



**Contribuições referentes à Consulta Pública /**  
***Contributions Regarding Public Consultation***  
**nº 10/2023**

**PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave**

**/ PROPOSAL OF SPECIAL CLASS AIRWORTHINESS CRITERIA for the aircraft**

**Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA**

**250 Contributions were made via ANAC Portal (108) and by e-mail (142)**

**Contributions made via ANAC Portal**

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23969</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Mauricio Custarella Da Costa <b>Categoria:</b> Piloto	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23970</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Guillaume Malaval (Noise Expert At EASA - European Union Aviation Safety Agency) <b>Categoria:</b> Entidade ou órgão público envolvido c/ setor aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23971</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eduardo Moraes Arraut - Ita <b>Categoria:</b> Entidade ou órgão público envolvido c/ setor aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b> scientific study
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Change criteria: EVE.2311 - Bird Strike. 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. 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.	
<b>Justificativa:</b> 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. 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. 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.” 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 23972	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eduardo Moraes Arraut - Ita <b>Categoria:</b> Entidade ou órgão público envolvido c/ setor aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b> scientific study
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Change criteria: EVE.2311 - Bird Strike. 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. 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.	
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<b>CONTRIBUIÇÃO Nº 23974</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> José Ricardo Agostinho <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> A EVE SOLUÇÕES DE MOBILIDADE AÉREA URBANA LTDA vem por meio desta, solicitar a extensão do prazo para envio de contribuições à Consulta Setorial nº 10/2023, que submete a audiência pública proposta de Critérios de Aeronavegabilidade de Classe Especial para a aeronave modelo EVE-100.	
<b>Justificativa:</b> Manter um período adequado para análise da proposta, a EVE SOLUÇÕES DE MOBILIDADE AÉREA URBANA LTDA solicita a extensão do prazo original, sugerindo um aumento de 30 dias no mesmo, conforme carta com a solicitação formal aqui anexada.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23979</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Evandro Carlos Ferreira <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> Trabalho a mais de 30 anos na aera de avionica e tenho grande interesse por este tema que considero um marco de desenvolvimento tecnológico para nosso pais 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 passarem despercebidos e posteriormente afetarem a segurança de voo.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23980</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Leopoldo Alfredo Ambrosio Bruck <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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;	
<b>Justificativa:</b> 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.	



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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23981</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Leopoldo Alfredo Ambrosio Bruck <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> FIRE AND HIGH ENERGY PROTECTION EVE.2325 - Fire protection. (b) The following materials must be flame-resistant: (3) battery compartment	
<b>Justificativa:</b> 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.	

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<b>CONTRIBUIÇÃO Nº 23982</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Leopoldo Alfredo Ambrosio Bruck <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE2325(e) Each baggage, BATTERY and cargo compartment must -	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23984</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Marcelo Tadeu Motta Ferreira <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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.	

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CONTRIBUIÇÃO Nº 23985	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> César Augusto Lino <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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, .	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 23986	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> César Augusto Lino <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
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CONTRIBUIÇÃO Nº 23987	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Alvimar De Lucena Costa Junior - Boeing <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b> same content
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Esta é uma tradução livre do comentário oficial anexado em PDF a este formulário on line. 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. 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. 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.	
<b>Justificativa:</b> 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 delineia 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 o alinhamento global. A Boeing está pronta para ajudar e aguarda ansiosamente para trabalhar em estreita colaboração com a ANAC. 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.	

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<b>CONTRIBUIÇÃO Nº 23988</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Renato Valero De Alencar <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> Abrir 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.	

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<b>CONTRIBUIÇÃO Nº 23989</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Renato Valero De Alencar <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> venda diretas para trabalho	
<b>Justificativa:</b> abrir vaga de trabalho	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23990</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Renato Valero De Alencar <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> Abrir 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23991</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Paulo Rodrigo Britto Coelho <b>Categoria:</b> Outros	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23992</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Bruna Gomes Huescar <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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 uma 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 inicio é isso mesmo que vai ocorrer, um ponto de partida(uma estação) e ponto final(aeroportos, pontos turísticos). Seria incessante 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. 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.	
<b>Justificativa:</b> 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 conseguimos ir até a lua e pousar uma sonda em segurança, porque não podemos fazer o mesmo aqui na terra.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23993</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Railel Azevedo Lopes <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Proponho que os novos carros voadores sejam usados em transportes emergenciais com risco de vida, no auxílio à acidentes em rodovias e áreas de interesse.	
<b>Justificativa:</b> A agilidade e praticidade do veículo voador são de eximia importância no trajeto até uma unidade de saúde que possa salvar a vida do cidadão.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 23994	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Paulo Roberto Pinheiro <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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!!!	
<b>Justificativa:</b> É mais fácil pousar, com helipontos municipais com receptores no solo e na aeronave, se comunicando diretamente!	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 23995	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Paulo Roberto Pinheiro <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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!!!	
<b>Justificativa:</b> É mais fácil pousar, com helipontos municipais com receptores no solo e na aeronave, se comunicando diretamente!	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23996</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Igor Ramos Marin <b>Categoria:</b> Concessionária de Infraestrutura Aeroportuária	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Gostaria de deixar minha sugestão dos veículos voadores. 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. Os drones, mesmo com pilotos acho que devem ser operado quase 90% no piloto automático 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. 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. Acho que todas as plataformas devem possuir, uma área de espera com banheiro. 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. Todos os drones devem possuir sensores para não colidir com outros drones e ser tudo automático. Acho que deve ter um aplicativo, tipo Google mapas, onde mostra em tempo real todos os drones voando Acho que não deve misturar Avião com os drones, acho que deve ser tudo separado. 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. 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23997</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Igor Ramos Marin <b>Categoria:</b> Concessionária de Infraestrutura Aeroportuária	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
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<b>Justificativa:</b> 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.	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23998</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Raul Fernando Beck <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 23999</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Raul Fernando Beck <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24000</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Joao Argolo <b>Categoria:</b> Piloto	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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 tráfego aéreo que está por surgir.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24001</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eduardo Lobato Salles Moulin Louzada <b>Categoria:</b> Operador Aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> CARENAR...	
<b>Justificativa:</b> SEGURANÇA...	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24002</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Guilherme Pennachin Sakamiti <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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 switche will be responsible for land the "EVE-100" in a secure pre determined area.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24003	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Guilherme Pennachin Sakamiti <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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 switche will be responsible for land the "EVE-100" in a secure pre determined area.	
<b>Justificativa:</b> 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".	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24004	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Guilherme Pennachin Sakamiti <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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 switche will be responsible for land the "EVE-100" in a secure pre determined area.	
<b>Justificativa:</b> 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".	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24005</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eduardo De Freitas Tobias <b>Categoria:</b> Outros	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Que haja sensores de aproximação de qualquer obstáculo, e que seja, automaticamente, corrigido a rota para evitar colisão.	
<b>Justificativa:</b> 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.	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24006	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Flávio Wilson Filomeno <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24007	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Flávio Wilson Filomeno <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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	
<b>Justificativa:</b> 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 do desaimes ou design do projeto desenvolvido pela empresa da Embraer e da eve Air mobility.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24008	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Flávio Wilson Filomeno <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> novamente este é um grande projeto de inovação é criatividade é invenções da empresa da Embraer e da eve Air mobility	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24009</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Flávio Wilson Filomeno <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24010</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Ulisses Ricardo Romao <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b> Lei 12.527
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24011	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Ulisses Ricardo Romao <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Quais as medidas de segurança serão introduzidas no EVE para prevenir acidentes?	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24012	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Ulisses Ricardo Romao <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24013</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Diogo <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Modelo de aeronave capaz de operar como triciclo ou helicóptero	
<b>Justificativa:</b> Modelo com asas rotativas e capaz de operar como triciclo aeronave ideal para a região norte do país como Macapá pela precariedade de rodovias	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24014</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Lucas Borba Inácio <b>Categoria:</b> Entidade ou órgão público envolvido c/ setor aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24016</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> EASA <b>Categoria:</b> Entidade ou órgão público envolvido c/ setor aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b> EVE-100 Airworthiness Criteria - EASA Comments
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> The enclosed file contains the contribution of the European Aviation Safety Agency to this public consultation.	
<b>Justificativa:</b> 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).	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24017	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Edson Genari <b>Categoria:</b> Outros	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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..	
<b>Justificativa:</b> Promover o desenvolvimento de rotas turísticas, tornando-as mais acessíveis através de um deslocamento mais rápido e seguro aos turistas.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24018</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Vincent Braley - Nidec Aerospace <b>Categoria:</b> Fabricante de produto aeronáutico	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

