field. Therefore, Embraer suggests the harmonization of the requirements.	EVE.2520	Not accepted. For HIRF, VFR operation of an eVTOL may present a scenario of high exposure to interference due to operation at lower altitudes and closer distances to RF transmitters. Therefore, unlike the lightning protection requirement, ANAC does not consider it reasonable to limit protection against Hazardous and Major events only to IFR operations. The application of less stringent environments, to be defined in the MoC, will already provide the necessary alleviation for the lower criticalities.
TCCA AARDD Eng Division	alteração	We suggest this requirement to be re-worded to require the system to return to its state of availability after exposure to HIRF and its recovery to actively provide the function only when its recovery does not conflict with other operational or functional requirements of the system. If pertinent, the same provision should also apply to the systems with hazardous criticality addressed in EVE.2520(b).	"... unless the system's recovery conflicts with other operational or functional requirements of the system." This portion of the requirement could be incorrectly interpreted as: if there are operational or functional requirements of the system that conflict with the system recovery after upset, the system then can be allowed to fail when exposed to HIRF without recovery after the exposure. It should be clarified what are these possible functional or operational requirements that need this provision. We believe this requirement does not accurately state the intent. After aircraft exposure to HIRF, and in a timely manner the system should be available for ensuring the function, and whether to be re-engaged and actively provide the function will depend on any associated operational or functional requirements. Additionally, why does this provision only apply to systems with catastrophic criticality and not included in EVE.2520(b) to be applied in the same manner to systems with hazardous criticality?	EVE.2520(a)(2)	Not accepted. Regarding EVE.2520(a)(2), the main intent of the requirement is that the normal operation of the function be recovered, either manually or automatically. The exception intends to preclude a situation where the recovery would create a hazard due to a conflict in the system.  Regarding EVE.2520(b), if a conflict could create a hazard due to interfacing with a level A system, it should be treated under EVE.2520(a).
TCCA AARDD Eng Division	inclusão	We recommend to create additional paragraph to address the safety hazards associated with power sources (e.g.: battery system) designs and installations. These additional requirements/paragraphs for batteries are described in the former 23.1353 and in the FAA draft AC 20-184A and draft AC 20-192.	EVE.2525 does not address the safety hazards of the batteries identified in the former 23.1353 and in the special conditions and safety objectives used for certification of lithium-based batteries (rechargeable and non-rechargeable). Electric aircraft designs use lithium batteries for their advantageous power density. However, these batteries and their installations can have failure conditions with hazardous or catastrophic effects.	EVE.2525	<b>NOT ACCEPTED:</b> The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined. More information or clarification will be provided by the means and methods of compliance for this requirement.
Leopoldo Alfredo Ambrosio Bruck	Alteração	O parágrafo EVE.2530 estabelece: External and cockpit lighting. (a) The applicant must design and install all lights to minimize any adverse effects on the performance of flightcrew duties Acredito que deveria ser escrito tal como: (a) The applicant must design and install all light system to minimize any adverse effects on the performance of flightcrew duties  A EMBRAER, por exemplo, não fabrica lâmpadas incandescentes ou LED. Portanto, não tem efeito o design.LED.		EVE.2530	Regarding EVE.2520(b), as it involves functions with failures of lower criticality, it is not expected that a conflict would prevent continued safe flight and landing. If this could occur due to interfacing with a level A system, it should be treated under EVE.2520(a).
Leopoldo Alfredo Ambrosio Bruck	Alteração	O parágrafo EVE.2530(d) estabelece que: (d) Any taxi and landing lights must be designed and installed so they provide sufficient light for night operations. Acredito que deveria estar escrito: (d) Any taxi and landing lights system must be designed and installed so they provide sufficient light for night operations.  A EMBRAER, por exemplo, não fabrica lâmpadas incandescentes ou LED. Portanto, não tem efeito o design.		EVE.2530	Not accepted. The comment suggested changing taxi and landing lights for taxi and landing lights system. ANAC agreed with the suggestion but will not modify this paragraph because the lighting requirements are specified in section EVE.2530, in line with the requirements for normal-category airplanes.
TCCA AARDC Flight Test Division	Esclarecimento	With the reference to Part 25, Appendix C removed, it is unclear in what icing conditions compliance will be shown.	Why no reference to Part 25 appendix C? What conditions will compliance be shown against?	EVE.2540	Accepted. EVE does not intend to fly into known icing, so there will be no icing conditions for which compliance needs to be shown.
FAA	exclusão	Regarding section EVE.2540, the FAA recommends removing icing requirements for applicants unless applicants are specifically requesting icing approval.		EVE.2540	Accepted. Since EVE won't seek approval for flight into known icing, the requirement will be removed, together with EVE.2415(b) and EVE.2165(a).
EASA	outros	EASA appreciates that ANAC also emphasises with this requirement the importance to ensure the availability of relevant flight data for the EVE-100 aircraft which can support the investigation of occurrences.		EVE.2555	Noted

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EVE AIR MOBILITY	Alteração	EVE.2555 - Installation of recorders  To change the introduction of EVE 2555 from: "The aircraft must be equipped with a recorder or recorders that" To: "If required by operating rules, the aircraft must be equipped with a recorder or recorders that".	Traditionally, installation of recorders in the aircraft is required by the operating rules. Aircraft with the number of seats or pilots such as EVE-100 aircraft, are not required to be equipped with recorders by the operating rules.  Given the global operation of eVTOLs, the incorporation of recorders in airworthiness criteria may lead to conflicts with regulations of foreign validating authorities, directly influencing the certification basis. While EVE recognizes the value of voluntary data recorder installation for these aircraft, it emphasizes that the determination of recorder applicability in each aircraft type should remain defined by operating rules (e.g., RBAC/14 CFR Part 91 and 135).	EVE.2555	Not accepted. Vehicles like EVE-100 cannot be considered as traditional aircraft. EVTOLs introduce a series of innovative features and technologies that lead to unprecedented safety considerations. Therefore, the traditional approach is not adequate.
Embraer S.A.	Alteração	EVE.2555 - Installation of recorders  To change the introduction of EVE 2555 from:  "The aircraft must be equipped with a recorder or recorders that"  To:  "If required by operating rules, the aircraft must be equipped with a recorder or recorders that".	Traditionally, installation of recorders in the aircraft is required by the operating rules. Aircraft with the number of seats or pilots such as EVE-100 aircraft, are not required to be equipped with recorders by the operating rules.  Given the global operation of eVTOLs, the incorporation of recorders in airworthiness criteria may lead to conflicts with regulations of foreign validating authorities, directly influencing the certification basis. While Embraer recognizes the value of voluntary data recorder installation for these aircraft, it emphasizes that the determination of recorder applicability in each aircraft type should remain defined by operating rules (e.g., RBAC/14 CFR Part 91 and 135).	EVE.2555	Not accepted. Vehicles like EVE-100 cannot be considered as traditional aircraft. EVTOLs introduce a series of innovative features and technologies that lead to unprecedented safety considerations. Therefore, the traditional approach is not adequate.
GAMA	Remoção	GAMA requests clarity around the inclusion of recorders as part of the airworthiness criteria. Traditionally, installation of recorders in the aircraft is required by the operating rules. Aircraft with the number of seats or pilots such as EVE-100 aircraft are not required to be equipped with recorders by the existing operating rules.  Given the planned global operation of eVTOLs, the incorporation of recorders in airworthiness criteria may lead to misalignment with regulations of foreign validating authorities, directly influencing the certification basis. While GAMA recognizes the value of voluntary data recorder installation for these aircraft, it emphasizes that the determination of recorder applicability in each aircraft type should remain defined by operating rules (e.g., RBAC/14 CFR Part 91 and 135).		EVE.2555	Not accepted. Vehicles like EVE-100 cannot be considered as traditional aircraft. EVTOLs introduce a series of innovative features and technologies that lead to unprecedented safety considerations. Therefore, the traditional approach is not adequate.
TOCA AARDC Flight Test Division	Inclusão	The concepts developed in ED-289 and ED-309 for energy system awareness and state of function need to be incorporated.	Development flights for this class of electric vehicle have clearly shown that the totable useable energy in the batteries is insufficient to provide the pilot with critical mission information.  The capacity of the vehicle is dependent on too many factors for the pilot to be able to incorporate all the elements into effective decision making.	EVE.2600	Not accepted. The critical mission information to the pilot must be in the flight, navigation, surveillance, and powerplant displays, as needed, so qualified flightcrew can monitor and perform defined tasks associated with the intended functions of systems and equipment, without excessive concentration, skill, alertness, or fatigue.
EVE AIR MOBILITY	Exclusão	EVE.2600 - Flightcrew interface  To remove EVE.2600(c).	Requirement proposed on EVE.2600(c) is, on Part 23 Amdt 64, applied only for level 4 aircraft. These aircraft (i.e., level 4 aircraft) are big enough to have at least 2 windshield panels. However, most eVTOL designs, including EVE-100, will not have multiple windshield panels, mainly due to room constraints. Therefore, Eve recommends deletion of this requirement.  It is important to notice that, in a recently published airworthiness criteria for a powered-lift aircraft (ref. FAA-2021-0638-0055), FAA did not establish a similar requirement. Therefore, the maintenance of this requirement for EVE-100 would adversely affect the level playing field.	EVE.2600	Accepted. ANAC agrees and has removed the requirement proposed on EVE.2600(c) ANAC has considered that the configuration of the windshield does not result in visibility restrictions to safely continue flying and land.
Embraer S.A.	Exclusão	EVE.2600 - Flightcrew interface.  To remove EVE.2600(c).	Requirement proposed on EVE.2600(c) is, on Part 23 Amdt 64, applied only for level 4 aircraft. These aircraft (i.e., level 4 aircraft) are big enough to have at least 2 windshield panels. However, most eVTOL designs, including EVE-100, will not have multiple windshield panels, mainly due to room constraints. Therefore, Embraer recommends deletion of this requirement.  It is important to notice that, in a recently published airworthiness criteria for a powered-lift aircraft (ref. FAA-2021-0638-0055), FAA did not establish a similar requirement. Therefore, the maintenance of this requirement for EVE-100 would adversely affect the level playing field.	EVE.2600	Accepted. ANAC agrees and has removed the requirement proposed on EVE.2600(c) ANAC has considered that the configuration of the windshield does not result in visibility restrictions to safely continue flying and land.
FAA	Inclusão	Regarding section EVE.2600(b), the FAA recommends adding "...without excessive concentration, skill, alertness, or fatigue" to the end of the first sentence so that the section reads: "(b) The applicant must install flight, navigation, surveillance, and powerplant controls and displays so qualified flightcrew can monitor and perform defined tasks associated with the intended functions of systems and equipment without excessive concentration, skill, alertness, or fatigue. The system and equipment design must minimize flightcrew errors, which could result in additional hazards."  The language "without excessive concentration, skill, alertness or fatigue" addresses the human factors elements used to control the aircraft. This aircraft is expected to have increased levels of automation and technology that could potentially impact pilot concentration, alertness, and fatigue.		EVE.2600	Accepted. ANAC agreed to adopt FAA's recommendations for the Airworthiness Criteria EVE-100 aircraft.
GAMA	Alteração	GAMA recommends ANAC maintain consistency with language implemented by the FAA in its recently published airworthiness criteria for the Joby JAS4-1 (FAA docket FAA-2021-0638-0055). GAMA members suggest adopting the term "approved flight envelope" throughout the entire airworthiness criteria.	GAMA expresses concern regarding EVE 2600(c), which pertains to considerations for multiple windshields which is historically applicable only to level 4 aircraft. Given that most eVTOL designs, including the EVE-100, do not feature multiple windshield panels due to room constraints, GAMA recommends the removal of this requirement for greater clarity and relevance.	EVE.2600(c)	Accepted. ANAC agrees and has removed the requirement proposed on EVE.2600(c) ANAC has considered that the configuration of the windshield does not result in visibility restrictions to safely continue flying and land.

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FAA	inclusão	<p>Regarding section EVE.2615(a), the FAA recommends adding "...source of lift and..." before "phase of flight" at the end of the first sentence so that the section reads:                      "(a) Installed systems must provide the flight crew member who sets or monitors parameters for the flight, navigation, and lift/thrust system the information necessary to do so during each source of lift and phase of flight. This information must."</p> <p>"Source of lift" is used in Subparts A, B, G of this proposed certification basis. Thus, adding this language would improve the consistency of the document.</p> <p>Furthermore, the FAA details phase of flight and source of lift as part of defining what may be necessary for flight, navigation, and power plant instruments. Since the control parameters, critical references, and margins will be unique for this class of aircraft, it was deemed necessary to define variables that may vary depending on a given flight path, takeoff and landing profile, such as the source of lift. The absence of the language may cause validation incongruities.</p>		EVE.2615	Accepted. EVE.2615 (b) will be updated accordingly.
TCCA AARDD Eng Division	alteração	<p>The requirement should be revised to delete the criteria for single failure and probability, in line with intent of 23.1309(d) pre Amt. 64, i.e.:                      "(b)(2) In combination with other systems, be designed and installed so information essential for continued safe flight and landing will be available to the flightcrew in a timely manner <del>after any single failure or probable combination of failures to enable them to take appropriate corrective action.</del>"</p>	<p>Paragraph (b)(2) would only require providing information essential for CSF&amp;L to the flight crew following single failure or probable combinations of failures. This seems inconsistent with safety requirements expected under EVE.2510, and for complex highly integrated systems installation would not be sufficient to provide adequate awareness to the crew, and would not result in an adequate level of safety at aircraft level.</p>	EVE.2615(b)(2)	Not accepted. The intent of the requirement is according to safety analysis.
TCCA AARDC Flight Test Division	Alteração	<p>Structure the header paragraph such that the requirements of this section are applicable to all possible configurations of thrust/flight for the aircraft.</p>	<p>This section is written in the same generic form as part 23 or 27 which only have one configuration of flight. There should be a more prescriptive requirement for the manufacturer to present pertinent information for the aircraft in all phases of transition.</p>	EVE.2620	Not accepted. AFM will contain all procedures and performance necessary for safe operation according to sources of lift and phases of flight (including configurations). Gama specification nº 1, ASTM F3174, AC 25.1581 are references to present pertinent information in the AFM.
TCCA AARDD Eng Division	inclusão	<p>Recommend adding the following:                      "Electric engine operating limitations are established as applicable, including:                      - Maximum transient overspeed and time;                      - Maximum transient overtorque and time, and number of overtorque occurrences;                      - Maximum overtorque and time;                      - Electrical power, voltage, current, frequency, and electrical power quality limits;                      - Maximum and minimum starting and continuous temperature(s), current, voltage;                      - Vibration limits"</p>	<p>Missing Operating limits</p>	EVE.3305	Acknowledged. Covered by EVE.3307.
TCCA AARDD Eng Division	alteração	<p>We recommend changing the proposed language in these requirements where applicable to "aircraft environmental and operating conditions" instead of "the declared environmental and operating conditions" or "declared environmental limits".</p>	<p>Subpart H contains requirements for the engine (including control and electrical systems) to show that the operation of the engine is not adversely affected by the declared environmental limits and environmental conditions and that the engine systems and components perform their intended functions in all declared environmental and operating conditions. Since the engine will be certified as part of the aircraft and not separately, we believe that that these airworthiness criteria should require the applicant to demonstrate the engine operation is not adversely affected by the aircraft environmental and operating conditions and not only the declared environmental limits and conditions. We believe that the requirement to declare the demonstrated environmental limits in the engine installation manual is adequate when the engine is certified separately and is intended for different aircraft installations, but it is less relevant when the engine is certified with and for a specific aircraft.</p>	EVE.3305	Not Accepted. Recognizing the fact that the engine will be certified as part of the aircraft among other operational systems, ANAC understands the applicant should demonstrate also declared environmental limits and operating conditions.



Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EVE AIR MOBILITY	Outros	<p>Eve expresses caution about the fact that ANAC did not adopt the RBAC (14 CFR Part) 23 amendment 64 and RBAC (14 CFR Part) 33 amendment 34 numbering system for those requirements that have the same Part 23/Part 33 safety intent. There are certain requirements where the differences are only related to the reference to airplane instead of aircraft. Eve requests ANAC to confirm that the newly adopted numbering system maintains the same safety intent as those original Part 23/Part 33 requirements.</p> <p>Also, Eve understands that, for a matter of consistence with RBAC 21.17(b) concept, which determines the application of airworthiness requirements appropriate for the aircraft and applicable to the specific type design and providing an equivalent level of safety with other RBAC, ANAC should remove any reference for "Reserved" requirements.</p> <p>It is noteworthy that in 2019, the European Union Aviation Safety Agency (EASA) issued Special Condition Vertical Take-Off and Landing Aircraft (SC-VTOL) which establishes the airworthiness criteria for VTOL aircraft for applicants in Europe. Furthermore, in March 2024, FAA published its first airworthiness criteria for special class powered-lift (FAA docket FAA-2021-0638-0055). Recognizing these developments, Eve reinforces that it is incumbent upon ANAC, FAA and EASA to provide global leadership and mutually commit to the development of generally applicable airworthiness standards for this emerging class of aircraft which are harmonized to the maximum extent practicable and facilitates transferability and continued operational safety support for operations worldwide.</p> <p>In this context, we suggest that ANAC, to facilitate validation process, to align EVE-100 Airworthiness Criteria structure with other published by FAA, such as, for example, FAA docket FAA-2021-0638-0055, notably in subpart H.</p>	General Comments	EVE.3305 EVE.2000 General	Acknowledged.
Embraer S.A.	Outros	<p>Embraer expresses caution about the fact that ANAC did not adopt the RBAC (14 CFR Part) 23 amendment 64 and RBAC (14 CFR Part) 33 amendment 34 numbering system for those requirements that have the same Part 23/Part 33 safety intent. There are certain requirements where the differences are only related to the reference to airplane instead of aircraft. Embraer requests ANAC to confirm that the newly adopted numbering system maintains the same safety intent as those original Part 23/Part 33 requirements.</p> <p>Also, Embraer understands that, for a matter of consistence with RBAC 21.17(b) concept, which determines the application of airworthiness requirements appropriate for the aircraft and applicable to the specific type design and providing an equivalent level of safety with other RBAC, ANAC should remove any reference for "Reserved" requirements.</p> <p>It is noteworthy that in 2019, the European Union Aviation Safety Agency (EASA) issued Special Condition Vertical Take-Off and Landing Aircraft (SC-VTOL) which establishes the airworthiness criteria for VTOL aircraft for applicants in Europe. Furthermore, in March 2024, FAA published its first airworthiness criteria for special class powered-lift (FAA docket FAA-2021-0638-0055). Recognizing these developments, Embraer reinforces that it is incumbent upon ANAC, FAA and EASA to provide global leadership and mutually commit to the development of generally applicable airworthiness standards for this emerging class of aircraft which are harmonized to the maximum extent practicable and facilitates transferability and continued operational safety support for operations worldwide.</p> <p>In this context, we suggest that ANAC, to facilitate validation process, to align EVE-100 Airworthiness Criteria structure with other published by FAA, such as, for example, FAA docket FAA-2021-0638-0055, notably in subpart H.</p>	General Comments	EVE.3305 EVE.2000 General	Acknowledged. EVE.3305 (c) will be updated accordingly.
EASA	alteração	Engine efficiency may need to be considered as part of this requirement as it may be necessary for the mission preparation	It is suggested to consider adding efficiency in the rule or at MoC. Note that EASA will address this as part of the MOC EHPS.40	EVE.3307	Accepted. EVE.3307 will be updated accordingly.

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Vincent Braley - Nidec Aerospace	Alteração	<p>EVE 3307 - Engine ratings and operating limits.</p> <p>(a) Engine ratings and operating limitations are established by ANAC and included in the engine certificate data sheet specified in RBAC 21.41, including ratings and limitations based on the operating conditions and information specified in this section, as applicable, and any other information found necessary for safe operation of the engine.</p> <p>(b) Ratings and operating limits must be established and included in the type certificate data sheet based on:</p> <p>(1) Shaft power, torque, rotational speed, and temperature for:</p> <p>(i) Rated takeoff power;</p> <p>(ii) Rated maximum continuous power; and</p> <p>(iii) Rated maximum temporary power and associated time limit.</p> <p>(2) Duty Cycle and the rating at that duty cycle. The duty cycle must be declared in the type certificate data sheet.</p> <p>(3) Power-supply requirements.</p> <p>(4) Any other ratings or limitations that are necessary for the safe operation of the engine.</p> <p>EVE 3308 - Selection of Engine Power and Thrust Ratings</p> <p>(a) Requested engine power and thrust ratings must be selected by the applicant.</p> <p>(b) Each selected rating must be for the lowest power or thrust that all engines of the same type may be expected to produce under the conditions used to determine that rating.</p>	<p>This comment aims to emphasize key factors in determining power rates for eVTOL engines, taking into account their distinct flight profiles, operational durations, and electrical engine design, rather than suggesting a new text for the requirement. It is understood that the definition of power rates for eVTOL engines should not be based on the same guidance as turbine engines. The flight profiles and operational times of eVTOL vehicles differ significantly from traditional aviation practices.</p> <p>In light of this, it is suggested that recent standards like EUROCAE ED-321, which consider the specific power demand and operational profiles of aircraft, should be taken into account as guidance for defining power rates in eVTOL engines. This may result in different time durations for each power rate, such as the Take-off Power, where the usual 5 minute duration for Turbine Engines may not be suitable for eVTOLs. For instance, a duration of 120 seconds, as outlined in section 3.4 of ED-321 under Practical Example – User Case 2, could be more appropriate. Additionally, we would like to emphasize the importance of adjusting thermal margins to account for the differences in construction and technology between Turbine Engines and Electric Engines, ensuring that margins are defined in consideration of electric machine application.</p> <p>This recommendation also takes into account the possible challenges that the product may encounter when implementing traditional Turbine Engine guidance in eVTOL applications. Overall, it is recommended taking into account the specific characteristics and requirements of eVTOL vehicles when defining power rates and thermal margins, rather than solely relying on guidance intended for turbine engines.</p>	EVE.3307 EVE.3308	Accepted. EVE 3307 will be updated accordingly.
TCCA AARDD Eng Division	alteração	<p>Recommend updating as follows:</p> <p>(a) Shaft power, torque, rotational speed, and temperature for:</p> <p>(1) Rated takeoff power;</p> <p>(2) Rated maximum continuous power; and</p> <p>(3) Rated maximum temporary powers <u>(including the take-off power)</u> and associated time limit.</p>	Takeoff power and its allowed time limitation is not defined.	EVE.3307(b)(1)	Not Accepted. ANAC understands takeoff power and its allowed time limitation is already considered.
TCCA AARDD Eng Division	alteração	<p>Recommend updating as follows:</p> <p>(b) Duty Cycle and the rating associated with that duty cycle. <del>The duty cycle must be declared in the type certificate data sheet documented in the engine installation manual.</del></p>	Duty Cycle is intrinsic with the rating definition. It will be hard to be defined in a comprehensible manner in the TCDS and probably not very useful for TCDS perspective. However, the TCDS shall include the exact matching combination of the inverter/controller/motor.	EVE.3307(b)(2)	Accepted. EVE 3307(b)(2) will be updated accordingly.
TCCA AARDD Eng Division	exclusão	<p>Recommend deleting the following:</p> <p>Selection of Engine Power and Thrust Ratings</p> <p>(a) through (b)</p>	Redundant definition of the engine ratings	EVE.3308	Not Accepted. ANAC considers selection engine power and thrust ratings as important definitions by the applicant.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Vincent Braley - Nidec Aerospace	Alteração	EVE 33100 - Engine electrical systems. (g) Electrical-system failures. The engine electrical system must: (2) When in the full-up configuration, be single fault tolerant, as determined by ANAC, for electrical, electrically detectable, and electronic failures involving LOPC events;  Comment: The windings of the Electric Engine motor should not be subject to the requirement EVE.33100.(g).(2), in a way that winding shorts should be exempt from complying with the requirement.	Rationale: Generally, the failure rate of electronic drivers, which are responsible for control, monitoring, and power commutation of the motors, is one or two orders of magnitude higher than the failure rate of electric motors used in Electric Engines, in a way that the reliability of the Electric Engine is dominated by the reliability of the electronic driver. Typically, an Electric Engine with a single electronic driver does not meet the vehicle level safety requirements and designing a redundant system that fully duplicates the Electric Engine is not practical from the vehicle performance standpoint due to the increased weight. A possible solution to increase the reliability and ensure compliance with availability related safety requirements, while keeping weight acceptable, is to design the Electric Engine with two redundant electronic drivers, each of them driving half of a dual motor that has two isolated windings in the same stator, operating in active-active configuration that results in torque sum at the output shaft. With this solution, the reliability of the Electric Engine becomes dominated by the reliability of the motor, which is in line with the availability related safety requirements. In this configuration, single failures of the motor or single failures of the electronic drivers result in loss of half the power instead of loss of total power as in a motor with single winding, as long as the drivers are functionally independent between each other as well as the motors. In the Electric Engine level, not considering common points of failure from system level, the functional independence between the electronic drivers can be achieved in a practical way using redundancy and segregation. One should note that most of the failure opportunities are in the electronic driver. However, total functional independence cannot be achieved in a motor with multiple windings that sum torque in a single mechanical output. There is a small set of motor failures that results in the total loss of the motor operation. From the mechanical standpoint, a single mechanical failure of bearings, shaft, rotor structure or magnets results in total loss of motor operation. From the electrical standpoint, there is one failure mode that also results in total loss of motor operation: the short of the windings. Although the effect of a winding short can vary depending on the type of short (i.e., in-phase, phase-to-ground or phase-to-phase) and the magnitude of the short due to exact location of the short, a conservative analysis should assume that if one winding is shorted it can cause electromagnetic breaking that the remaining half-motor is not able to overcome and at the same time provide the expected half of the mechanical output power. Nevertheless, the stator and the windings can be designed to ensure that the failure rate of a winding short circuit is compatible with the Electric Engine reliability derived from the vehicle level safety requirements. It is also important to highlight that windings shorts are not expected to result in any hazardous engine effect defined in EVE.3375.(d).(2) and the	EVE.33100	Not accepted  Windings should be considered as part of the engine electrical system, therefore 33100(g)(2) will be applied to it. Nevertheless, LOPC need to be assessed at the aircraft level, taking into account the contribution of each of the engine electrical systems.  The rationale is relevant and will be looked at during the certification process.
TCCA AARDD Eng Division	alteração	As recommended in the comment.	We recommend that the type of mitigation (mechanical i.e. manual, vs automatic) required here be linked to the possible effects of the fault on the safety of flight and the aircraft. Automatic mitigation means should be required for critical electrical faults with immediate effect on the safety, while manual mitigation means can be accepted for less critical faults.	EVE.33100(c)(3)	Not accepted Although we concur with the concern, no changes to the requirement in this respect was made. It will be addressed at the means of compliance level. The requirement was changed to include reference to the definition of "hazardous engine effects".
TCCA AARDD Eng Division	alteração	As recommended in the comment.	Since the engine electrical power distribution system is part of the engine electrical system, we recommend combining the requirement of the second sentence in EVE.33100(c)(1) with EVE.33100(d) in one common requirement with the following suggested change: <i>"The engine electrical system and associated protections must be designed such that the loss, malfunction, or interruption of the electrical power source will not result in a hazardous engine effect, as defined in EVE.3375(d)(2)."</i>	EVE.33100(d)	Not accepted  EVE.33100(c)(1) relates to the engine electrical system distribution while EVE.33100(d) is related to protections of the engine electrical system.
EASA	Esclarecimento	The requirement may be applicable at engine level or at propulsion system level, taking benefit from the high number of engines to ensure CSFL in case of loss of one engine	Clarification is sought that the requirement can be applied at engine or at propulsion system level if adequately substantiated	EVE.33100(g)	Noted Requirement needs to be assessed at the aircraft level, taking into account the contribution of each of the engine electrical systems.
TCCA AARDD Eng Division	alteração	We recommend using in these requirements the language of Sec 33.28(d)(4) which provides a delimitation of the terminology "local events".	The term "local events" is vague and needs to be defined.	EVE.33100(g)(4)	Accepted  Included the definition of the term "local events" in EVE.2000(b)(6).
EVE AIR MOBILITY	Esclarecimento	EVE1. 3317 Fire protection  To clarify the terms "fireproof" and "firewall" in a context of an electric engine.	It is not clear if the intended definition of the terms "firewall" and "fireproof" are the same found in AC 33.17-1A and RBAC/14 CFR part 01, respectively. If this is the case, the requirement is not applicable for EVE-100 and could be removed. Otherwise, if there is a specific definition for electric engine, then ANAC should include this definition in the requirement and make the necessary adaptation to RBAC 01.	EVE.3317	The ANAC has confirmed that the terms "firewall" and "fireproof" have the same definition as outlined in RBAC 01. Additionally, ANAC notes that the electric motor of the EVE-100 will not contain flammable fluids. As a result, requirement EVE.3317 (b)(c) & (d) will be removed from the EVE-100 certification base.
Embraer S.A.	Esclarecimento	EVE1. 3317 Fire protection  To clarify the terms "fireproof" and "firewall" in a context of an electric engine.	It is not clear if the intended definition of the terms "firewall" and "fireproof" are the same found in AC 33.17-1A and RBAC/14 CFR part 01, respectively. If this is the case, the requirement is not applicable for EVE-100 and could be removed. Otherwise, if there is a specific definition for electric engine, then ANAC should include this definition in the requirement and make the necessary adaptation to RBAC 01.	EVE.3317	The ANAC has confirmed that the terms "firewall" and "fireproof" have the same definition as outlined in RBAC 01. Additionally, ANAC notes that the electric motor of the EVE-100 will not contain flammable fluids. As a result, requirement EVE.3317 (b)(c) & (d) will be removed from the EVE-100 certification base.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDD Eng Division	alteração	As recommended in the comment.	EVE.3317 is titled "Fire Protection" and requires the protection of the high-voltage electrical wiring and interconnect systems from arc faults. Arc faults could have effects other than fire, therefore we recommend changing the title of the requirement to better reflect the intent, to the following: "High Voltage Arc Faults and Fire Protection". In addition, we suggest the word "interconnect systems" be replaced with "interconnection systems" in the body of the requirement, to include connectors and not only wiring and to be consistent with the general definition of EWIS used in other FAR regulations (part 25 subpart H).	EVE.3317(e)	Accepted  First comment: ANAC changed the requirement as follows: EVE.3318 - High-Voltage EWIS arc fault protection (a) High-voltage EWIS must be protected against arc faults that can lead to hazardous engine effects as defined in EVE.3375(g)(2). Any non-protected electrical wiring interconnections must be analyzed to show that arc faults do not cause a hazardous engine effect.  Second comment: Changed the word "interconnect" by "interconnection" to harmonize with EWIS definitions. For clarification, original intent of requirement included applicability to connectors.
TCCA AARDD Eng Division	alteração	Recommend updating as follows: (a) A rotor overspeed must not result in a burst, rotor growth, or damage of itself or of its windings that results in a hazardous engine effect, as defined in EVE.3375(d)(2) when operating in an engine for 5 minutes at the maximum overspeed condition. Compliance with this paragraph must be shown by test, validated analysis, or a combination of both. <del>Applicable assumed rotor speeds must be declared and justified.</del> When determining the maximum overspeed condition, the evaluation must include one hundred twenty percent of the maximum permissible rotor speed associated with any continuous, periodic, or non-periodic duty rating, including ratings for short time duty.	Max overspeed condition for demonstration compliance is missing.	EVE.3327	Not accepted. The intent of the requirement already addresses this issue.
EASA	alteração	The Certification basis proposes to demonstrate that the rotor design is tolerant to rotor growth or burst. However, this will impose to classify the rotor as Critical Part. Critical Parts should be used when it is shown impractical. However, electric engine architectures may allow to demonstrate the containment of high energy debris in case of overspeed.	It is proposed to change requirement EVE.3394 in a similar way as EHPS.250 (a) from EASA SC E-19	EVE.3327 and EVE.3394	Not accepted. The intent of the requirement already addresses this issue.
TCCA AARDD Eng Division	inclusão	Recommend adding the following: <i>"The applicant must demonstrate that, when fault or failure results in a sudden partial or complete power loss at one or several engines, the remaining engines compensate without exceeding any of their operating limitations."</i>	Missing control transitions	EVE.3328	Accepted. EVE.3328 (f) will be updated accordingly.
EVE AIR MOBILITY	Alteração	EVE1.3328 Engine control systems  To change EVE.3328(f)(4) from: "(f) Engine control system failures. The engine control system must: [...] (4) Not have any likely failures or malfunctions that lead to local events in the intended aircraft application." To: "(f) Engine control system failures. The engine control system must: (4) Not result in a hazardous engine effect due to engine control system failures or malfunction, in case of foreseeable local events originated from engine or installation-related failures."	The change in this paragraph is proposed to clarify its intent and be aligned with AC 33.28-3, which states that: "Under § 33.28(d)(4), foreseeable failures or malfunctions leading to local events, such as engine or installation-related failures that could lead to damage to control system electrical harnesses or connectors or to the control units, must not result in a hazardous engine event. We recommend that applicants analyze local events to ensure a hazardous engine event will not occur".	EVE.3328	Accepted. EVE.3328 (d) and (f) will be updated accordingly.
Embraer S.A.	Alteração	EVE1.3328 Engine control systems.  To change EVE.3328(f)(4) from: "(f) Engine control system failures. The engine control system must: [...] (4) Not have any likely failures or malfunctions that lead to local events in the intended aircraft application." To: "(f) Engine control system failures. The engine control system must: (4) Not result in a hazardous engine effect due to engine control system failures or malfunction, in case of foreseeable local events originated from engine or installation-related failures."	The change in this paragraph is proposed to clarify its intent and be aligned with AC 33.28-3, which states that: "Under § 33.28(d)(4), foreseeable failures or malfunctions leading to local events, such as engine or installation-related failures that could lead to damage to control system electrical harnesses or connectors or to the control units, must not result in a hazardous engine event. We recommend that applicants analyze local events to ensure a hazardous engine event will not occur".	EVE.3328	Accepted. EVE.3328 (d) and (f) will be updated accordingly.
TCCA AARDD Eng Division	alteração	We recommend using in these requirements the language of Sec 33.28(d)(4) which provides a delimitation of the terminology "local events".	The term "local events" is vague and needs to be defined.	EVE.3328(f)(4)	Accepted. EVE.3328 (f) will be updated accordingly.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDD Eng Division	Inclusão	We recommend including a definition for the terminology "minimal material properties" used in this requirement.	We believe the "minimal material properties" terminology is vague and needs to be defined.	EVE.3362(b)	[EN] Not accepted. Anac made no change as a result of this comment. Noted. EVE.3362(b) requires determining maximum stresses in the engine without exceeding "minimum material properties". The model EVE-100 must comply with EVE.3315, which establishes the requirements for engine materials. Compliance with EVE.3315 will determine "minimum material properties". Anac will clarify the means of compliance with EVE.3315 with the applicant, as needed. As a reference, ANAC's EVE.3362 is harmonized with FAA's JS4.2712 and AM1.2712. Similarly, ANAC's EVE.3315 is harmonized with FAA's 14 CFR Part 33.15, which is referred to in airworthiness criteria for the Joby model JAS-1 and Archer Model 001.  [PT] Não aceito. Não houve alteração como resultado desse comentário. Anotado. O EVE.3362(b) requer a determinação das tensões máximas no motor sem exceder as "propriedades mínimas do material". O modelo EVE-100 deve cumprir com o EVE.3315, que estabelece os requisitos para os materiais do motor. O cumprimento com o EVE.3315 determinará as "propriedades mínimas do material". A Anac esclarecerá os meios de cumprimento com o EVE.3315 com o requerente, conforme necessário. Como referência, o EVE.3362 da ANAC é harmonizado com o JS4.2712 e AM1.2712 da FAA. Da mesma forma, o EVE.3315 da ANAC é harmonizado com o 14 CFR Parte 33.15 da FAA, que é mencionado nos critérios de aeronavegabilidade para o modelo JAS-1 da Joby e o modelo 001 da Archer. A Anac esclarecerá os meios de conformidade com o EVE.2240(b) com o requerente, conforme necessário.
Airbus Helicopters	Alteração	Comment on EVE.3370 - Engine life-limited parts paragraph (a) Life limited parts are in CS27 and CS29 related to fatigue aspects for both metallic and composite parts. The static failure notion is only for composite parts. When considering the list of parts mentioned, leading life limit to static is questionable.		EVE.3370	Accepted. EVE.3370 will be updated accordingly.
Airbus Helicopters	Alteração	Comment on EVE.3370 - Engine life-limited parts paragraph (b) The reference to static parts to be managed throughout their service life as critical or life-limited parts in this requirement is unclear and should be clarified	Justification of Comment on EVE.3370 - Engine life-limited parts paragraph (b) Why this notion of static part right in a middle of very specific parts which can be only static loaded ? Definition of static part missing.  There is a mix between critical parts (CAT failure + Critical characteristics) and Fatigue loaded parts (CAT failure + under fatigue loads). The critical parts have not systematically a service life. The notion of service life is related to fatigue aspect and a critical parts is not necessarily fatigue loaded or have a so low fatigue level that it doesn't lead to fatigue damage. In comparison EASA SC E-19 EHPS require to perform a fatigue evaluation of critical parts (only). ANAC requirement is unclear.	EVE.3370	Accepted. EVE.3370 will be updated accordingly.
EVE AIR MOBILITY	Alteração	EVE1.3373 Power response  To change EVE.3373(a) from: "From the minimum power setting to the highest rated power without detrimental engine effects" To: "From the minimum power setting to the highest rated power without detrimental engine effects in the intended aircraft application".	The current wording lacks specificity, and Eve recommends adding "in the intended aircraft application" to EVE.3373(a). This modification allows the aircraft manufacturer to define and assess what constitutes "detrimental effects".	EVE.3373	Accepted. EVE.3373 will be updated accordingly.
Embraer S.A.	Alteração	EVE1.3373 Power response.  To change EVE.3373(a) from:  "From the minimum power setting to the highest rated power without detrimental engine effects"  To:  "From the minimum power setting to the highest rated power without detrimental engine effects in the intended aircraft application".	The current wording lacks specificity, and Embraer recommends adding "in the intended aircraft application" to EVE.3373(a). This modification allows the aircraft manufacturer to define and assess what constitutes "detrimental effects".	EVE.3373	Accepted. EVE.3373 will be updated accordingly.
GAMA	Alteração	GAMA recommends modifying EVE.3373(a) to include "in the intended aircraft application." This change grants flexibility to aircraft manufacturers to interpret and evaluate the meaning of "detrimental effects" within the context of their specific aircraft applications.	GAMA seeks clarification on the term "detrimental engine effects" within EVE.3373(a). The current wording lacks specificity, and GAMA recommends adding "in the intended aircraft application" to EVE.3373(a). This modification allows the aircraft manufacturer to define and assess what constitutes "detrimental effects."	EVE.3373 – Power Response	Accepted. EVE.3373 will be updated accordingly.
TCCA AARDD Eng Division	alteração	Recommend updating as follows: <i>"If the design allows any of the engine main rotating systems to continue to rotate after the engine is shut down while in-flight, this continued rotation must not result in hazardous engine effects, as specified in JS4.2717(d)(2). <u>The back-EMF generated during this engine non-operating mode shall not cause Hazardous effects in case of shorted windings for a time consistent with the applicable continued operation ."</u></i>	Missing back-EMF considerations	EVE.3374	Not accepted. The intent of the requirement already addresses this issue.