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 required compliance with 33100.(g).(3) is not questioned.

However, designing the windings to be tolerant to all sorts and magnitudes of shorts increases the volume and weight of the machine, affecting the performance required for this type of vehicle.

Therefore, considering that the windings can be designed to ensure compliance with safety requirements at the vehicle level, it is understood that designing the motor to be single fault tolerant to shorts severely jeopardizes performance of the vehicle while it does not necessarily increase its overall level of safety, as other equipment or components may dominate the vehicle level reliability.

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24019</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Vincent Braley - Nidec Aerospace <b>Categoria:</b> Fabricante de produto aeronáutico	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.3307 - Engine ratings and operating limits. (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. (b) Ratings and operating limits must be established and included in the type certificate data sheet based on: (1) Shaft power, torque, rotational speed, and temperature for: (i) Rated takeoff power; (ii) Rated maximum continuous power; and (iii) Rated maximum temporary power and associated time limit. (2) Duty Cycle and the rating at that duty cycle. The duty cycle must be declared in the type certificate data sheet. (3) Power-supply requirements. (4) Any other ratings or limitations that are necessary for the safe operation of the engine. EVE.3308 - Selection of Engine Power and Thrust Ratings (a) Requested engine power and thrust ratings must be selected by the applicant. (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.	
<b>Justificativa:</b> 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. 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. This recommendation also takes into account the possible challenges that the product may encounter when implementing traditional Turbine Engine guidance in eVTOL applications.	

## **Contributions Regarding Public Consultation nº 10/2023**

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

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.

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24020</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Airbus Helicopters <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.  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,[..] 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" 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	
<b>Justificativa:</b>  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.  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):	



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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

Comment: the requirement that " fire would be visible to the pilots " is excessive. The wording of CS27/29 §855 is more appropriate.

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.

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24021</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Ronaldo Aparecido De Souza <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Na nossa Região há Serras imponentes como a do Mar e a Mantiqueira. Os veículos estão adaptados para operar também nestas áreas de turismo.	
<b>Justificativa:</b> Já aconteceram acidentes de aviões de pequeno porte nestas Serras por falhas operacionais e técnicas.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24022	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Ronaldo Aparecido De Souza <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Na nossa Região há Serras imponentes como a do Mar e a Mantiqueira. Os veículos estão adaptados para operar também nestas áreas de turismo.	
<b>Justificativa:</b> Já aconteceram acidentes de aviões de pequeno porte nestas Serras por falhas operacionais e técnicas.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24023	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> U.S. Federal Aviation Administration - FAA <b>Categoria:</b> Entidade ou órgão público envolvido c/ setor aéreo	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b> 2024.03.15 FAA comments_Brazil eVTOL certification basis
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Please see attachment.	
<b>Justificativa:</b> Please see attachment.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24024</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b>	
<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. 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>	
<b>Justificativa:</b> General Comments	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24025</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2000 - Applicability and definitions. To add specific definitions for key terms used in the proposed airworthiness criteria for the EVE-100 eVTOL, such as "Local Events".  To include of the terms "essential performance" and "increased performance" into the EVE.2000, as well as the definition of these terms.  To clarify on how the authority establishes "Flight path clear of obstacles."  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.  To align CSFL definition with other RBAC/14 CFR parts, admitting certain damage allowance to the aircraft.	
<b>Justificativa:</b> 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. 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. 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. 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. 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). EVE-100 Airworthiness Criteria seems to not admit any damage allowance under CFSL 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24026</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24027</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24028</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2125 - Climb information To remove EVE.2125(c).	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24029</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2130 - Landing To remove the word "and" in the end of the paragraph EVE.2130(a)(2).	
<b>Justificativa:</b> 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).	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24030</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2135 - Controllability To replace the text "In all flight and propulsion control system failures..." for "In all degraded flight control system operating modes..." in EVE.2135(a)(5).	
<b>Justificativa:</b> 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.  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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24031</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24032</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24033</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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: Typo correction.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24034</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2300 - Flight Control Systems To remove EVE.2300(b).	
<b>Justificativa:</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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24035</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> Typo correction.	



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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24036</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24037	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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). Furtherly, 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".	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24038</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> The division is not necessary for paragraph EVE.2325(f).	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24039</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2330 - Fire Protection in Fire Zones and Adjacent Areas To exclude EVE.2330(d).	
<b>Justificativa:</b> 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 na event of fire in the battery. However, our undestanding, 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24040</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2405 - Power or Thrust Control System To remove EVE.2405(d).	
<b>Justificativa:</b> EVE.2405(d) specifies the acceptable probability for automatic power or thrust control failure. However, Eve understands, alined 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24041</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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).	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24042</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2435 - Powerplant induction and exhaust systems To remove EVE.2435	
<b>Justificativa:</b> 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).	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24043</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2515 - Electrical and Electronic-System Lightning Protection To remove EVE.2515(a)(2).	
<b>Justificativa:</b> 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.	



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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24044</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24045</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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).	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24046</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2600 - Flightcrew interface To remove EVE.2600(c).	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24047</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1. 3317 Fire protection To clarify the terms "fireproof" and "firewall" in a context of an electric engine.	
<b>Justificativa:</b> 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.	

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<b>CONTRIBUIÇÃO Nº 24048</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> "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".	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24049</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1.3375 Safety analysis Comment 1: To remove requirement EVE.3375(d)(2)(ix). As an alternative, we suggest the following change to the requirement: 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." Comment 2: To change EVE.3375(d)(1) from: "(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." 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." Comment 3: To remove EVE.3375(d)(2)(ii). 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".	
<b>Justificativa:</b> 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. Comment 2:	

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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.

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).

Comment 4:

In EVE.3375(e), the reference to paragraph (g) seems to be incorrect. Should it be paragraph (d).

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24050</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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".	



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<b>CONTRIBUIÇÃO Nº 24051</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1.3377 Ingestion Clarification on the intent of the requirement EVE.3377.	
<b>Justificativa:</b> 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.	

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<b>CONTRIBUIÇÃO Nº 24052</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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 eligiblefor 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 eligiblefor continued operation in accordance with the information submitted for showing compliance with EVE.1529.	
<b>Justificativa:</b> Typo correction.	

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<b>CONTRIBUIÇÃO Nº 24053</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Eve Air Mobility <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1.3394 – Containment To clarify the parameters regarding the margin referred on EVE.3394(a).	
<b>Justificativa:</b> 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.	

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<b>CONTRIBUIÇÃO Nº 24054</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2000 - Applicability and definitions. To add specific definitions for key terms used in the proposed airworthiness criteria for the EVE-100 eVTOL, such as "Local Events".  To include of the terms "essential performance" and "increased performance" into the EVE.2000, as well as the definition of these terms.  To clarify on how the authority establishes "Flight path clear of obstacles."  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.  To align CSFL definition with other RBAC/14 CFR parts, admitting certain damage allowance to the aircraft.	
<b>Justificativa:</b> 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. 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. 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. 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. 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). EVE-100 Airworthiness Criteria seems to not admit any damage allowance under CFSL 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.	

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<b>CONTRIBUIÇÃO Nº 24055</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24056</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24057</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2125 - Climb information To remove EVE.2125(c).	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24058</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2130 - Landing. To remove the word "and" in the end of the paragraph EVE.2130(a)(2).	
<b>Justificativa:</b> 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).	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24059</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2135 - Controllability To replace the text "In all flight and propulsion control system failures..." for "In all degraded flight control system operating modes..." in EVE.2135(a)(5).	
<b>Justificativa:</b> 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.  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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24060</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24061</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24062</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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: Typo correction.	

## Contributions Regarding Public Consultation nº 10/2023

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<b>CONTRIBUIÇÃO Nº 24063</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2300 - Flight Control Systems To remove EVE.2300(b).	
<b>Justificativa:</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.	

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<b>CONTRIBUIÇÃO Nº 24064</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> Typo correction.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24065</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24066</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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). Furtherly, 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".	



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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24067</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> The division is not necessary for paragraph EVE.2325(f).	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24068</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2330 - Fire Protection in Fire Zones and Adjacent Areas To exclude EVE.2330(d).	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24069</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2405 - Power or Thrust Control System To remove EVE.2405(d).	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24070</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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).	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24071</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2435 - Powerplant induction and exhaust systems. To remove EVE.2435.	
<b>Justificativa:</b> 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).	

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<b>CONTRIBUIÇÃO Nº 24072</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2515 - Electrical and Electronic-System Lightning Protection To remove EVE.2515(a)(2).	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24073</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

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<b>CONTRIBUIÇÃO Nº 24074</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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).	



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<b>CONTRIBUIÇÃO Nº 24075</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Exclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE.2600 - Flightcrew interface. To remove EVE.2600(c).	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24076</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1. 3317 Fire protection To clarify the terms "fireproof" and "firewall" in a context of an electric engine.	
<b>Justificativa:</b> 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.	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24077</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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."	
<b>Justificativa:</b> 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".	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24078</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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".	
<b>Justificativa:</b> 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".	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24079</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1.3377 Ingestion Clarification on the intent of the requirement EVE.3377.	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24080</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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.	
<b>Justificativa:</b> Typo correction.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24081</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Esclarecimento <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1.3394 – Containment To clarify the parameters regarding the margin referred on EVE.3394(a).	
<b>Justificativa:</b> 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.	

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24082</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Outros <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> 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. 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. 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. 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.	
<b>Justificativa:</b> General Comments	



## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

<b>CONTRIBUIÇÃO Nº 24083</b>	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Embraer S.A. <b>Categoria:</b> Fabricante de aeronave	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Alteração <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> EVE1.3375 Safety analysis. Comment 1: To remove requirement EVE.3375(d)(2)(ix). As an alternative, we suggest the following change to the requirement: 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." Comment 2: To change EVE.3375(d)(1) from: "(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." 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." Comment 3: To remove EVE.3375(d)(2)(ii). 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".	
<b>Justificativa:</b> 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. Comment 2:	

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Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

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.

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).

Comment 4:

In EVE.3375(e), the reference to paragraph (g) seems to be incorrect. Should it be paragraph (d).

## Contributions Regarding Public Consultation nº 10/2023

Proposal of Special Class Airworthiness Criteria for the aircraft Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA

CONTRIBUIÇÃO Nº 24084	
<b>Identificação</b>	
<b>Autor da Contribuição:</b> Nathan Vinicius Pontes Santos <b>Categoria:</b> Pessoa física	<b>Documento:</b> PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave Modelo EVE-100 da EVE Soluções de Mobilidade Aérea Urbana LTDA <b>Tipo de Contribuição:</b> Inclusão <b>Arquivo anexo:</b>
<b>Contribuição</b>	
<b>Texto sugerido para alteração ou inclusão:</b> Essa aeronave deveria ter como obrigatoriedade o uso de um sistema de paraquedas assim como o Cirrus Vision Jet por exemplo.	
<b>Justificativa:</b> 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.	

NR	Paragraph	Comment	Suggested Resolution
1	General	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).	
2	General	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.
3	EVE.2000(b)(1)	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
4	EVE.2000(b)(3)	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).
5	EVE.2000(b)(5)	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.
6	Various	“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.
7	EVE.2005	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.

NR	Paragraph	Comment	Suggested Resolution
8	EVE.2105(g)	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.	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.
9	EVE.2110	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.
10	EVE.2120	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.
11	EVE.2125 (c)	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 intent and design objective to be demonstrated with this requirement.
12	EVE.2240(b)	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).
13	EVE.2240(e) and EVE.2510(c),	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.
14	EVE.2315(a)(1)	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.