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EVE AIR MOBILITY	Alteração	<p>EVE1.3375 Safety analysis</p> <p>Comment 1: To remove requirement EVE.3375(d)(2)(ix). As an alternative, we suggest the following change to the requirement:</p> <p>From "Blockage of cooling systems that are required for the engine to operate within temperature limits" to "Loss of cooling system that are required for the engine to operate within temperature limits."</p> <p>Comment 2: To change EVE.3375(d)(1) from:</p> <p>"(d) Unless otherwise approved by ANAC and stated in the safety analysis, the following failure definitions apply to the engine: (1) A minor engine effect does not prohibit the engine from meeting its type-design requirements and the intended functions in a manner consistent with EVE.3328(d)(1)(i), (d)(1)(ii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate."</p> <p>To: "(d) Unless otherwise approved by ANAC and stated in the safety analysis, the following failure definitions apply to the engine: (1) A minor engine effect does not prohibit the engine from meeting its type-design requirements and the intended functions in a manner consistent with EVE.3328(d)(1)(i), (d)(1)(ii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate, or does not result in LOPC."</p> <p>Comment 3: To remove EVE.3375(d)(2)(ii).</p> <p>Comment 4: To change EVE.3375(e) from "The applicant must comply with EVE. 3375(a)(1), (2),(b) and (c) using the failure definitions in paragraph (g) of this section and the ICA in EVE.1529" to "The applicant must comply with EVE. 3375(a)(1), (2),(b) and (c) using the failure definitions in paragraph (d) of this section and the ICA in EVE.1529".</p>	<p>Comment 1: "Loss of cooling system" will not necessarily result in a hazardous engine effect. Actually, it will depend on the effects of this failure condition. "Loss of cooling system" that may result in higher temperatures can be accommodated by reducing power or shutting the engine down, which is not a hazardous engine effect. If those protections cannot be activated, and engine continues to operate with high temperature, it may result in structure strength degradation, loss of power control, or fire, which are already covered by EVE.3375(d)(2)(i), (iii), (iv), (v), and (vii). Therefore, Eve suggests to remove the EVE.3375(d)(2)(ix). As an alternative, we suggest to change the expression "blockage of cooling systems" for "loss of cooling system", since, blockage is just one failure mode that could result in a loss of cooling system.</p> <p>Comment 2: Single faults in an electric engine control system may result in partial loss of thrust, but the engine will still be capable to provide power above Single Fault Ratings, such as ESDP (Emergency Short Duration Power) and ECDP (Emergency Continuous Duration Power). Only LOPC events, which are defined as loss of power that results in inability to reach power above Single Fault Ratings, should be considered as a major engine effect.</p> <p>Comment 3: EVE-100 aircraft does not have a bleed system. Therefore, aligned with RBAC 21.17(b) concept, Eve suggest to remove EVE.3375(d)(2)(ii).</p> <p>Comment 4: In EVE.3375(e), the reference to paragraph (g) seems to be incorrect. Should it be paragraph (d).</p>	EVE.3375	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.
Embraer S.A.	Alteração	<p>EVE1.3375 Safety analysis.</p> <p>Comment 1: To remove requirement EVE.3375(d)(2)(ix). As an alternative, we suggest the following change to the requirement:</p> <p>From "Blockage of cooling systems that are required for the engine to operate within temperature limits" to "Loss of cooling system that are required for the engine to operate within temperature limits."</p> <p>Comment 2: To change EVE.3375(d)(1) from:</p> <p>"(d) Unless otherwise approved by ANAC and stated in the safety analysis, the following failure definitions apply to the engine: (1) A minor engine effect does not prohibit the engine from meeting its type-design requirements and the intended functions in a manner consistent with EVE.3328(d)(1)(i), (d)(1)(ii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate."</p> <p>To: "(d) Unless otherwise approved by ANAC and stated in the safety analysis, the following failure definitions apply to the engine: (1) A minor engine effect does not prohibit the engine from meeting its type-design requirements and the intended functions in a manner consistent with EVE.3328(d)(1)(i), (d)(1)(ii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate, or does not result in LOPC."</p> <p>Comment 3: To remove EVE.3375(d)(2)(ii).</p> <p>Comment 4: To change EVE.3375(e) from "The applicant must comply with EVE. 3375(a)(1), (2),(b) and (c) using the failure definitions in paragraph (g) of this section and the ICA in EVE.1529" to "The applicant must comply with EVE. 3375(a)(1), (2),(b) and (c) using the failure definitions in paragraph (d) of this section and the ICA in EVE.1529".</p>	<p>Comment 1: "Loss of cooling system" will not necessarily result in a hazardous engine effect. Actually, it will depend on the effects of this failure condition. "Loss of cooling system" that may result in higher temperatures can be accommodated by reducing power or shutting the engine down, which is not a hazardous engine effect. If those protections cannot be activated, and engine continues to operate with high temperature, it may result in structure strength degradation, loss of power control, or fire, which are already covered by EVE.3375(d)(2)(i), (iii), (iv), (v), and (vii). Therefore, Embraer suggests to remove the EVE.3375(d)(2)(ix). As an alternative, we suggest to change the expression "blockage of cooling systems" for "loss of cooling system", since, blockage is just one failure mode that could result in a loss of cooling system.</p> <p>Comment 2: Single faults in an electric engine control system may result in partial loss of thrust, but the engine will still be capable to provide power above Single Fault Ratings, such as ESDP (Emergency Short Duration Power) and ECDP (Emergency Continuous Duration Power). Only LOPC events, which are defined as loss of power that results in inability to reach power above Single Fault Ratings, should be considered as a major engine effect.</p> <p>Comment 3: EVE-100 aircraft does not have a bleed system. Therefore, aligned with RBAC 21.17(b) concept, Embraer suggest to remove EVE.3375(d)(2)(ii).</p> <p>Comment 4: In EVE.3375(e), the reference to paragraph (g) seems to be incorrect. Should it be paragraph (d).</p>	EVE.3375	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
TCCA AARDD Eng Division	alteração	Recommend updating as follows: “(d)(1) A minor engine effect does not prohibit the engine from meeting its type-design requirements and the intended functions in a manner consistent with EVE.3328(d)(1)(i)-(d)(1)(iii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate. An engine failure in which the only consequence is partial or complete loss of power from the engine will be regarded as a minor electric engine effect.”	Minor engine effect is not as per the accepted definitions.	EVE.3375(d)(1)	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.
GAMA	Alteração	GAMA recommends the update of this paragraph as follows: (d) Unless otherwise approved by ANAC and stated in the safety analysis, the following failure definitions apply to the engine: (1) A minor engine effect does not prohibit the engine from meeting its type-design requirements and the intended functions in a manner consistent with EVE.3328(d)(1)(i), (d)(1)(ii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate, or <b>does not result in LOPC</b> .	Single faults in an electric engine control system may result in partial loss of thrust, but the engine will still be capable to provide power above Single Fault Ratings, such as ESDP (Emergency Short Duration Power) and ECDP (Emergency Continuous Duration Power). Only LOPC events, which are defined as loss of power that results in inability to reach power above Single Fault Ratings, should be considered as a major engine effect.	EVE.3375(d)(1) - Safety Analysis	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.
EASA	exclusão	“(ix) Blockage of cooling systems that are required for the engine to operate within temperature limits.” This might not lead to a Hazardous or Catastrophic event but rather to an IFSD which is considered as Major according to EVE spec. It could lead to other Hazardous Engine Events already listed.	It is proposed to remove it as covered by other Hazardous Engine Events	EVE.3375(d)(2)	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.
GAMA	Remoção	GAMA recommends the removal of this requirement.	Regarding EVE.3375(d)(2)(ii): The EVE-100 aircraft does not include a bleed system.	EVE.3375(d)(2)(ii) - Safety Analysis	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.
GAMA	Remoção	GAMA recommends the removal of requirement EVE.3375(d)(2)(ix), because this is interpreted as a failure that is not considered hazardous. Instead, it should be classified as a major effect as determined by an aircraft hazard analysis.	Regarding EVE.3375(d)(2)(ix): The term "Blockage of cooling system" represents only one potential failure condition affecting the cooling system's performance. GAMA members suggest replacing this language with "Loss of cooling system." The outcome of "Loss of cooling system" doesn't inherently lead to hazardous engine effects; it depends on the specific consequences of this failure. If the primary concern is maintaining engine operation within temperature limits, item (ix) should be substituted with "Inability to operate the engine within temperature limits," accounting for various failure scenarios beyond just the cooling system. "Loss of cooling system" leading to higher temperatures can be managed by reducing power or shutting down the engine, actions that don't inherently result in hazardous engine effects. If, under certain conditions, these protective measures cannot be activated, and the engine continues to operate with elevated temperatures, it may lead to structural strength degradation, loss of power control, or fire. However, these outcomes are already addressed by EVE.3375(d)(2)(i), (iii), (iv), (v), and (vii).	EVE.3375(d)(2)(ix) - Safety Analysis	Accepted. EVE.3375 (b) up to (i) will be updated accordingly.
EVE AIR MOBILITY	Esclarecimento	EVE1.3377 Ingestion  Clarification on the intent of the requirement EVE.3377.	Eve suggests a comprehensive review of the distinctions between Internal Combustion Engines (ICE) and electric propulsion systems, particularly in the context of engine ingestion requirements. The conventional approach in RBAC 33 / 14 CFR Part 33 addresses combustion engines, ensuring an unobstructed air supply for combustion processes, but these standards may not be directly applicable to electric engines like those used in the EVE-100. Eve kindly requests ANAC to provide clarification on the intent and specific concerns guiding the applicability of engine ingestion requirements to electric propulsion systems. Given the unique nature of electric engines, clear guidance or a dedicated standard may be needed to address potential challenges adequately.	EVE.3377	Accepted. EVE.3377 (b) and (c) will be updated accordingly.
Embraer S.A.	Esclarecimento	EVE1.3377 Ingestion  Clarification on the intent of the requirement EVE.3377.	Embraer suggests a comprehensive review of the distinctions between Internal Combustion Engines (ICE) and electric propulsion systems, particularly in the context of engine ingestion requirements. The conventional approach in RBAC 33 / 14 CFR Part 33 addresses combustion engines, ensuring an unobstructed air supply for combustion processes, but these standards may not be directly applicable to electric engines like those used in the EVE-100. Embraer kindly requests ANAC to provide clarification on the intent and specific concerns guiding the applicability of engine ingestion requirements to electric propulsion systems. Given the unique nature of electric engines, clear guidance or a dedicated standard may be needed to address potential challenges adequately.	EVE.3377	Accepted. EVE.3377 (b) and (c) will be updated accordingly.
GAMA	Esclarecimento	GAMA kindly requests ANAC to provide clarification on the intent and specific concerns guiding the applicability of engine ingestion requirements to electric propulsion systems. Given the unique nature of electric engines, clear guidance or a dedicated standard may be needed to address potential challenges adequately.	GAMA suggests a comprehensive review of the distinctions between Internal Combustion Engines (ICE) and electric propulsion systems, particularly in the context of engine ingestion requirements. The conventional approach in 14 CFR Part 33 addresses combustion engines, ensuring an unobstructed air supply for combustion processes, but these standards may not be directly applicable to electric engines like those used in the EVE-100.	EVE.3377	Accepted. EVE.3377 (b) and (c) will be updated accordingly.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
EASA	alteração	"must not result in hazardous engine effects defined by EVE.3375(d)(2), or unacceptable power loss". This might not be sufficient to guarantee a Continued Safe Flight and Landing (CSFL).	It is proposed to replace the wording by "must not result in hazardous engine effects defined by EVE.3375(d)(2), or unacceptable power loss, or must not preclude CSFL"	EVE.3377(a)	Not Accepted. However, EVE.3377 (b) and (c) will be updated accordingly.
EASA	alteração	Another element could be to take benefit from the redundancy of the lift/thrust systems: Beyond the requirement that a 1kg bird must not result in a Hazardous Engine Event, this could be complemented by addressing that "Multiple bird strikes (with lower mass) must not lead to unacceptable power loss or must not preclude CSFL".	It is proposed to consider a similar wording as EHPS.290 of EASA SC E-19	EVE.3377(a)	Not Accepted. However, EVE.3377 (b) and (c) will be updated accordingly.
EASA	alteração	This requirement appears to go beyond what is today requested in FCAR 33 for turbine engines in the sense that it is applicable to all ratings.	It is proposed to ensure consistency with turbine engine requirements and limit the requirement to ratings with a duration of two minutes or less	EVE.3388	Not accepted. The intent of the requirement already addresses this issue. However, EVE.3388 title will be updated accordingly.
EVE AIR MOBILITY	Alteração	EVE1.3393 Teardown inspection  To change EVE.3393(a)(1) from: "After the endurance and durability demonstrations have been completed, the each engine must be completely disassembled. Each engine component and lubricant must be within service limits and eligible for continued operation in accordance with the information submitted for showing compliance with EVE.1529."  To: After the endurance and durability demonstrations have been completed, each engine must be completely disassembled. Each engine component and lubricant must be within service limits and eligible for continued operation in accordance with the information submitted for showing compliance with EVE.1529.	Typo correction.	EVE.3393	Accepted. EVE.3393 will be updated accordingly.
Embraer S.A.	Alteração	EVE1.3393 Teardown inspection  To change EVE.3393(a)(1) from: "After the endurance and durability demonstrations have been completed, the each engine must be completely disassembled. Each engine component and lubricant must be within service limits and eligible for continued operation in accordance with the information submitted for showing compliance with EVE.1529."  To: After the endurance and durability demonstrations have been completed, each engine must be completely disassembled. Each engine component and lubricant must be within service limits and eligible for continued operation in accordance with the information submitted for showing compliance with EVE.1529.	Typo correction.	EVE.3393	Accepted. EVE.3393 will be updated accordingly.
EVE AIR MOBILITY	Esclarecimento	EVE1.3394 – Containment  To clarify the parameters regarding the margin referred on EVE.3394(a).	Eve requests guidance on the defined parameters regarding "the margin to rotor burst precludes the possibility of a rotor burst" in EVE.3394(a). Additionally, guidance or specific parameters are necessary to accurately define and assess the margin to rotor burst considerations.	EVE.3394	Acknowledged. ANAC will determine an acceptable margin similar to the way the agency determines acceptable margins for engines under part 33 (AC 33-5 - Turbine Engine Rotor Blade Containment/Durability and others). Also, specific parameter will be defined at the next phase as part of the Means of Compliance definition.
Embraer S.A.	Esclarecimento	EVE1.3394 – Containment  To clarify the parameters regarding the margin referred on EVE.3394(a).	Embraer requests guidance on the defined parameters regarding "the margin to rotor burst precludes the possibility of a rotor burst" in EVE.3394(a). Additionally, guidance or specific parameters are necessary to accurately define and assess the margin to rotor burst considerations.	EVE.3394	Acknowledged. ANAC will determine an acceptable margin similar to the way the agency determines acceptable margins for engines under part 33 (AC 33-5 - Turbine Engine Rotor Blade Containment/Durability and others). Also, specific parameter will be defined at the next phase as part of the Means of Compliance definition.
GAMA	Remoção	GAMA requests clarification from ANAC related to the applicability of EVE.3394 for aircraft designs that do not have a "case" for the rotating components (e.g., out-runner electric engine). Additionally, GAMA also requests guidance on the defined parameters regarding "the margin to rotor burst precludes the possibility of a rotor burst" in EVE.3394(a). For example, electric motors may turn at 100's of RPMs, compared to turbine engines which may turn at tens of 1000's of RPMs. As such, guidance or specific parameters may be necessary to accurately define and assess the margin to rotor burst considerations.	GAMA acknowledges the relevance of the containment of high-energy rotating components requirement for the EVE-100, which features an out-runner electric engine. However, there is caution regarding what constitutes a "high-energy rotor" and the assumption that all rotating components have a "case," specifically, that the rotor is internal to the stator.	EVE.3394	Acknowledged. ANAC will determine an acceptable margin similar to the way the agency determines acceptable margins for engines under part 33 (AC 33-5 - Turbine Engine Rotor Blade Containment/Durability and others). Also, specific parameter will be defined at the next phase as part of the Means of Compliance definition.
Marcelo Tadeu Motta Ferreira	Alteração	Appendix A - Instructions for Continued Airworthiness EVE.A.1 - General (b) If Instructions for Continued Airworthiness are not supplied by the manufacturer of an appliance or product installed in the aircraft, the Instructions for Continued Airworthiness for the aircraft must include the information essential to the continued airworthiness of the aircraft.  Creio que a palavra "aircraft", no final da sentença, deva ser substituída por "appliance".	Da forma como a sentença está escrita, a palavra "aircraft" ao final não faz sentido, fazendo a sentença se tornar redundante. Creio que a palavra "appliance" seria a adequada, dando o sentido correto a sentença.	EVE.A.1	ANAC will address the matter in specific MoCs.
FAA	outros	Regarding section EVE.A.3, consider making manuals available in both languages.		EVE.A.3	The suggestion to make manuals available in both languages (Portuguese and English) is noted. ANAC understands the importance of ensuring accessibility of critical documentation for both local and international stakeholders. However, the specific requirements for language in manuals will depend on the intended operational environment and the regulatory framework applicable to each certification process.  ANAC will evaluate the need for dual-language manuals on a case-by-case basis, ensuring clarity and compliance with both local and international regulations.