NR	Paragraph	Comment	Suggested Resolution
15	EVE.2320(a)(2)	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.
16	EVE.2311	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.  In urban operations, a flock of birds may constitute a realistic threat.	Clarification is sought how the threat of a multiple bird impact will be addressed during airworthiness certification.
17	EVE.2335 EVE.2515	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.
18	EVE.2425(b)	The restart may not be necessary for VTOL aircraft.	It is proposed to consider VTOL 24.25 (b) wording from EASA SC-VTOL
19	EVE.2510 EVE.2250(c)	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.
20	EVE.2510	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?
21	EVE.2555	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.	
22	EVE.3307	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
23	EVE.3327 and EVE.3394	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
24	EVE. 3375(d)(2)	“(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
25	EVE.3377(a)	“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”
26	EVE.3377(a)	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
27	EVE.3388	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

NR	Paragraph	Comment	Suggested Resolution
28	General comment	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.
29	EVE.33100(g)	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

## U.S. FAA response to Consulta Setorial n° 10/2023

March 15, 2024

The U.S. Federal Aviation Administration is submitting the below comments for consideration by ANAC. Thank you for the opportunity to provide feedback on this consultation.

FAA comment: 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.

FAA comment: 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.

FAA comment: Regarding section EVE.2105, the FAA recommends inserting “autorotation” into the regulatory text adjacent to “gliding or an equivalent means” for clarity.

FAA comment: 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).

FAA comment: 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.

FAA comment: Regarding section EVE.2215(c), FAA recommends clarifying what constitutes a likely failure. Please specify the failure probability for a likely failure.

FAA comment: 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.



FAA comment: Regarding section EVE.2125, the FAA recommends inserting “autorotation” into the regulatory text adjacent to “gliding or an equivalent means” for clarity.

FAA comment: 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.

FAA comment: 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).

FAA comment: 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.

FAA comment: 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.”

FAA comment: 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.

FAA comment: 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.

FAA comment: Regarding section EVE.2160, please confirm that the level of safety expectations is the same as that defined in section EVE.2160(a).

FAA comment: 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.”

FAA comment: 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?

FAA comment: 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.

FAA comment: 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.

FAA comment: 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.

FAA comment: 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.

FAA comment: Regarding section EVE.2330(d), the FAA recommends removing this requirement, as it exceeds current normal category requirements.

FAA comment: Regarding section EVE.2400(b), consider including an appendix I for the propeller requirements to allow the option to certificate 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).

FAA comment: 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.

FAA comment: 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.

FAA comment: 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.

FAA comment: Regarding section EVE.2435, the FAA recommends removing this requirement. These products don't have traditional induction and exhaust systems.

FAA comment: Regarding section EVE.2540, the FAA recommends removing icing requirements for applicants unless applicants are specifically requesting icing approval.

FAA comment: 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.

FAA comment: 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:”

“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.

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.

FAA comment: Regarding section EVE.A.3, consider making manuals available in both languages.

FAA comment: 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.



**Contribuições referentes à Consulta Pública**  
***/ Contributions Regarding Public Consultation***  
**nº 10/2023**

**PROPOSTA DE CRITÉRIOS DE AERONAVEGABILIDADE DE CLASSE ESPECIAL para a aeronave**  
**/ PROPOSAL OF SPECIAL CLASS AIRWORTHINESS CRITERIA for the aircraft**  
**Model EVE-100 - EVE Soluções de Mobilidade Aérea Urbana LTDA**

**Contributions made by e-mail**

**Contributions by  
e-mail**

Nº	Date	Contributor	Category of Contributor	Type of Contribution	Contribution	Justification
e-mail	14/12/2023	Leopoldo Alfredo Ambrosio Bruck	Pessoa física	Alteração	<p>A seção EVE.2415 estabelece: Powerplant ice protection.</p> <p>(a) The aircraft design, including the induction and inlet system, must prevent foreseeable accumulation of ice or snow that adversely affects powerplant operation.</p> <p>(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.</p> <p>Acredito que seria melhor estabelecer da seguinte forma: Powerplant ice protection.</p> <p>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.</p> <p>(b) The powerplant installation design must prevent any accumulation of ice or snow that adversely affects powerplant operation,</p>	Não vi justificativa para considerar os impecilios da formação de gelo de forma separada.
e-mail	14/12/2023	Leopoldo Alfredo Ambrosio Bruck	Pessoa física	Alteração	<p>O parágrafo EVE.2530 estabelece: External and cockpit lighting.</p> <p>(a) The applicant must design and install all lights to minimize any adverse effects on the performance of flightcrew duties</p> <p>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</p> <p>A EMBRAER, por exemplo, não fabrica lâmpadas incandescentes ou LED. Portanto, não tem efeito o design.LED.</p>	
e-mail	14/12/2023	Leopoldo Alfredo Ambrosio Bruck	Pessoa física	Alteração	<p>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.</p> <p>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.</p> <p>A EMBRAER, por exemplo, não fabrica lâmpadas incandescentes ou LED. Portanto, não tem efeito o design.</p>	
e-mail	05/01/2024	Edmundo Ortiz	Pessoa física	Esclarecimento	<p>Primeiramente, parabéns ao trabalho estruturado neste processo!</p> <p>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?</p>	
e-mail	15/02/2024	Leonardo Helicopters	Fabricante	Alteração	<p>Please clarify the safety objective and the type of operation will be accepted for a possible basic category that will operate in Brasil environment.</p>	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.

**Contributions by  
e-mail**

Nº	Date	Contributor	Category of Contributor	Type of Contribution	Contribution	Justification
e-mail	15/03/2024	Airbus Helicopters	Fabricante	Alteração	<p>Comments on EVE.2105 it is proposed to delete the paragraph (f) of EVE.2105 :</p> <p>(f) Continued safe flight and landing must be possible from any point within the approved flight envelope following a critical change of thrust.</p> <p>OR alternatively, if the above paragraph is kept it is proposed to modify EVE.2510 as follows:</p> <p>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>Justification of Comment on Sec. EVE.2510 Equipment, Systems, and Installations and EVE.2105 - Performance data paragraph (f):</p> <p>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>
e-mail	15/03/2024	Airbus Helicopters	Fabricante	Alteração	<p>Comment on Sec. EVE.2325 - Fire protection paragraph (e)(1):</p> <p>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>Justification of Comment: the requirement that " fire would be visible to the pilots " is excessive. The wording of CS27/29 §855 is more appropriate.</p>
e-mail	15/03/2024	Airbus Helicopters	Fabricante	Alteração	<p>Comment on EVE.3370 - Engine life-limited parts paragraph (a)</p> <p>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.</p>	
e-mail	15/03/2024	Airbus Helicopters	Fabricante	Alteração	<p>Comment on EVE.3370 - Engine life-limited parts paragraph (b)</p> <p>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 EVE.3370 - Engine life-limited parts paragraph (b)</p> <p>Why this notion of static part right in a middle of very specific parts which can be only static loaded ?</p> <p>Definition of static part missing.</p> <p>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.</p>

18 de Dezembro de 2023.



EMBRAER INDUSTRIA AERONAUTICA S.A

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Ao ilustríssimos.

## AUD PUBLICA - ANAC

Solicito gentilmente aos relatores ANAC da RBAC21, com objetivo contribuir para melhor eficácia e aplicação do Regulamento Brasileiro da Aviação Civil, compartilhar um pouco da experiência de 8 anos como Bombeiro de Aeródromo, sendo dedicado área de ensaios em voo e homologação na fabricante Embraer S.A.

O presente regulamento vigente RBAC21 EMD09 de 01/10/2022, momento algum é supracitada em suas seções 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, saliento 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 Ensaios em Voo de uma aeronave e sua tripulação.

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.

**Inclusão Texto sugerido na Seção: 21.308 – Manual da Qualidade** – O Fabricante deverá disponibilizar o Manual Aircraft Rescue & Firefigting Information, para equipes de emergência realizar uma intervenção na aeronave com Segurança.

**Inclusão Texto sugerido na Seção: 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 equipe 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)**.

**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.

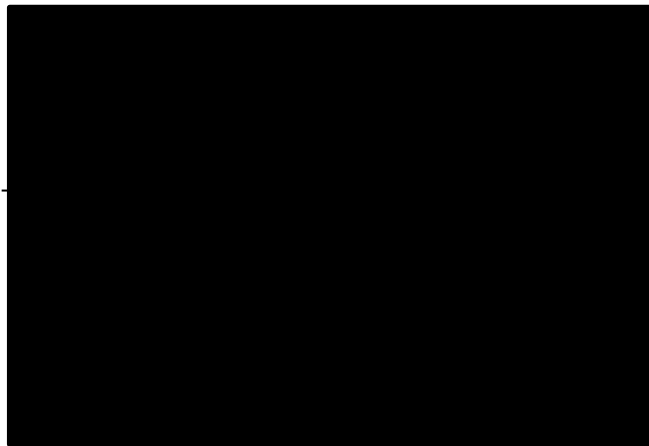


**Fonte Bibliográfica: CE-024:102.009** – Comissão de Estudos de Segurança Contra Incêndio em Sistemas Contendo Acumuladores de Energia.

**RBAC153 EMD07** - Aeródromos - Operação, Manutenção e Resposta à Emergência

Agradeço a compreensão, rogo o deferimento deste ofício e aproveito ainda a oportunidade para elevar meus protestos de estima e consideração.

Atenciosamente.



**ASD - Europe comments on the PROPOSAL FOR SPECIAL CLASS AIRWORTHINESS CRITERIA for the aircraft model EVE-100 (December 14th, 2023)**

Comment #	Paragraph	Page	Comment	Suggested resolution
1	General		<p>ASD-Europe thanks the ANAC for the opportunity to provide comments on the Special Class Airworthiness Criteria for the EVE's Model EVE-100.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Detailed comments are provided below.</p>	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.
2	General		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.	
3	General		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.	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.
4	EVE.2510 (a)	12	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.	It is proposed to introduce explicitly this criteria on single failures to ensure clarity on the intent of the rule.
5	General		No specific requirement is mentioned for aircraft batteries, in particular for fire protection, fire propagation, crashworthiness, high-voltage current disconnection means	Considering the novelties and threats introduced by the new high-voltage propulsion systems, dedicated requirements should be introduced.
6	EVE.2000(b)(1)	1	<p><i>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.</i></p> <p>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.</p>	Please could you clarify the meaning of alternate landin?

Comment #	Paragraph	Page	Comment	Suggested resolution
7	EVE.2105(f)	2	<p><i>Continued safe flight and landing must be possible from any point within the approved flight envelope following a critical change of thrust.</i></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</p> <p>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>	<p>1. An alignment between the safety objectives of ANAC EVE Certification Basis and EASA SC-VTOL is recommended to allow mutual recognition.</p> <p>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:</p> <ul style="list-style-type: none"> <li>- EASA SC-VTOL Enhanced   CFP --&gt; CSFL Vertiport</li> <li>- EASA SC-VTOL Basic   CFP --&gt; CEL</li> <li>- ANAC EVE   Critical Change of Thrust --&gt; CSFL Somewhere</li> </ul>
8	EVE.2105(g)	2	<p><i>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.</i></p> <p>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'.</p> <p>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.</p> <p>This means that neither an aircraft certified under SC-VTOL Category Basic or Category Enhanced may be certified under this EVE Certification Basis.</p> <p>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.</p>	<p>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.</p> <ul style="list-style-type: none"> <li>- EASA SC-VTOL Enhanced   CFP - CSFL, No Gliding Capability</li> <li>- EASA SC-VTOL Basic   CFP - CEL, Gliding Capability</li> <li>- ANAC EVE   Total Loss of Thrust --&gt; CEL, Gliding Capability</li> </ul>
9	EVE.2240 (d)	6	<p><i>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.</i></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.</p> <p>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.</p> <p>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.</p> <p>As an example EVE-100 will not be able to be certified in the Category Enhanced.</p> <p>A minimization exercise is required for Level 3 aircraft, using guidelines such as the AMC20-128A.</p> <p>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.</p> <p>This is a major misalignment which has a huge implications on the aircraft architecture and may not allow mutual recognition between the authorities.</p> <p>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>	<p>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.</p> <ul style="list-style-type: none"> <li>- EASA SC-VTOL Enhanced   No CAT</li> <li>- EASA SC-VTOL Basic   Up to 6 Pax - Nothing to do</li> <li>- EASA SC-VTOL Basic   7-9 Pax - Minimization</li> <li>- ANAC EVE   Minimization</li> </ul>
10	EVE.2260(e)	7	<p>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.</p>	<p>A clarification at requirement level is recommended.</p>
11	EVE.2510(b)	12	<p>The associated probabilities to extremely improbable are assumed to be those of the ASTM F3230-17 Class IV with &lt;10<sup>-7</sup> objective for hazardous failure conditions.</p>	<p>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.</p>
12	EVE.2510(c)	12	<p>The associated probabilities to extremely improbable are assumed to be those of the ASTM F3230-17 Class IV with &lt;10<sup>-5</sup> objective for major failure conditions.</p>	<p>Please confirm this understanding is correct.</p>

# United Kingdom Civil Aviation Authority

## Safety and Airspace Regulation Group



15 February 2024

### **ANAC Proposed Airworthiness Criteria EVE-100 CAA-UK Comments.**

The CAA has reviewed the reference proposed airworthiness criteria. The CAA is not in a position to submit detailed comments on the proposed criteria, as the CAA has limited detailed knowledge of the EVE-100 design.