Relatório de Análise de Contribuições

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TCCA AARDD Eng Division	alteração	Recommend rewording as follows: <i>"This section must set forth each mandatory <u>maintenance action</u>, replacement time, structural inspection interval, and related structural inspection procedure required for type certification."</i>	The Airworthiness Limitations Section should also include the mandatory maintenance checks / tasks (i.e. equivalent to CCMRs) necessary to show compliance with the safety requirements. EASA VTOL 2625(c) is referring instead to "each mandatory maintenance action" which is more general would cover all relevant task types.	EVE.A.4	The suggestion to reword the section to include each mandatory maintenance action, rather than specific tasks such as replacement time and structural inspection intervals, is acknowledged. ANAC agrees that a more general approach, as reflected in EASA VTOL 2625(c), could provide better coverage of all relevant maintenance tasks necessary for demonstrating compliance with safety requirements.  ANAC will consider address this matter in specific MoCs.
TCCA AARDC Flight Test Division	Outros	Cold weather and cold soak testing (similar to TCCA AWM 52x.1301-1) would be expected MoC to demonstrate proper operation of these vehicles across the whole flight envelope. Understand it may not be an ANAC specific issue.	Given the known vulnerability of battery-operated systems to cold weather, a cold soak demonstration is required to establish the minimum environmental ramp conditions under which the aircraft can operate. Similar comment for hot weather condition (hot soak). Should this be considered?	General	<b>NOT ACCEPTED:</b> The proposed certification basis follows a performance-based philosophy (performance-based regulations). Details on compliance with the requirements will be defined in the next phase, when acceptable means of compliance (DDS - Detailed Design Standard) are defined. All the characteristics of the propulsion batteries will be taken in account before the means and method of compliance be set. The test scenarios must include all the operational envelope of the aircraft.
EASA	outros	The chosen wording and distribution of requirements is assigned differently to the sets of airworthiness criteria published so far by other authorities. This may create confusion for applicants and increase validation efforts when recognition of the airworthiness compliance demonstrations is sought.	Harmonization of the requirements architecture and objectives is proposed, catering for the expected needs in international validation projects.	General	ANAC intends to collaborate with other authorities to achieve harmonization, and some updates have already been incorporated into the final proposal.
ASD - Europe	alteração	As explained in the comment box, ASD suggests the ANAC to consider further harmonization with the global Authorities partners, in line with the rulemaking cooperation guidelines signed between Authorities.	ASD-Europe thanks the ANAC for the opportunity to provide comments on the Special Class Airworthiness Criteria for the EVE's Model EVE-100. ASD-Europe notes with satisfaction the ANAC approach which takes into account several interactions with different certification authorities and international organizations to ensure coherence with regulatory frameworks worldwide for similar vehicles and operations. The criteria is indicated to be applicable only to a defined CONOPS which includes commercial operations in urban centers. It therefore aligns with the need of the European EASA enhanced category VTOL aircraft as specified in the SC-VTOL. As such the European Industry members of ASD appreciate the efforts made to align with the EASA SC VTOL on many aspects included in the proposed criteria. In particular the provisions included on energy reserve definition to pave the way for a future performance operational requirement is recognised as a major step towards international harmonization on the topic. However ASD believes that the commercial in urban areas market targeted for the given product, due to the novelties of the aircraft design and the expected volume of operation, requires the Authority to aim at an increased level of safety compared to the existing RBAC 23 regulation, in order to protect customers, third parties involved in the air transport ecosystem, and people on the ground. The latter are particularly exposed to increased risks when operations are performed over-populated areas. In addition, one of the ANAC criteria includes some prescriptive requirements on the aircraft gliding or equivalent means capability which favour particular eVTOL solutions. This precludes certification of other eVTOL designs capable of continued safe flight and landing at an aerodrome after a combination of failures affecting power or thrust not shown to be extremely improbable and meeting the no single failure catastrophic criteria. Indeed, the lack of harmonization between Authorities requirements poses a strong threat to the achievement of a level playing field among the manufacturers worldwide, and will generate additional costs and burden which will be a barrier in the development of the market both in Brazil and in the EU, especially at the time of TC validation. For the above, ASD suggests the ANAC to consider further harmonization with the global Authorities partners, in line with the rulemaking cooperation guidelines signed between Authorities. The request is reinforced by the fact that the rulemaking process for this new type of aircraft and their peculiar operational environment is in an early stage of implementation. Detailed comments are provided below.	General	ANAC acknowledges the importance of harmonizing criteria with other global authorities, and maintains continuous dialogue with international agencies to ensure regulatory compatibility across different markets. Efforts to align airworthiness requirements with international practices are a key priority for ANAC, and the feedback received through this public consultation reinforces the relevance of this approach.  Regarding the observation that ANAC's requirements may introduce some restrictions, particularly related to the capability for safe landing in case of failure, the current criteria reflect the current stage of technological development and the need to ensure high levels of safety, both for occupants and third parties on the ground. The evolution of certification criteria will continue to be assessed in future revisions, based on technological advancements and operational experience.  ANAC's commitment to regulatory harmonization and the implementation of robust safety systems aims to support the safe and efficient development of the eVTOL market in Brazil, without compromising safety or the integrity of aerial operations. ANAC will continue to monitor developments in this field and make adjustments as necessary to ensure regulations keep pace with international best practices.
ASD - Europe	outros		Whist the document is specific to an a particular application, the comments have been made as if it is a generic requirement as it is clear that it will be used as the basis for further applications. It contains a number of criteria which are not necessarily applicable to the application in question.	General	The document indeed addresses specific requirements for the particular application of EVE-100, and while it may serve as a foundation for future applications, the criteria have been carefully tailored to meet the unique operational and safety challenges of EVE. Each application will undergo an individual evaluation process, and criteria not relevant to other designs will not be automatically applied without thorough review.  As for the identified criteria that may not be applicable to the current application, these will be reassessed to ensure they align with the specific operational context. ANAC remains open to refining the criteria where necessary, ensuring that the certification process is both effective and aligned with the operational realities of each eVTOL design.
UK CAA	outros	Finally, it is noted that because the criteria described in the proposed Airworthiness Criteria are performance based, there remains a some uncertainty as to exactly what will need to be done by the applicant in order to satisfy the ANAC that compliance has been demonstrated. To this end, it will not be possible for the CAA to indicate its detailed position regarding the acceptability of the proposed airworthiness criteria for the EVE-100, without a detailed review of the means of compliance yet to be published by ANAC. The CAA continues to actively engage with regulators and the eVTOL industry, for the development and harmonisation of certification and industry consensus standards. The CAA will be pleased to work with the ANAC, on the development of a convergent approach to this new type of aviation activity.		General	ANAC acknowledges the concern regarding the performance-based nature of the proposed Airworthiness Criteria and the resulting uncertainty around the specific means of demonstrating compliance. The performance-based approach allows for flexibility in addressing the unique design features of eVTOLs, but we understand the need for clear guidance on how compliance will be assessed.  ANAC will work to develop detailed Means of Compliance, which will provide applicants with the necessary information to understand how to demonstrate adherence to the airworthiness criteria. Once these guidelines are published, they will clarify the expectations for applicants and help eliminate any remaining ambiguity.  ANAC is committed to collaborating with the CAA UK and other international authorities to harmonize the certification process for eVTOLs. We welcome the opportunity to work together towards a convergent approach that ensures safety and operational efficiency for this new category of aviation.

Relatório de Análise de Contribuições

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TCCA AARDC Flight Test Division	Inclusão	Vortex ring state prediction and warning systems should be implemented. Envelope protection to prevent entering the condition should be included.	Vortex Ring State - The current regulations have a lack of guidance regarding detection, avoidance and impacts of vortex ring state. Given that research has demonstrated that these type of aircraft will be susceptible to this dangerous phenomenon, the newly developed regulations should address this matter. There are known handling qualities difficulties and structural load issues encountered when the aircraft is subject to VRS. Protection should be built into these novel technologies, particularly given the push to have lower experienced pilots at the controls.	General	This Airworthiness criteria addresses specific requirements for the particular application of EVE-100, and while it may serve as a foundation for future applications, the criteria have been carefully tailored to meet the unique operational and safety challenges of EVE. ANAC remains open to refining the criteria where necessary, ensuring that the certification process is both effective and aligned with the operational realities of each eVTOL design.
EASA	alteração	Propellers are designed to ensure thrust and not lift. Therefore, the requirements demonstration during the propeller certification might not be enough.	It is proposed to establish guidance for propellers/rotors.	General	The concern regarding propeller certification and the need for additional requirements for both thrust and lift is acknowledged. eVTOL designs often rely on rotors and propellers to provide both functions, distinguishing them from traditional aircraft. ANAC agrees that the current certification criteria do not fully address all aspects of the process, particularly because the EVE-100 propeller will be certified separately from the aircraft's Type Certificate.  Establishing more detailed guidance for the certification of propellers and rotors in eVTOL applications is indeed a priority, ensuring that their dual role in providing both lift and thrust is thoroughly evaluated.
Paulo Roberto Pinheiro	Outros	Pôr no eve, identificador de sinal GPS automático, dos helipontos ( aeroportos municipal ) para facilitar o pouso/decolagem, mesmo em tempos sem visibilidade. A longitude e a latitude, instalados no Eve, de cada helipontos municipais, ajudaria muito!!!	É mais fácil pousar, com helipontos municipais com receptores no solo e na aeronave, se comunicando diretamente!	General	A sugestão de implementar sistemas automáticos de identificação de sinal GPS em helipontos para facilitar pousos e decolagens, mesmo em condições de baixa visibilidade, é válida. A ANAC reconhece a importância de tecnologias de navegação avançadas para melhorar a segurança e eficiência das operações, especialmente em ambientes urbanos com aeronaves eVTOL.  A inclusão de sistemas de navegação que utilizam GPS, latitude e longitude em helipontos municipais, com comunicação direta entre o solo e a aeronave, pode ser explorada no futuro, à medida que esses sistemas se tornem tecnologicamente viáveis e alinhados com os padrões de segurança exigidos para operações em áreas densamente povoadas.  No entanto, esses aspectos de infraestrutura de apoio precisam ser coordenados com as autoridades municipais e outros órgãos reguladores para garantir a integração adequada desses sistemas em operações eVTOL.
Paulo Roberto Pinheiro	Outros	Pôr no eve, identificador de sinal GPS automático, dos helipontos ( aeroportos municipal ) para facilitar o pouso/decolagem, mesmo em tempos sem visibilidade. A longitude e a latitude, instalados no Eve, de cada helipontos municipais, ajudaria muito!!!	É mais fácil pousar, com helipontos municipais com receptores no solo e na aeronave, se comunicando diretamente!	General	A sugestão de implementar sistemas automáticos de identificação de sinal GPS em helipontos para facilitar pousos e decolagens, mesmo em condições de baixa visibilidade, é válida. A ANAC reconhece a importância de tecnologias de navegação avançadas para melhorar a segurança e eficiência das operações, especialmente em ambientes urbanos com aeronaves eVTOL.  A inclusão de sistemas de navegação que utilizam GPS, latitude e longitude em helipontos municipais, com comunicação direta entre o solo e a aeronave, pode ser explorada no futuro, à medida que esses sistemas se tornem tecnologicamente viáveis e alinhados com os padrões de segurança exigidos para operações em áreas densamente povoadas.  No entanto, esses aspectos de infraestrutura de apoio precisam ser coordenados com as autoridades municipais e outros órgãos reguladores para garantir a integração adequada desses sistemas em operações eVTOL.
ULISSES RICARDO ROMAO	Alteração	Baseado na Lei nº 12.527, de 18 de novembro de 2011 de acesso a informações, solicito que o texto para discussão técnica do documento cs-10-2023-proposta, seja apresentado também no idioma português do Brasil.	Por se tratar de uma consulta pública, o acesso ao documento colocado para apreciação deve ser amplo total e irrestrito a qualquer pessoa física ou entidade através dos seus representantes, desse maneira a utilização do idioma inglês na documentação restringi enormemente o acesso as informações, por tanto, acredito que uma versão na língua nativa do nosso país deve ser apresentada.	General	Prezado Senhor. Apresentamos aqui as razões para adoção da língua inglesa nesse caso. Os chamados critérios de aeronavegabilidade, segundo o RBAC 21, item 21.17(b) fazem o papel dos RBAC para aeronaves de classe especial, como essa, que não se enquadram nas categorias dos RBACs existentes. Este assunto é relevante e já foi extensamente discutido na ANAC antes de ser tomada essa decisão, com a Procuradoria Geral da União e a Diretoria da ANAC, como consta dos processos 00058.015415/2020-74 e 00058.083967/2024-39 (Regulamentos e Normas: Elaboração e Revisão de Normas Finalísticas de Aeronavegabilidade). Resumidamente, as razões são as seguintes: Dado que a consulta setorial, diferentemente da consulta pública, é mais voltada para o setor, neste caso o de fabricantes de produtos aeronáuticos, e que estes normalmente não atuam somente no mercado brasileiro, é natural que não só dominem o idioma inglês como também elaborem sua própria documentação de demonstração desse requisitos nesse idioma, para realizar os processos de validação da certificação por parte das autoridades dos outros países onde vendem suas aeronaves, o que se reflete no fato de a maioria dos relatórios enviados por requerentes de certificação de tipo à ANAC estarem redigidos em inglês. Mesmo fabricantes de aeronaves menores devem dominar o idioma inglês porque, por mais que alguns RBACs sejam escritos em português, as normas da indústria necessárias para demonstrar cumprimento com os regulamentos estão disponíveis apenas em inglês. Considerando essa argumentação, e que a alocação de recursos humanos traz ônus administrativo à ANAC, conclui-se que o impacto negativo dessas possíveis medidas supera seu impacto positivo. Assim, vê-se que para argumentar sobre os requisitos técnicos sob consulta, ainda que estivessem em português, as pessoas precisariam consultar as normas da indústria em inglês, os regulamentos de outros países, também em inglês. Adicionalmente, embora o ideal fosse termos as duas línguas na consulta setorial, já foi constatado que a tradução para o Português tem o potencial de conter erros de tradução, o que pode ocasionar risco para a segurança da aviação civil.
ULISSES RICARDO ROMAO	Esclarecimento	Quais as medidas de segurança serão introduzidas no EVE para prevenir acidentes?	Recomendações de normas internacionais de aviação utilização de sistemas de controle de tráfego aéreo. Assim como as aeronaves convencionais, os carros voadores devem seguir os procedimentos estabelecidos de controle de tráfego aéreo para garantir uma operação segura. Isto inclui comunicar-se com o controle de tráfego aéreo, seguir rotas de voo designadas e cumprir as restrições de altitude e velocidade.	General	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
ULISSES RICARDO ROMAO	Alteração	Baseado na Lei nº 12.527, de 18 de novembro de 2011 de acesso a informações, solicito que o texto para discussão técnica do documento cs-10-2023-proposta, seja apresentado também no idioma português do Brasil.	Por se tratar de uma consulta pública, o acesso ao documento colocado para apreciação deve ser amplo total e irrestrito a qualquer pessoa física ou entidade através dos seus representantes, desse maneira a utilização do idioma inglês na documentação restringi enormemente o acesso as informações, por tanto, acredito que uma versão na língua nativa do nosso país deve ser apresentada.	General	Prezado Senhor. Apresentamos aqui as razões para adoção da língua inglesa nesse caso. Os chamados critérios de aeronavegabilidade, segundo o RBAC 21, item 21.17(b) fazem o papel dos RBAC para aeronaves de classe especial, como essa, que não se enquadram nas categorias dos RBACs existentes. Este assunto é relevante e já foi extensamente discutido na ANAC antes de ser tomada essa decisão, com a Procuradoria Geral da União e a Diretoria da ANAC, como consta dos processos 00058.015415/2020-74 e 00058.083967/2024-39 (Regulamentos e Normas: Elaboração e Revisão de Normas Finalísticas de Aeronavegabilidade). Resumidamente, as razões são as seguintes: Dado que a consulta setorial, diferentemente da consulta pública, é mais voltada para o setor, neste caso o de fabricantes de produtos aeronáuticos, e que estes normalmente não atuam somente no mercado brasileiro, é natural que não só dominem o idioma inglês como também elaborem sua própria documentação de demonstração desse requisitos nesse idioma, para realizar os processos de validação da certificação por parte das autoridades dos outros países onde vendem suas aeronaves, o que se reflete no fato de a maioria dos relatórios enviados por requerentes de certificação de tipo à ANAC estarem redigidos em inglês. Mesmo fabricantes de aeronaves menores devem dominar o idioma inglês porque, por mais que alguns RBACs sejam escritos em português, as normas da indústria necessárias para demonstrar cumprimento com os regulamentos estão disponíveis apenas em inglês. Considerando essa argumentação, e que a alocação de recursos humanos traz ônus administrativo à ANAC, conclui-se que o impacto negativo dessas possíveis medidas supera seu impacto positivo. Assim, vê-se que para argumentar sobre os requisitos técnicos sob consulta, ainda que estivessem em português, as pessoas precisariam consultar as normas da indústria em inglês, os regulamentos de outros países, também em inglês. Adicionalmente, embora o ideal fosse termos as duas línguas na consulta setorial, já foi constatado que a tradução para o Português tem o potencial de conter erros de tradução, o que pode ocasionar risco para a segurança da aviação civil.
Ronaldo Aparecido de Souza	Esclarecimento	Na nossa Região há Serras imponentes como a do Mar e a Mantiqueira. Os veículos estão adaptados para operar também nestas áreas de turismo.	Já aconteceram acidentes de aviões de pequeno porte nestas Serras por falhas operacionais e técnicas.	General	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Ronaldo Aparecido de Souza	Esclarecimento	Na nossa Região há Serras imponentes como a do Mar e a Mantiqueira. Os veículos estão adaptados para operar também nestas áreas de turismo.	Já aconteceram acidentes de aviões de pequeno porte nestas Serras por falhas operacionais e técnicas.	General	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Nathan Vinicius Pontes Santos	Inclusão	Essa aeronave deveria ter como obrigatoriedade o uso de um sistema de paraquedas assim como o Cirrus Vision Jet por exemplo.	Provavelmente essa aeronave irá sobrevoar baixo residências, ruas movimentadas e uma provável pane certamente colocaria a vida não somente dos tripulantes como também das pessoas em seu entorno em risco.	General	Não Aceita. Embora a ideia de um sistema de paraquedas para aeronaves eVTOL seja compreensível, dadas as operações em áreas urbanas, a inclusão deste sistema neste momento não se mostra a solução mais adequada. Projetadas com redundância em seus motores e sistemas de controle, as aeronaves eVTOL já oferecem meios eficazes para mitigar falhas sem comprometer a segurança de tripulantes e pessoas em solo. No entanto, essa preocupação com segurança será abordada continuamente com outras soluções de projeto que aprimorem ainda mais a confiabilidade e segurança das operações, mantendo o compromisso com a proteção dos ocupantes e do entorno urbano
EASA	Outros	The enclosed file contains the contribution of the European Aviation Safety Agency to this public consultation.	EASA thanks ANAC for this opportunity to comment on the airworthiness criteria developed for the certification of the EVE Soluções de Mobilidade Aérea Urbana LTDA (EVE) Model EVE-100. EASA looks forward to the exchange and harmonisation of certification requirements and policies for VTOL aircraft, which for EASA mainly consist in the Special Condition VTOL (first published in 2018) and the subsequently published Means of Compliance, plus, for electric and hybrid propulsion, the Special Condition E-19 (first published in 2020).	Informative	ANAC appreciates EASA's contribution to this public consultation and values the opportunity for collaboration on the airworthiness criteria developed for the certification of the EVE-100 model. The exchange of certification requirements and policies for VTOL aircraft is essential to ensure harmonization and alignment between our regulatory bodies. ANAC is fully committed to maintaining close coordination with EASA, particularly with respect to the Special Condition VTOL and related Means of Compliance. We look forward to further cooperation in this area to establish a consistent and convergent framework for the certification of VTOL aircraft, including electric and hybrid propulsion systems, ensuring a seamless regulatory environment for the industry.
EASA	outros	EASA thanks ANAC for this opportunity to comment on the airworthiness criteria developed for the certification of the EVE Soluções de Mobilidade Aérea Urbana LTDA (EVE) Model EVE- 100. EASA looks forward to the exchange and harmonisation of certification requirements and policies for VTOL aircraft, which for EASA mainly consist in the Special Condition VTOL (first published in 2018) and the subsequently published Means of Compliance, plus, for electric and hybrid propulsion, the Special Condition E-19 (first published in 2020).		Informative	ANAC appreciates EASA's contribution to this public consultation and values the opportunity for collaboration on the airworthiness criteria developed for the certification of the EVE-100 model. The exchange of certification requirements and policies for VTOL aircraft is essential to ensure harmonization and alignment between our regulatory bodies. ANAC is fully committed to maintaining close coordination with EASA, particularly with respect to the Special Condition VTOL and related Means of Compliance. We look forward to further cooperation in this area to establish a consistent and convergent framework for the certification of VTOL aircraft, including electric and hybrid propulsion systems, ensuring a seamless regulatory environment for the industry.
U.S. Federal Aviation Administration - FAA	Outros	Please see attachment.	Please see attachment.	Informative	ANAC appreciates FAA's contribution to this public consultation and values the opportunity for collaboration on the airworthiness criteria developed for the certification of the EVE-100 model. The exchange of certification requirements and policies for VTOL aircraft is essential to ensure harmonization and alignment between our regulatory bodies. ANAC is fully committed to maintaining close coordination with FAA. We look forward to further cooperation in this area to establish a consistent and convergent framework for the certification of VTOL aircraft, including electric and hybrid propulsion systems, ensuring a seamless regulatory environment for the industry.