The CAA has adopted the airworthiness criteria defined in EASA SC.VTOL for aircraft designs such as the EVE-100, as part of our implementation of EASA material on exit from the EU.

The CAA agrees that the EVE-100 represents a new class of aircraft with powered lift capability, that incorporates characteristics from both conventional and rotary wing flight, but also introduces new flight and handling characteristics. As such the CAA agrees that the existing airworthiness standards are not sufficient and new standards are needed, which may draw on existing material, but which will also incorporate new material. In this regard, the CAA decided to adopt the SC.VTOL standards published by EASA, and which CAA helped to develop prior to the UK exit from the EU. The CAA has continued to support the application of SC.VTOL and is an active part of the subsequent development of Means of Compliance (MoC) and industry standards through the Eurocae collaborative effort. The CAA considers that the intended operational model as described by not just EVE, but all the leading designers, to provide paid for passenger flights over densely populated urban environments, constitutes a new risk to third parties which should be recognised in the safety performance of these vehicles.

The CAA notes that the approach being taken by ANAC is similar to that of the FAA, insofar as ANAC has determined that the EVE-100 is a special class aircraft under RBAC 21.17(b) and the proposed airworthiness criteria are based on RBAC 23 amdt 64 and RBAC 33 amdt 34.

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. These are all factors with which the CAA agrees. That said, 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.

**Civil Aviation Authority**

Aviation House Gatwick Airport South Gatwick RH6 0YR [www.caa.co.uk](http://www.caa.co.uk)

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. 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.

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.

If you have any comments on the position stated above, please do not hesitate to contact us at [global.affairs@caa.co.uk](mailto:global.affairs@caa.co.uk)

Yours Sincerely,  
UK CAA

## TCCA AARDC Flight Test division

### 1. Document Being Consulted

		<b>Issue No:</b>	N/A	<b>Subject:</b>	<b>Title of Document / Titre du document</b> EVE 100- Certification Basis Proposal
<b>RDIMS Document No.</b>		<b>RDIMS Version No.</b>	N/A	<b>Consultation Date:</b>	<b>Comments due to AARTT:</b> <b>March 15, 2024</b>

### 2. Comments

<b>COMMENTER</b>	<b>PAGE NO / SECTION / PARAGRAPH</b>	<b>COMMENT SUMMARY</b>	<b>SUGGESTED RESOLUTION</b>	
AARDC	General	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.	Vortex ring state prediction and warning systems should be implemented.  Envelope protection to prevent entering the condition should be included.	
AARDC	Subpart A – General  1.3 (b)(4)	For controlled emergency landing the definition strays from definitions accepted by other authorities and does not account for workload.	Recommend aligning with EASA definition and add “without requiring exceptional piloting skill”.	
AARDC	EVE.2105 (a)	Aircraft performance is expected to be demonstrated over the entire flight envelope. Definition seems to be	Recommend to align with EASA definition and add (2) “ambient atmospheric	

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		missing elements from definitions accepted by other authorities.	conditions within the operational flight envelope”	
AARDC	EVE.2105 (b)(1)	Consider including a definition of "vertiport" under EVE.2000	Define terminology.	
AARDC	EVE.2105(f)	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.	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.	
AARDC	EVE.2105(g)	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> .	Provide clarity for the introduction of this phrase.	
AARDC	EVE.2110	“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	Rationale provided in comment.	

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		wing aircraft.		
AARDC	JS4.2135 (a)(6) EVE.2115 Take Off	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.	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.	
AARDC	EVE.2120 (a)	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?	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.	
AARDC	EVE.2120 (a)	In ground effect, out of ground effect, or both?	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.	
AARDC	EVE.2120 (d)(1)(i)	This requirement describes the	The term sufficient must be	



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		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.	explicitly defined. Recommend aligning with previous industry standards and require 15 foot clearance above obstacles.	
AARDC	EVE.2125 (b)	<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>	<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 glide</u> 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>	
AARDC	EVE.2130(c) (2)	Agree with this section being akin to category A verbiage.	Should also address case of failure after LDP.	
AARDC	EVE.2135(a)	The use of the term "approved envelope" is unclear. FAA uses 'operating	Envelopes need to be clarified. Recommend	

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		<p>envelope' only. EASA uses 'operational flight envelope' and 'limit flight envelope.</p> <p>If referring only to the envelope as approved by the flight manual, this does not provide adequate criteria to define envelope within which C&amp;M needs to be evaluated.</p>	aligning with EASA's corresponding 2135(a)."	
AARDC	EVE.2135(a)(5)	<p><del>This paragraph is intended to capture degrade operational modes not just 1309 style failures. The test should refer to 'failure condition', rather than failure.</del></p>	<p><del>Recommend rephrasing as "In all flight and/or propulsion control system failure conditions not shown to be extremely improbable; and"</del></p>	See AARDD comment
AARDC	EVE.2135(a)(6)	<p>The limitation to 'thrust borne" only is not understood. The aircraft will be able to land by other means.</p> <p>Thrust borne is commonly understood to be RW related operations. What about a FW type of landing?</p>	Expand requirement to encompass all landing methodologies.	
AARDC	EVE.2135(c)	<p>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.</p> <p>The current approach appears to be not as conservative as other authorities.</p>	Envelope needs to be clarified. Recommend aligning with EASA's definition of envelopes.	
AARDC	EVE.2115 Take Off EVE.2135 (a)(6)	<p>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</p>	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	

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		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.	design. Recommend the currently accepted 17 knots be reutilized for any hover takeoff.	
AARDC	EVE.2150(a)	Editorial: The second sentence is incomplete (missing a verb).	Should be something like "In case (...), there must be a clear and distinctive..."	
AARDC	Flight Information	The EVE certification basis appears to have omitted the equivalent EASA section VTOL.2170.	Recommend including a similar section to establish the operating limitation requirements.	
AARDC	EVE.2145	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.	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.	
AARDC	EVE.2145	Is there a requirement for positive static stability? Can more measurable criteria for dynamic stability not be expressed?	Suggest including dynamic stability requirements that can be measured. Some are included in Part 29.	
AARDC	EVE.2165(a)	Smaller rotors and airfoils are known to be highly susceptible to the deleterious effects of snow and icing.	Requirements for recirculating snow need to be included.	
AARDC	EVE.2405	It is expected that the power to each propeller is controlled based on primary	It is suggested that the System Safety process be	