Relatório de Análise de Contribuições

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Guillaume Malaval (Noise Expert at EASA - European Union Aviation Safety Agency)	Outros	ANAC has announced a public consultation of their draft cert basis for the EVE-100 Embraer eVTOL in CAEP WG1 and invited members to comment. This contribution is made on behalf of the Noise team at EASA (part of the Environment & Sustainability group). EASA proposes to work in partnership with ANAC to establish the noise requirements of the EVE-100.	EASA understands that ANAC is still in discussion with Embraer to establish the noise requirements of the EVE-100. Acknowledging this situation and considering EASA's recent experience and publications of noise requirements for eVTOL equipped with non-tilting and tilting rotors, EASA is offering to collaborate with ANAC on those future noise requirements. This would allow leveraging EASA's experience and contribute to the standardization of noise requirements, thereby providing current and future eVTOL applicants with clear directions and ensuring a level-playing field at the international level. ANAC is therefore welcome to reach out to EASA Noise group as soon as this activity is started.	Noise	Noted. ANAC appreciates EASA's offer to collaborate in the establishment of the noise requirements of this project, and ANAC we will reach out to EASA's noise group as the project progresses.
FAA	inclusão	The proposed criteria prescribe airworthiness standards for the issuance of a type certificate and for continued airworthiness. The proposed criteria do not address noise certification, which should be part of the type certification. The FAA requests that ANAC include a description of your proposed noise certification methods for the EVE-100 in an update of the document.		Noise	Noted. Although the proposal does not currently address noise certification considerations, discussions on this topic are ongoing. Brazilian noise certification requirements (RBAC 36) will be applied where relevant for certifying eVTOL aircraft. Additionally, supplementary noise requirements to address the acoustic characteristics of eVTOLs will be proposed if necessary.
Maurício Custarella da Costa	Esclarecimento	Srs.(a), Minha contribuição é referente ao tipo de licença de pilotagem que será exigida. Minha sugestão é requerer ao solicitante da licença para pilotar o EVE-100 é que seja possuidor de no mínimo uma licença de piloto de helicópteros.	Considerando a capacidade de pousos e decolagens verticais do EVE-100 além de sua baixa autonomia, o treinamento de pilotagem a ser requerido tem mais pertinência se relacionado ao treinamento aplicado para pilotos de asas rotativas.	out of scope	Esta contribuição, apesar de relevante, está fora do escopo da consulta que trata apenas de requisitos de aeronavegabilidade. No entanto, será repassada à superintendência competente para que considere quando tratar do tema.
Evandro Carlos Ferreira	Esclarecimento	Um fator que considero muito importante é sobre quais as alterações necessárias ou atualizações para o programa de treinamento dos mecânicos que prestam serviços de manutenção para essas aeronaves. Será necessário uma nova Habilitação técnica ou apenas a Avionics será suficiente, já que este tipo de equipamento opera com alta tensão de corrente contínua e nossos profissionais não tem este assunto abordado em sua formação.	Trabalho a mais de 30 anos na área de aviação e tenho grande interesse por este tema que considero um marco de desenvolvimento tecnológico para nosso país no modal aéreo e gostaria de contribuir o máximo possível na sua implantação. É comum durante a implantação de novas tecnologias detalhes técnicos de treinamento passem despercebidos e posteriormente afetarem a segurança de voo.	out of scope	Esta contribuição, apesar de relevante, está fora do escopo da consulta que trata apenas de requisitos de aeronavegabilidade. No entanto, será repassada à superintendência competente para que considere quando tratar do tema.
César Augusto Lino	Outros	Eu César Augusto Lino, portador do CPF: *** ***, tenho muito interesse em saber como pilotar e me torna piloto dos tais modelos. Não sei onde nem como ter essas informações para que eu possa me capacitar para essa revolucionária histórica na aviação e para a humanidade! Sou uma pessoa que aprende rápido, proativo, comprometido, autodidata, e apaixonado pela aviação. Me disponho em ser um voluntário para aprender a pilotar esse modelos EVES, caso vocês tenham poucas pessoas com bravura e coragem.	Sonho em ser piloto comercial, e não tive oportunidade, nem condições financeiras, mas vejo aqui uma outra oportunidade de atuar na área e estou disposto voluntariamente e participar deste ou, nos demais projetos que surgirão para que a apresentação e lançamento seja mais que um marco na história, será algo que os filhos de nosso filhos, aprenderam e terão o conhecimento através dos seus livros de história! Será um orgulho radiante fazer parte e evoluir nos projetos, junto de todos vós!  Sou grato pela atenção e espero um dia ser útil contribuindo com os projetos. Atenciosamente,	out of scope	Louvamos o interesse e disposição do contribuidor com esta consulta, no entanto, não se trata de contribuição de sugestão sobre os requisitos consultados. A Anac não treina pilotos e sugerimos procurar centros de formação apropriados quando estes estiverem habilitados a proverem cursos sobre eVTOL.
César Augusto Lino	Outros	Eu César Augusto Lino, portador do CPF: *** ***, tenho muito interesse em saber como pilotar e me torna piloto dos tais modelos. Não sei onde nem como ter essas informações para que eu possa me capacitar para essa revolucionária histórica na aviação e para a humanidade! Sou uma pessoa que aprende rápido, proativo, comprometido, autodidata, e apaixonado pela aviação. Me disponho em ser um voluntário para aprender a pilotar esse modelos EVES, caso vocês tenham poucas pessoas com bravura e coragem.	Sonho em ser piloto comercial, e não tive oportunidade, nem condições financeiras, mas vejo aqui uma outra oportunidade de atuar na área e estou disposto voluntariamente e participar deste ou, nos demais projetos que surgirão para que a apresentação e lançamento seja mais que um marco na história, será algo que os filhos de nosso filhos, aprenderam e terão o conhecimento através dos seus livros de história! Será um orgulho radiante fazer parte e evoluir nos projetos, junto de todos vós!  Sou grato pela atenção e espero um dia ser útil contribuindo com os projetos. Atenciosamente,	out of scope	Louvamos o interesse e disposição do contribuidor com esta consulta, no entanto, não se trata de contribuição de sugestão sobre os requisitos consultados. A Anac não treina pilotos e sugerimos procurar centros de formação apropriados quando estes estiverem habilitados a proverem cursos sobre eVTOL.

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Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Alvimar de Lucena Costa Junior - Boeing	Outros	<p>Esta é uma tradução livre do comentário oficial anexado em PDF a este formulário on line.</p> <p>A Boeing Company agradece esta oportunidade de revisar e fornecer comentários sobre os critérios de aeronavegabilidade propostos para a aeronave EVE-100. A publicação desses critérios de aeronavegabilidade é um passo significativo e importante para possibilitar a integração das aeronaves de Mobilidade Avançada do Ar (AAM) no espaço aéreo brasileiro. Revisamos os critérios e a justificativa e temos os seguintes comentários gerais.</p> <p>A Boeing está investida na AAM de várias maneiras, incluindo por meio de nossa subsidiária, a Wisk, fabricante de eVTOLs, e nossa joint venture, SkyGrid, que tem como objetivo possibilitar a integração segura de aeronaves não tripuladas no espaço aéreo global, não segregado, em grande escala. Um dos pilares de segurança do ecossistema da aviação é a consistência mundial. Continuamos a acompanhar a harmonização dos requisitos para certificação e aprovação operacional desses novos tipos de aeronaves como um facilitador-chave para a expansão segura das operações de AAM internacionalmente.</p> <p>É evidente que a ANAC dedicou esforço significativo no desenvolvimento desses critérios de aeronavegabilidade. De particular destaque é o foco especial aplicado ao feedback regulatório, da indústria e do público até o momento em outras publicações de critérios de aeronavegabilidade em busca da harmonização. A Boeing parabeniza a ANAC por essa consideração e pelos passos substanciais dados em direção a esse objetivo. A Boeing também recomenda que a ANAC entre em contato com a FAA para compartilhar aprendizados e trabalhar juntas em critérios de aeronavegabilidade harmonizados, se ainda não estiverem em andamento.</p>	<p>Inicialmente publicado em 2022 e atualizado em dezembro de 2023, a Boeing se associou à Wisk e à SkyGrid para publicar um Conceito de Operações de Mobilidade Urbana Aérea. Neste ConOps, a Boeing delinea uma série de princípios e abordagens, incluindo a necessidade de regras e operações harmonizadas. Como forma de acelerar os esforços em direção ao nosso objetivo comum de harmonização, a Boeing gostaria de oferecer nossa assistência, por meio de parceria com a ANAC, para facilitar e incentivar a alinhamento global.</p> <p>A Boeing está pronta para ajudar e aguarda ansiosamente para trabalhar em estreita colaboração com a ANAC.</p> <p>Mais uma vez, agradecemos pela oportunidade de fornecer contribuições. Por favor, observe que os comentários são fornecidos em nome da The Boeing Company. Solicitamos que os nomes dos funcionários não sejam publicados em nenhum documento público.</p>	out of scope	A Anac agradece a disponibilidade da Boeing Company para contribuir com o desenvolvimento da harmonização do arcabouço regulatório.
Renato Valero de Alencar	Inclusão	Acredito que deveria ser fornecido pelas empresas fabricantes ou ate pelo Governo Federal possibilidades de cursos de pilotagem para as pessoas pudessem trabalhar ou mesmo compra estes equipamentos para fazerem voos de turismo aos finais de semana para as regiões onde mora.	Abriu vagas de trabalho para pessoas que demonstram interesse e quem trabalhar adquirir esse equipamento para prestar serviços como se fosse um táxi, desta forma abrindo vagas de trabalho, pois acredito que desta forma abre vaga em todos os sentidos.	out of scope	Agradecemos o comentário. No entanto, não é aplicável ao objetivo desta consulta.
Renato Valero de Alencar	Inclusão	venda diretas para trabalho	abrir vaga de trabalho	out of scope	Agradecemos o comentário. No entanto, não é aplicável ao objetivo desta consulta.
Renato Valero de Alencar	Inclusão	Acredito que deveria ser fornecido pelas empresas fabricantes ou ate pelo Governo Federal possibilidades de cursos de pilotagem para as pessoas pudessem trabalhar ou mesmo compra estes equipamentos para fazerem voos de turismo aos finais de semana para as regiões onde mora.	Abriu vagas de trabalho para pessoas que demonstram interesse e quem trabalhar adquirir esse equipamento para prestar serviços como se fosse um táxi, desta forma abrindo vagas de trabalho, pois acredito que desta forma abre vaga em todos os sentidos.	out of scope	Agradecemos o comentário. No entanto, não é aplicável ao objetivo desta consulta.
Bruna Gomes Huescar	Outros	<p>Para começar a usar um "Carro Voador", primeiro precisa que a cidade seja estruturada para tal. Ex. Todas as cidades brasileiras tem a fiação suspensa. Teria de começar a estruturação para essa fiação ser subterrânea. É difícil? Sim, Mas para o conceito de "Carro Voador" vai se aplicar apenas como um helicóptero, onde vai ter destino de ponto a ponto. No início é isso mesmo que vai ocorrer, um ponto de partida(uma estação) e ponto final(aeroportos, pontos turísticos). Seria inessante as empresas dispostas a fabricar "Carros Voadores" terem como investimentos a infraestrutura da cidade para onde vai vender seus produtos. Não é para mudar a cidade inteira, seria um gasto enorme, mas contribuição para ajudar a limpar poluição que a fiação de energia e rede faz com a cidade.</p> <p>Outro ponto é sobre os pilotos, como será a classificação dos pilotos? Se a ideia é ter o transporte mais barato que o helicóptero, teria de ter a formação de pilotos mais barato também. Pontos de segurança é o mais importante para esse tipo de transporte. Seria interessante em caso de pane uma maneira de ter um tipo de paraquedas, (já existe esse tipo para diminuir a velocidade). Seria uma maneira de tentar e evitar um tragedia. Como o "Carro Voador" vai ser mais leve, seria uma maneira de em uma eventual situação de perigo a possibilidade de salvação.</p>	Tenho interesse em pilotar um "Carro Voador" e acesso ao curso de piloto mais barato e também a segurança para os passageiros e algo que tem que estar em primeiro lugar. Se conseguirmos ir até a lua e pousar uma sonda em segurança, porque não podemos fazer o mesmo aqui na terra.	out of scope	Agradecemos o comentário. No entanto, não é aplicável ao objetivo desta consulta.
Rallel Azevedo Lopes	Inclusão	Proponho que os novos carros voadores sejam usados em transportes emergenciais com risco de vida, no auxilio à acidentes em rodovias e áreas de interesse.	A agilidade e praticidade do veiculo voador são de eximia importância no trajeto ate uma unidade de saúde que possa salvar a vida do cidadão.	out of scope	Agradecemos o comentário. No entanto, não é aplicável ao objetivo desta consulta.
Joao Argolo	Inclusão	Considerando a possibilidade de miniaturização deste tipo de equipamento, proponho que haja a construção de ambientes que onde sejam possíveis simulações com modelos em escala reduzida em que sejam reproduzidas situações próximas da realidade, através da pilotagem remota incluindo quantidade razoável de aparelhos voando e simulando o novo modelo de trafego aéreo que está por surgir.	Diferentemente do ambiente aéreo comum, este novo tipo de equipamento trará uma nova realidade para o meio urbano, onde a tendência é um movimento muito maior de veículos, o que envolve um número também maior de inovações, forma de operar e de monitorar, trazendo também vários novos profissionais em toda a cadeia desta operação. Sendo assim, quanto mais próximo do real forem os testes e treinamentos e que traga o menor risco para os envolvidos, melhor. Pensando nisso, junto com a simulação virtual, a aeronave remotamente pilotada em escala reduzida seriam os meio ideais para as várias necessidades de preparação que irão se apresentar nesta nova demanda. Ao reunir várias aeronaves para esta simulação haverá um ganho significativo de tempo e recursos por motivos óbvios.	out of scope	Agradecemos o comentário. No entanto, não é aplicável ao objetivo desta consulta.
Flávio Wilson Filomeno	Esclarecimento	alô amigos boa noite para vocês liberar este projeto da empresa da Embraer e da eve Air mobility vocês tem que primeiro procurar saber se este projetos são de origem edonia e se existe algum problema ou possossos na justiça nacional e internacional sobre a origem do projeto está e a minha sugestão.	eu acho que para um projeto desse ser liberado e legalizado no Brasil é no mundo inteiro este projeto tem que estar devidamente patenteado no Brasil e no mundo inteiro ok.	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Flávio Wilson Filomeno	Outros	alô amigos este é um grande projeto que vai gerar mobilidade aérea e empregos e rendas e riqueza para as empresas da Embraer e da eve Air mobility	mais para a anac regularizar a navegabilidade da aeronaves ela precisa primeiro saber se tudo está legalizado e patentado legalmente na justiça nacional brasileira e também na justiça internacional para ninguém vir copiar os projetos ou fazer reivindicações futuras de ser donos dos desaimes ou design do projeto desenvolvido pela empresa da Embraer e da eve Air mobility.	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Flávio Wilson Filomeno	Esclarecimento	novamente este é um grande projeto de inovação e criatividade é invenções da empresa da Embraer e da eve Air mobility	mais novamente esclarecendo a anac antes de fazer a liberação do projeto da navegabilidade da aeronave ela tem que confirmar se o projeto está registrado no Brasil é no exterior corretamente e no nome de quem.	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Flávio Wilson Filomeno	Esclarecimento	alô amigos boa noite para vocês liberar este projeto da empresa da Embraer e da eve Air mobility vocês tem que primeiro procurar saber se este projetos são de origem edonia e se existe algum problema ou possessos na justiça nacional e internacional sobre a origem do projeto está e a minha sugestão.	eu acho que para um projeto desse ser liberado e legalizado no Brasil é no mundo inteiro este projeto tem que estar devidamente patentado no Brasil e no mundo inteiro ok.	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Diogo	Outros	Modelo de aeronave capaz de operar como triciclo ou helicóptero	Modelo de asas rotativas e capaz de operar como triciclo aeronave ideal para a região norte do país como Macapá pela precariedade de rodovias	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Lucas Borba Inácio	Inclusão	Somente serão permitidos voos em rotas predefinidas e exclusivas para evtol constantes em circulação aérea compatível com outros voos VFR e IFR. Fora das rotas predefinidas somente para pouso ou decolagem.	Sou controlador de tráfego aéreo e entendo que não pode haver manipulação do evtol fora de uma rota exclusiva de evtol, pois não pode haver conflito com trajetos preexistentes de voos IFR nem em áreas de voos frequentes VFR.	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Edson Genari	Outros	Priorizar a instalação de vertiports juntos ou próximos aos atrativos turísticos consolidados ou com grande potencial turístico existente na região de operação dos EVE-100..	Promover o desenvolvimento de rotas turísticas, tornando-as mais acessíveis através de um deslocamento mais rápido e seguro aos turistas.	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.
Igor Ramos Marin	Outros	<p>Gostaria de deixar minha sugestão dos veículos voadores.</p> <p>Acho que todas as quadras dos bairros e parques tenham uma plataforma elevadas onde os drones possam descer e pegar as pessoas e levar em outras plataformas espalhadas pela cidade.</p> <p>Os drones, mesmo com pilotos acho que devem ser operado quase 90% no piloto automático</p> <p>Em todas as plataformas, acho que deve ter um dispositivo, tipo biruta, para medir a velocidade do vento e ajudar na segurança para o drone não virar.</p> <p>Para voos noturno, os drones devem ter muitas luzes de led para aumentar a segurança. Exemplo. Luzes verdes quando o drone está cheio, luzes azuis, quando o drone estiver vazio, luzes vermelha, quando o drone estiver com problema.</p> <p>Acho que todas as plataformas devem possuir, uma área de espera com banheiro.</p> <p>O curso para formação de piloto dever ser simples e barato ou gratuito. Acho que a função piloto não possa ser usada nos drones e sim, operador de equipamento.</p> <p>Todos os drones devem possuir sensores para não colidir com outros drones e ser tudo automático.</p> <p>Acho que deve ter um aplicativo, tipo Google mapas, onde mostra em tempo real todos os drones voando</p> <p>Acho que não deve misturar Avião com os drones, acho que deve ser tudo separado.</p> <p>Os drones não pode voar em local não autorizado perto de aeroporto e heliponto. O próprio aplicativo não deixa o drone a voar em local não autorizado, mesmo que o operador força isso.</p> <p>Tenha segurança nos programas dos drones, mesmo que o operador queira cometer suicídio com o drone encima de um prédio o programa não deixa isso acontecer, entra em modo automático e desce com segurança.</p>	<p>Acho que o futuro chegou, porém a operação com drones tem que ser 90% automático, tudo no sistema e maps digital. Esse negócio de ficar comunicando com torres e bases de aviação é coisa do passado. Os equipamentos precisam ser independente e automático. Um botão para acionar emergência, um botão para pousar, um botão para decolar, só isso. Acho que o equipamento não precisa ser complicado como os aviões com milhares de botões. Se a bateria estiver acabando, o próprio drone vai sozinho para a base carregar sem a intervenção humana.</p>	out of scope	Agradecemos o comentário. No entanto, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta.

Relatório de Análise de Contribuições

Contribuinte	Tipo de Contribuição	Contribuição	Justificativa/Comentário	Requisito	Resposta Anac (Aceito, Não aceito) e justificativa.
Alex Machado Almeida	Inclusão	<p>Inclusão Texto sugerido na Secção: 21.308 – Manual da Qualidade – O Fabricante deverá disponibilizar o Manual Aircraft Rescue &amp; Firefigting Information, para equipes de emergência realizar uma intervenção na aeronave com Segurança.</p> <p>Inclusão Texto sugerido na Secção: 21.35 - Ensaios em voo - O requerente deve demonstrar, para cada ensaio em voo (exceto para planadores e balões livres tripulados), que precauções adequadas (PLEM,PCINC,SREA) foram tomadas a fim de garantir que a tripulação possa abandonar a aeronave em caso de emergências em solo, sendo elas no mínimo uma equipem de CCI com CAT-AV equivalente a categoria da aeronave ensaiada ou superior, bem como equipe de resgate e salvamento conforme RBAC153 (153.419 (1), (c) e 153.423).</p>	<p>O presente regulamento vigente RBAC21 EMD09 de 01/10/2022, momento algum é supracitada em suas secções e/ou subparte, preparação e Resposta Emergência, com a experiência ao longo dos anos, bem como a vivência e relatos de incidentes em ensaios em voo, salientando a importância da presença dos profissionais BA, BA-MC e BA-CE nos cenários de ensaios em voo supracitados na RBAC153 SUBPARTE G, pois proporciona uma pronta resposta em uma condição de Urgência, Socorro e Ensaio em Voo de uma aeronave e sua tripulação.</p> <p>A prevenção durante estas atividades de risco potencial durante seus teste e ciclo de ensaios em solo ou voo, sendo todos seus riscos mapeados em cada etapa e atividade exercida, com objetivo de eliminar e mitigar os riscos potenciais da atividade inerente.</p> <p>Justificativa: Devido ser uma aeronave de categoria especial, e motor elétrico movido por baterias de íon lítio, onde existe um potencial risco de reação química (Termogênese) da bateria e um incêndio de alto desprendimento de energia e calor, podendo chegar há mais de 1200°C com liberação de gases e vapores tóxicos (Hazmat), se faz jus ter os recursos, equipe e Plano de emergência estruturado para minimizar os potenciais riscos e impactos ao patrimônio e meio ambiente.</p>	<p>out of scope.</p> <p>Registrar para futura revisão do RBAC 21</p>	<p>Agradecemos o comentário. No entanto, por se tratar do Regulamento RBAC 21, embora trate de assunto relevante, não é aplicável ao objetivo desta consulta, que trata apenas dos critérios de aeronavegabilidade nela publicados. O comentário está registrado para ser considerado quando de uma revisão do RBAC 21.</p>

## Arrazoado das Modificações para a versão final dos Critérios de Aeronavegabilidade para a aeronave EVE-100

### Subparte A

No EVE.2000(b), a ANAC concordou com os comentários da consulta setorial para inclusão das categorias de performance “essential” e “increased”, em busca de harmonização com outras Autoridades.

Para o requisito EVE.2000(b)(4), o TCCA recomendou que a ANAC harmonizasse à definição da EASA adicionando "without requiring exceptional piloting skill" à definição CEL para considerar a carga de trabalho do piloto. A ANAC aceitou o comentário do TCCA a respeito.

ANAC adicionou plural no requisito EVE.2000(b)(5) devido a comentário do TCCA na consulta setorial.

A ANAC incluiu um novo requisito EVE.2000(b)(6) para incluir a definição de “local events”. Na consideração das certificações de aeronaves convencionais, a preocupação aparece nas certificações de motor e hélice, no RBAC 33.28 e no RBAC 35.23, os “local events” são exemplificados como “fire, overheat, or failures leading to damage to engine control system components” no caso de motores, e “structural failures of attachments to the control, fire, or overheat” no caso de propellers. Deste entendimento, a ANAC entende que a definição de “local events” é necessária para base de certificação proposta (devido ao EVE.3328 e EVE.33100).

A ANAC também incluiu o requisito EVE.2000(b)(7) devido a comentários de autoridades estrangeiras recebidos na consulta setorial, apontando que o termo “approved envelope” não estava consistente com o material EASA e FAA. Por conta disso a ANAC entende que é necessário definir o entendimento por “Approved Flight Envelope”.

### Subparte B

O requisito EVE.2105 (b)(1) foi alterado para cobrir todo o envelope de altitude e não somente o envelope de altitude de pouso e decolagem. Incluído "minimum" pois normalmente o mínimo do envelope de altitude para as aeronaves é “-1000ft”.

O requisito EVE.2105 (g) foi alterado devido a comentário da EASA na consulta setorial.

No requisito EVE.2110 houve uma pequena alteração na redação para delimitar o escopo de demonstração.

O requisito EVE.2115 (b) foi incluso devido a incorporação da categoria “essential performance”. A redação foi ajustada pois o entendimento é que o Rejected Takeoff



envolve um ponto de decisão que não é aplicável para a categoria essencial performance. Por isso, ao invés de utilizar o termo "Rejected Takeoff" optou-se por utilizar CSFL.

No requisito EVE.2115(c) foi incluído o termo "For aircraft approved for increased performance" para diferenciação das categorias e no EVE.2115(c)(1) e no EVE.2115(c)(2) foi feita a quebra de texto para melhorar a redação do requisito.

ANAC também melhorou a redação do requisito EVE.2115(c)(1)(i) com a substituição do "or" por "and" para ficar compatível com a redação do EVE.2130.

O requisito EVE.2115(c)(2)(iii) foi incluído com objetivo de melhor conexão com a definição de CSFL do EVE.2000 para categoria increased performance.

No requisito EVE.2120(a) foi inserido "out of ground effect" para endereçar comentário aceito da consulta setorial.

O requisito EVE.2120(b), EVE.2120(b)(1) e EVE.2120(b)(2) foram incluídos para detalhar a performance AEO (all engines operating) com objetivo de harmonização internacional e devido a comentários recebidos na consulta setorial.

A ANAC não incluiu o valor numérico do gradiente de subida nos requisitos EVE.2120(b)(1) e EVE.2120(b)(2) para deixá-los não prescritivos e direcionar essa discussão para os meios de cumprimento.

Os requisitos EVE.2120(c), EVE.2120(c)(1) e EVE.2120(c)(2) foram incluídos devido a incorporação da categoria essencial performance.

No requisito EVE.2120(d) foi incluído o termo "For aircraft approved for increased performance" para diferenciação das categorias e no EVE.2120(d)(1)(iv) foi incluído "or landing" para correção editorial. No item EVE.2120(d)(2)(i) foi incluído "s" em source.

O texto do requisito EVE.2125(c) foi alterado para compatibilização com o texto do EVE.2105(g).

O requisito EVE.2130(b) foi incluso devido incorporação da categoria essencial performance com ajustes na redação para consistência com o texto do EVE 2115(b).

No requisito EVE.2130(c)(1) houve quebra de texto para melhoria de redação.

No requisito EVE.2130(c)(2) foi retirado o texto "and performance" porque a ANAC entende que não é necessário. Foi incluído também a complementação em relação ao CSFL para melhor conexão com a definição de CSFL do EVE.2000 para categoria increased performance.

Foram incluídos os requisitos EVE.2130(c)(2) e EVE.2130(c)(2)(i) para contemplar um “critical change of thrust” após o LDP.

O requisito EVE.2135(a)(3) foi alterado devido a sugestões da consulta setorial de migrar a parte de falhas do EVE.2135(a)(5) para o EVE.2135(a)(3) de forma a harmonizar o texto como outras agências. Entretanto, a ANAC entende que não é adequado incluir o termo genérico "likely", pois este tem o propósito no RBAC 23 de incluir falhas de elementos simples dos sistemas de comandos de voo (desconexões), o qual não é coberto pelo requisito RBAC 23.2510. Para a aeronave EVE, é necessário avaliar falhas de comandos de voo com o critério do EVE.2510 e critérios complementares de handling qualities tendo em vista que trata-se de um sistema complexo "fly-by-wire".

Foram aceitos múltiplos comentários para o requisito EVE.2135 (a)(5) para que fosse incluído modos degradados, ainda que a ANAC entenda que tal requisito é redundante com o de falhas EVE.2135(a)(3). Porém, como a aeronave tem propulsão distribuída cuja função é a determinante para pousos, entendeu-se necessário ampliar o escopo para incluir o sistema de propulsão, dado que este tem papel tão crítico quanto comandos de voo nesta aeronave, principalmente no modo de voo vertical.

No requisito EVE.2135 (a)(6) e EVE.2135 (a)(7), o texto foi alterado/incluído após comentários da consulta. O texto está harmonizado com propostas internacionais.

No requisito EVE.2135(c) foi feita uma pequena alteração de "change" para “transition”, de forma harmonizar com propostas internacionais.

O requisito EVE.2135(d) foi migrado do EVE.2300(c) porque historicamente este tipo de requisito (implementado por Condições Especiais em aeronaves categoria transporte) é cumprido por demonstração no escopo da Subpart B do que por projeto, no escopo da Subpart D.

Nos requisitos EVE.2140(a) e EVE.2140(b), foi aceito comentário para trocar “primary flight controls” por “inceptor”. Além disso, texto foi simplificado dado que não há comando de trim na aeronave, e também o fato que a aeronave irá usar o sistema de comandos de voo para fazer a compensação automática da aeronave.

No requisito EVE.2145 (a) e EVE.2145(b), os textos foram ligeiramente alterados para definir o envelope de voo. Não se concordou com os comentários da consulta setorial de torná-lo mais prescritivo e incluir cenários de falha.

No requisito EVE.2150(a) o texto foi ligeiramente alterado em relação à consulta setorial em razão de um comentário que alertou sobre a necessidade de inclusão de um verbo na segunda parte do requisito. ANAC entende que é melhor fazer

referência a fase de voo em que a aeronave se encontra e utilizar o termo de velocidade mínima de segurança porque se prevê que não haverá stall warning.

No requisito EVE.2150(b) o texto foi ligeiramente alterado em relação à consulta setorial para incluir alteração brusca de tração “including a sudden change os thrust” como um exemplo de item a ser tratado devido a comentários recebidos. No entendimento da ANAC este requisito tem por objeto a perda de sustentação de asa fixa, a qual é influenciada por ângulo de ataque / velocidade da aeronave. A ANAC entende que o requisito EVE.2150 não deveria incluir a fase de voo puramente vertical, pois para esta fase de voo, a sustentação e o controle da aeronave são providos integralmente por sistemas de propulsão, sem contribuição aerodinâmica da asa, e portanto, situações que podem levar a perda de controle já são tratadas plenamente pelo requisito EVE.2135.