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		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.	referenced here since the complexity of the aircraft is well beyond what Part 23 wording can address.	
AARDC	EVE.2440	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).	Recommend capturing the requirements as established in Amdt 64 as a minimum.	
AARDC	EVE.2505	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?	How will this affect perf and flight planning? HMI considerations?	
AARDC	EVE.2510	<del>Equipment, systems, and installations: Is this intended as the equivalent 1309-type requirements for the aircraft? I think it is essential that the 1309-methodology be retained and applied to these types of aircraft.</del>	<del>The requirement should specify the use of well-established standards such as ARP 4761 and ARP 4754.</del>	See AARDD comment
AARDC	EVE.2540	Why no reference to Part 25 appendix C? What conditions will compliance be shown against?	With the reference to Part 25, Appendix C removed, it is unclear in what icing conditions compliance will be shown.	
AARDC	EVE .2600	Development flights for this class of electric vehicle have clearly shown that the totable useable energy in the batteries is insufficient to provide the	The concepts developed in ED-289 and ED-309 for energy system awareness and state of function need	

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		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.	to be incorporated.	
AARDC	1301-1 Cold Soak	<p>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.</p> <p>Similar comment for hot weather condition (hot soak). Should this be considered?</p>	<p>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.</p> <p><i>Understand it may not be an ANAC specific issue.</i></p>	
AARDC	EVE.2620	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.	Structure the header paragraph such that the requirements of this section are applicable to all possible configurations of thrust/flight for the aircraft.	

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**TCCA – AARDD Engineering Division**

Originating Office:	Document Description: <b>ANAC - EVE 100- Certification Basis Proposal</b>	Information/Contact: <a href="#">Consulta Setorial nº 10/2023</a>	Reviewing Office: <b>Transport Canada, National Aircraft Certification, Engineering</b>	Date of Review: <b>2024-03-14</b>  <b>RDIMS #</b>
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	Commenter	Section #	Comment	Suggested Changes and Rationale
1	Transport Canada (NAC) AARDD-M	General, EVE.2000	<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 thrust and lift functions.</p> <p>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.</p> <p>Some examples:</p> <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</li> </ul>	<p>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).</p> <p>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.</p> <p>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.</p>

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			<p>control”</p> <ul style="list-style-type: none"> <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>	
2	Transport Canada (NAC) AARDD-M	General, EVE.2510 EVE.2300 EVE.2405	<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>	<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>
3	Transport Canada (NAC) AARDD-M	EVE.2000(b)(1)	<p>a) The definition of CSF&amp;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,</i></p>	<p>It is recommended to update the definition of CSF&amp;L under EVE.2000(b)(1) along the following lines:</p> <p>“(b)(1) Continued safe flight and landing means the aircraft is capable of</p>

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			<p><i>on a flightpath clear of obstacles, and maintaining level flight to a planned destination or alternate landing...".</i></p> <p>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).</p> <p>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&amp;L.</p> <p>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></p> <p>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'.</p>	<p>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 alternate landing site</u>, possibly using emergency procedures, without requiring exceptional pilot skill, strength, or alertness."</p>
4	Transport Canada (NAC) AARDD-L	EVE.2000(b)(2)	Recommend to add "taxi" to be consistent with other proposed requirements (e.g.: EVE.2155/2220/2225(b)(5)).	As recommended in the comment.
5	Transport Canada (NAC) AARDD-S	EVE.2000(b)(3)	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.	<p>Recommend rewording as follows:</p> <p><i>"Thrust-borne is defined as when the powered-lift is maneuvering in the</i></p>



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				<p><i>vertical plane and lift is predominately from downward thrust.</i></p> <p><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></p> <p><i>Semi-thrust-borne is the combination of thrust-borne and wing-borne, where both forms of lift are applied.”</i></p>
6	Transport Canada (NAC) AARDD-M	EVE.2000(b)(5)	<p>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.</p> <p>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.</p>	<p>Recommend clarifying per the comment in the associated MoCs. Also, the following change to the definition may help clarify:</p> <p><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></p>
7	Transport Canada (NAC) AARDD-M	EVE.2000(b)(1) EVE.2000(b)(4) EVE.2510	<p>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.</p>	<p>As recommended in the comment.</p>

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8	Transport Canada (NAC) AARDD-M	EVE.2135(a)(5)	<p><i>“(5) In all flight and propulsion control system failures not shown to be extremely improbable;”</i></p> <p>a) It would be preferable to refer to ‘failure conditions’ rather than ‘failures’.</p> <p>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&amp;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.</p>	<p>Recommend rewording as follows:</p> <p><i>“(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”</i></p>
9	Transport Canada (NAC) AARDD-M	EVE.2140(a)(b)	<p>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.</p> <p>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.</p>	<p>Recommend rewording as noted in comment.</p>
10	Transport Canada (NAC) AARDD-S	EVE.2215(b)	<p>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.</p>	<p>Consider incorporating this under EVE.2235.</p>
11	Transport Canada (NAC) AARDD-S	EVE.2215(c)	<p>a) The word “likely” appears to be colloquial in this context.</p> <p>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.</p>	<p>a) Consider wording such as “not shown to be extremely improbable”.</p> <p>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.</p>

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12	Transport Canada (NAC) AARDD-S	EVE.2220	“Effect of ground gust on loads must be considered.” Isn’t this a duplication of EVE.2225(b)(5)?	Consider removing this requirement.
13	Transport Canada (NAC) AARDD-S	EVE.2225(d)	<p>Currently:</p> <p>“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. “</p> <p>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).</p>	<p>Recommended change as noted below, to capture all phases of flight:</p> <p>“(c) Engine-driven lifting-device assemblies, considering loads resulting from flight (<u>including transitional flight mode</u>) and ground conditions, as well limit input torque at any lifting-device rotational speed.”</p>
14	Transport Canada (NAC) AARDD-S	EVE.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.	It is recommended to adopt the same language as EASA’s SC-VTOL Category Enhanced requirement of VTOL.2240(b).

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15	Transport Canada (NAC) AARDD-S	EVE.2240	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).	It is recommended to adopt the same language as EASA's SC-VTOL Category Enhanced requirement of VTOL.2240(e):  <i>"(e) ... provisions for in-service monitoring of parts having an important bearing on safety in operations must be established."</i>
16	Transport Canada (NAC) AARDD-S	EVE.2241	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).	Recommend rewording as follows:  <i>"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."</i>
17	Transport Canada (NAC) AARDD-S	EVE.2245	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	Recommend rewording as follows:  <i>"EVE.2245 - Aeroelasticity (a) ... (3) Accounting for critical degrees of freedom; and..."</i>

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			<p>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.</p> <p>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.</p>	
18	Transport Canada (NAC) AARDD-S	EVE.2250(c)	<p>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.</p>	<p>Recommend adding the following to EVE.2250(c), in line with VTOL.2250(c):</p> <p><i>"A single failure must not have a catastrophic effect upon the aircraft."</i></p>
19	Transport Canada (NAC) AARDD-S	EVE.2260(e)	<p>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.</p>	<p>Recommend replacing "thermal effects" by "environmental effects".</p>