No requisito EVE.2160(a) o texto foi ligeiramente alterado em relação ao texto da consulta setorial para inclusão do termo “buffeting” e da necessidade de avaliação até VD/MD.

O requisito EVE.2160(b) foi alterado de acordo com comentários da consulta setorial para harmonizar com outras propostas internacionais.

O requisito EVE.2165(a) foi removido por coerência dado que a aeronave não pretender ter certificação em FIKI.

### Subparte C

No requisito EVE.2200(f) foi adicionado o termo "thrusting" para deixar claro que o envelope de voo também engloba a avaliação do espectro de velocidades rotacionais do motor que produz empuxo (thrust) em direções que vão além da de sustentação (lift). Esta alteração está em linha com a feita para o requisito EVE.2225(d), vide justificativa deste requisito.

O requisito EVE.2205 foi harmonizado com a proposta de base de certificação da FAA e com o requisito 23.2205 do RBAC 23 da Anac.

O requisito EVE.2215(a)(3) foi incluído para harmonizar o requisito de outras autoridades internacionais e evitar ambiguidade na interpretação. Após a consulta optou-se por remover o requisito EVE.2215(c) e substituí-lo pelo 2215(a)(3). Conforme apontado por FAA e TCCA, o EVE.2215(c) proposto na consulta setorial da ANAC causou confusão sobre a obrigatoriedade de se considerar falhas adicionais, além da falha simples de motor, o que poderia incluir a falha obrigatória de uma pá de hélice e esta não é a intenção da ANAC, conforme comentado no EVE.2240(c). Além disso, o próprio EVE.2205, sobre interação de sistemas e estruturas, já disciplina a necessidade de se considerar falhas de sistemas que afetam estruturas e não sejam extremamente improváveis. O EVE.2215(c) proposto

na consulta setorial trazia ambiguidade sobre a necessidade de se considerar falhas de sistemas ou estruturas independente de probabilidade. Desta forma, o atual EVE.2215(c)(3), em linha com o RBAC 23.2215(c), solicita que sejam consideradas cargas provenientes de assimetria de tração devido à falha de motor. No contexto desses requisitos, essa consideração inclui situações nas quais a tração é utilizada como fonte de sustentação (thrust-borne source of lift). Destaca-se que o termo "thrust" se aplica também a "fontes de sustentação", conforme definição do parágrafo EVE.2000(b)(3). Essa definição está harmonizada com a definição de "tração" da norma SAE ARP8676 (Nomenclature and Definitions for Electrified Propulsion Aircraft), a qual a Anac entende ser apropriada. Portanto, a Anac entende que o termo "powerplant unit" desse requisito equivale à referência da EASA a "lift/thrust unit". Adicionalmente, a Anac entende que esse requisito engloba assimetria de sustentação causada por falha de um motor do tipo designado pela Easa como "lifter".

No requisito EVE.2215(b) o termo "flight envelope" foi substituído por "structural design envelope" para harmonizar com a terminologia adotada no requisito EVE.2200.

Após a observação do FAA e TCCA, a parte do requisito EVE.2220 foi removida para fins de harmonização. Além disso, está compreendido que os efeitos de rajadas em solo já estão capturados pelo requisito EVE.2225(b)(5).

O requisito EVE.2225(c) foi mantido como reservado para o caso de uma futura modificação requerer a pressurização de cabine e assim manter um nível de harmonização com outras autoridades.

O requisito EVE.2225(d) é uma atualização do requisito EVE.2215(c) para ficar harmonizado com outras autoridades. Foi incluído o termo "thrusting" junto ao "lifting" para deixar claro que este requisito também deve ser aplicado ao motor "pusher" do EVE-100. Pelo requisito proposto por outras autoridades a aeronaves eVTOL vetorados, os motores que produzem sustentação (lifters) são vetorados para também produzirem impulso (thrust). No caso do EVE-100 essa função é feita por motores independentes. Assim, esta alteração visa garantir que o torque limite será avaliado com condições de solo e voo para todos os motores/propulsores da aeronave.

O requisito EVE.2240(a) foi harmonizado com a proposta de outras autoridades.

No requisito EVE.2241 foi adicionado o termo "dangerous oscillations" que advém do RBAC 27.241 para endereçar ressonância em solo de aeronaves de asas rotativas. Este termo deixa implícito que é necessária a realização de ensaio em solo/voo para se determinar a ausência de ressonância. A linguagem também foi adequada para ficar harmonizado com outras autoridades.

No requisito EVE.2245(c) foi adicionado o termo “any aeroelastic” para melhor especificar a natureza da instabilidade e para a linguagem ficar harmonizada com a de outras autoridades.

A FAA propôs adicionar a última frase no requisito EVE.2250(c) para esclarecer que, embora falhas pontuais sejam permitidas no projeto, elas devem ser impedidas de resultar em um efeito catastrófico na aeronave. Além disso, a proposta da FAA adiciona inspeções para detectar danos de forma confiável antes que resultem em uma falha estrutural, mitigando que falhas estruturais não resultem em uma falha catastrófica. Portanto, a ANAC concorda com os esforços de harmonização feitos pela FAA e EASA adotando o mesmo requisito para o EVE.2250(c).

A Anac recebeu um comentário relacionado ao requisito de pouso de emergência EVE.2270(a)(3). Esse comentário destacou que o cumprimento deste requisito também deve considerar itens de massa localizados acima da cabine (e não apenas dentro ou atrás dela) e sugeriu utilizar o termo “adjacent” do requisito Easa VTOL.2270(a)(3). A Anac concordou parcialmente com esse comentário e alterou o parágrafo EVE.2270(a)(3) para melhor refletir a intenção da regra. A Anac substituiu o termo “aft of” por “external to”. Com essa substituição o requisito passa a considerar itens de massa provenientes de diferentes direções, os quais, em condições de emergência, podem lesionar algum ocupante. Destaca-se que essa alteração faz o requisito EVE.2270(a)(3) assemelhar-se com o requisito Easa VTOL.2270(a)(3).

#### Subparte D

No requisito EVE.2300(a)(3) a ANAC aceitou o comentário do TCCA, levando em consideração que o EVE-100 possui um sistema de comandos de voo integrado com o sistema propulsivo. Com isso ANAC preferiu adotar o texto da proposta da EASA e deve deixar a discussão para o meio de cumprimento com o requisito.

O requisito EVE.2300(c) foi trocado de lugar para o EVE.2135(d) porque a ANAC entende que a proposta está mais relacionada à subparte B (controlabilidade).

O requisito EVE.2311 foi reescrito sem alterar seu conteúdo, apenas para harmonizar sua redação com o texto correspondente da FAA.

O requisito EVE.2315 foi harmonizado com a proposta de base de certificação de outras autoridades. A opção de colocar o sistema de flotation foi incluído na base do EVE-100 como opcional para o projeto, porém essa possibilidade foi incluída na base de certificação para futuras modificações, podendo ser necessária para o atendimento de requisitos operacionais.

O requisito EVE.2320(a)(2) tem como intenção proteger o piloto e os sistemas para que o piloto possa pousar a aeronave em caso de falha das hélices, por esse motivo

o requisito foi revisado para mencionar “pilot” em vez de “occupants”. O requisito EVE.2315 é o responsável por assegurar que as portas da aeronave não estarão posicionadas onde possam representar um risco para pessoas utilizando estas portas, ou qualquer outro tipo de saída, numa evacuação de emergência. Do mesmo modo, o requisito EVE.2250 requer o mesmo das portas em operações normais de embarque e desembarque. Adicionalmente, os aspectos de segurança das operações de embarque e desembarque também devem ser abordados nos requisitos e procedimentos operacionais.

A ANAC decidiu permanecer com o texto do requisito EVE.2325(e)(1) após a consulta setorial, pois ele está harmonizado com outras autoridades.

O requisito EVE.2325(f) foi alterado para harmonizar com outras autoridades.

A inclusão do EVE.2325(i) está relacionada com a preocupação da ANAC que o EVE.2440 está restrito ao sistema de propulsão e que outros sistemas da aeronave também podem utilizar energia de alta tensão/alta potência das baterias principais. Por este motivo a ANAC considera que o EVE.2325 deve ser complementado com a inclusão do EVE.2325(i) para abordar essa questão.

#### Subparte E

O requisito EVE.2400 foi alterado para harmonizar com entendimento de outras autoridades, assim como a remoção do EVE.2405(d).

O requisito EVE.2415(a) foi alterado por conta de comentários recebidos na consulta setorial da ANAC.

O requisito EVE.2415(d) foi removido para ficar coerente com o EVE.2540 e o EVE.2165(a).

O requisito EVE.2430(a)(2) foi atualizado para que tenha mais clareza e harmonização com os textos de outras autoridades, porém sem alterar a intenção pretendida pela proposta inicial.

A ANAC decidiu alterar o requisito EVE.2430(a)(3) porque o EVE-100 não é equipado com uma APU.

O requisito EVE.2430(a)(6) foi alterado para harmonizar com outras autoridades.

Os requisitos EVE.2430(b)(3) e EVE.2430(b)(4) foram removidos pois já foram abordados em outros requisitos, como o EVE.2430(a)(1) e EVE.2510, portanto, a manutenção desses requisitos aumentaria o esforço de demonstração.

O requisito EVE.2435 foi removido porque são relacionados com motores a combustão que não serão utilizados no projeto EVE-100.

#### Subparte F

O requisito EVE.2500 foi alterado uma vez que a versão anterior poderia causar lacunas regulatórias não intencionais ao isentar a aplicação da EVE.2500 diante de regulamentos específicos. A versão atual corrige isso, reafirmando a aplicação geral da EVE.2500, e a adequação dos requisitos específicos deve ser avaliada e registrada nos meios de cumprimento.

O requisito EVE.2510 foi alterado uma vez que a versão anterior poderia causar lacunas regulatórias não intencionais ao isentar a aplicação da EVE.2510 diante de regulamentos específicos. A versão atual corrige isso, reafirmando a aplicação geral da EVE.2510, e a adequação dos requisitos específicos deve ser avaliada e registrada nos meios de cumprimento.

No requisito EVE.2510(a) foi incluída a expressão “and does not result from a single failure” em alusão a avaliação da ANAC de que a exigência de nenhuma falha única que resulte em evento catastrófico deveria ser incluída explicitamente no regulamento devido à sua importância e maior clareza desse aspecto, sendo mais adequado do que abordá-lo apenas na documentação dos Meios de cumprimento. Em casos limitados, requisitos de segurança específicos e meios de cumprimento aceitáveis podem abordar falhas simples potencialmente catastróficas por meio da minimização de riscos ou fatores compensatórios de estruturas baseados no estado da arte da indústria específica para certas tecnologias. Quando considerado aceitável, o cumprimento desses requisitos específicos é considerado suficiente para cobrir a intenção do critério de «inexistência de falha única» (“*no single failure*”) estabelecida na seção EVE.2510(a).

O requisito 2517 foi incluído de forma semelhante à EASA (VTOL.2517) na versão mais recente do SC-VTOL (Edição 2). A inclusão deste novo requisito da base de certificação melhora o marco regulatório aplicável ao projeto EVE-100, contribuindo para a segurança para fiação elétrica e acessórios. O conceito de “EWIS” é bem conhecido pela indústria da aviação, bem como as melhores práticas referentes à seleção, projeto e instalação de fiação elétrica e seus componentes. Embora a FAA Parte 23, emenda 64 (e as emendas anteriores) não mencione o EWIS, o conceito já foi aplicado como o estado da arte para projeto e instalação de fiação elétrica pela indústria aeronáutica nos mais recentes projetos de novas aeronaves. O requisito EVE.2540 foi alterado para “Reserved” pois a EVE não buscará aprovação para voar em condições de formação de gelo (*icing conditions*). Por coerência, também serão alterados para “Reserved” os requisitos EVE.2415(b) e EVE.2165(a).

#### Subparte G

No requisito EVE.2600(b) o termo “as needed” e a linguagem “without excessive concentration, skill, alertness or fatigue” foram adicionados para esclarecer que os controles e displays devem ser instalados conforme as necessidades específicas

da operação, garantindo que a tripulação receba informações adequadas sem sobrecarga. Isso assegura um design adaptativo que minimiza a carga cognitiva e física, permitindo que a tripulação realize suas funções de maneira eficiente e segura, reduzindo a probabilidade de erros e melhorando a segurança operacional.

O requisito EVE.2600(c) foi removido, devido ao projeto EVE-100 contar apenas com um único painel para-brisa e a configuração de cabine da aeronave, devido ao espaço disponível, possibilitar a continuidade do voo mesmo com restrições de visibilidade neste painel.

No requisito EVE.2615(b) e EVE.2615(b)(1) o texto “source of” foi adicionado para melhorar a consistência do documento. A FAA detalha a fase do voo e a fonte de sustentação como parte da definição do que pode ser necessário para os instrumentos de voo e navegação. Como os parâmetros de controle, referências críticas e margens serão únicos para esta classe de aeronave, considerou-se necessário definir variáveis que podem ser alteradas dependendo de uma determinada trajetória de voo, perfil de decolagem e pouso, como a fonte de sustentação.

#### Subparte H

Os requisitos EVE.3305 (b)(4) e EVE.3305 (c) foram alterados para harmonizar com outras autoridades.

O requisito EVE.3307 (b) até o EVE.3307 (c) foi alterado para harmonizar com outras autoridades.

O requisito EVE.3307 (b)(3) foi alterado pois não há fluido de arrefecimento.

O requisito EVE.3317 (h) foi removido do EVE.3317, uma vez que a intenção do requisito vai além de proteção contra fogo, englobando 'hazardous engine effects' como consequência de um "arc fault.

O requisito EVE.3321 foi alterado para harmonizar com outras autoridades.

O requisito EVE.3327 (a) foi alterado para harmonizar com outras autoridades.

O requisito EVE.3328 (d) foi alterado para harmonizar com outras autoridades.

Os requisitos EVE.3328 (f)(3) e (4) foram alterados para harmonizar com outras autoridades, assim como também o requisito EVE.3328 (g).

O requisito EVE.3329 (a) até (e) foi alterado para harmonizar com outras autoridades.

O requisito EVE.3329 (d)(2) foi alterado para harmonizar ao requisito EVE.3375 (g)(2) sempre que o termo “hazardous engine effects” for usado.



No requisito EVE.3362 (a) foi incluído “as defined in EVE.3375 (g)(2)” para harmonizar com outras autoridades.

Os requisitos EVE.3370, EVE.3373 e EVE.3374 foram alterados para que pudessem harmonizar com outras autoridades.

Todo o requisito EVE.3375 foi alterado para harmonizar com outras autoridades.

O requisito EVE.3377 (b) e (c) foram alterados para harmonizar com outras autoridades.

O requisito EVE.3393 (1) foi alterado para harmonizar com outras autoridades.

O requisito EVE.33100 (c)(1) faz referência ao requisito EVE.3375 (g)(2).

O requisito EVE.33100 (c)(3) foi alterado para harmonizar com referência ao requisito EVE.3375 (g)(2) sempre que o termo “hazardous engine effects” for usado.

O requisito EVE.33100 (d) faz referência ao requisito EVE.3375 (g)(2).

Nos requisitos EVE.33100 (e), EVE.33100 (e)(1) e EVE.33100 (e)(2) foram feitas uma organização textual (supplied form).

#### Appendix A - Instructions for Continued Airworthiness

Atualização do texto apenas para correção de RBHA para RBAC.