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20	Transport Canada (NAC) AARDD-M	EVE.2270(a)(3)	<p>“Items of mass (...) within or aft of the cabin, that could injure an occupant...”</p> <p>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.</p>	<p>Recommend rewording to align with VTOL.2270(a)(3), i.e.</p> <p>“Items of mass (...) within or <u>adjacent to</u> <del>aft of</del> the cabin, that could injure an occupant...”</p>
21	Transport Canada (NAC) AARDD-M	EVE.2300	<p>Between paragraph 23.2510 and JS4.2300, there is currently no requirement to ensure single failures in flight control functions would not prevent CSF&amp;L. This is a significant concern.</p> <p>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.</p>	<p>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).</p>
22	Transport Canada (NAC) AARDD-M	EVE.2300	<p>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.</p>	<p>Comment only.</p>
23	Transport Canada (NAC) AARDD-M	EVE.2300(a)(3)	<p><i>“Ensure that the flightcrew is made suitably aware whenever the <b>means of primary flight control</b> approaches the limits of control authority.”</i></p> <p>Since the design integrates flight and propulsion control</p>	<p>Recommend avoiding reference to ‘primary flight controls’, or clarifying how the term would relate to integrated thrust / lift / flight control functions.</p> <p>Using more generic wording similar to that of VTOL.2300(a)(3) could also be</p>

## External Public Review Comment Matrix

			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.	an avenue.
24	Transport Canada (NAC) AARDD-M	EVE.2305	Paragraph EVE.2305 is missing a requirement addressing ability to hold the aircraft in position when parked (parking brake).	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>
25	Transport Canada (NAC) AARDD-L	EVE.2320	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.	As recommended in the comment.
26	Transport Canada (NAC) AARDD-M	EVE.2320(a)(2)	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.	Recommend using wording similar to that of VTOL.2320(a)(2), i.e. <i>"(a)(2) Protect the occupants against serious injury due to hazards originating from high energy, associated with systems and equipment, including while embarking and disembarking"</i>
27	Transport Canada (NAC) AARDD-M	EVE.2325	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.	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. <i>"(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;"</i>
28	Transport Canada (NAC)	EVE.2335(b)	As static electricity could potentially lead to catastrophic severity events, the protection should be against Hazardous	Recommend rewording as follows:

## External Public Review Comment Matrix

	AARDD-L		and Catastrophic effects.	<i>"The aircraft must be protected against catastrophic and hazardous effects caused by an accumulation of electrostatic charge."</i>
29	Transport Canada (NAC) AARDD-M	EVE.2405(b)	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.	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).
30	Transport Canada (NAC) AARDD-M	EVE.2415	The requirements under EVE.2415 address accumulation of ice or snow, but is missing explicit reference to shedding.	Recommend aligning with VTOL.2415 requirements.
31	Transport Canada (NAC) AARDD-L	EVE.2430(a)(1)	<p>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): <i>"Be designed and arranged to provide independent multiple energy storage and supply..."</i></p> <p>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: <i>"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;"</i></p>	<p>Recommend rewording as follows:</p> <p><i>"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;"</i></p>
32	Transport Canada (NAC) AARDD-L	EVE.2430(a)(3)	What is the definition of auxiliary power unit in the context of electric propulsion aircraft?	It is recommended to clarify the definition.
33	Transport Canada (NAC)	EVE.2430(b)(3)	Assuming EVE only contains batteries as ESS, please clarify the intent of this item.	It is recommended to clarify the definition.



## External Public Review Comment Matrix

	AARDD-L			
34	Transport Canada (NAC) AARDD-L	EVE.2440	<p>Concern: high voltage and batteries introduces new fire threats and requirement(s) should address them.</p> <ul style="list-style-type: none"> <li>- Does this req also addresses ESS?</li> <li>- 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.</li> </ul>	As recommended in the comment.
35	Transport Canada (NAC) AARDD-M	EVE.2500 EVE.2505 EVE.2510	<p>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.</p> <p>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: <i>“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.”</i> The intent of 23.1309 compliance remains as it was prior to Amt 64.</p> <p>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</p>	<p>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):</p> <p><b>EVE.2500 and .2505</b> <i>“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.”</i></p> <p>➔ 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.</p> <p><b>EVE.2510</b> <i>“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.”</i></p> <p><del>“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</del></p>

## External Public Review Comment Matrix

			<p>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.</p> <p>The wording used in VTOL.2500 and VTOL.2510 is clearer in this regard.</p>	<p>equipment...”</p> <p>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.</p>
36	Transport Canada (NAC) AARDD-M	EVE.2510	<p>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.</p> <p>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.</p> <p>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.</p>	<p>Paragraph EVE.2510 should be reworded as follows:</p> <p>“(a) Each catastrophic failure condition is extremely improbable <u>and does not result from a single failure</u>”</p>
37	Transport Canada (NAC) AARDD-M	23.2510	<p>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</p>	<p>Note only for Certification Basis. The FAA is requested to consider in establishing corresponding acceptable MoCs.</p>

## External Public Review Comment Matrix

			populated areas.	
38	Transport Canada (NAC) AARDD-L	EVE.2515(a)(2)	<p><i>"... unless the system's recovery conflicts with other operational or functional requirements of the system."</i></p> <p>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.</p> <p>It should be clarified what are these possible functional or operational requirements that need this provision.</p> <p>We believe this requirement does not accurately state the intent.</p> <p>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.</p> <p>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?</p>	<p>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.</p> <p>If pertinent, the same provision should also apply to the systems with hazardous criticality addressed in EVE.2515(b).</p>
39	Transport Canada (NAC) AARDD-L	EVE.2520(a)(2)	<p><i>"... unless the system's recovery conflicts with other operational or functional requirements of the system."</i></p> <p>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.</p> <p>It should be clarified what are these possible functional or operational requirements that need this provision.</p> <p>We believe this requirement does not accurately state the</p>	<p>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.</p> <p>If pertinent, the same provision should also apply to the systems with hazardous criticality addressed in EVE.2520(b).</p>

## External Public Review Comment Matrix

			<p>intent.</p> <p>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.</p> <p>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?</p>	
40	Transport Canada (NAC) AARDD-L	EVE.2525	<p>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).</p> <p>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.</p>	<p>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.</p>
41	Transport Canada (NAC) AARDD-M	EVE.2615(b)(2)	<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>	<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.:</p> <p><i>“(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</del> to enable them to take appropriate corrective action.”</i></p>

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42	Transport Canada (NAC) AARDD-P	Section H, EVE.3307(b)(1)	Takeoff power and its allowed time limitation is not defined.	<p>Recommend updating as follows:</p> <p>(a) Shaft power, torque, rotational speed, and temperature for:  (1) Rated takeoff power;  (2) Rated maximum continuous power; and  (3) Rated maximum temporary powers <u>(including the take-off power)</u> and associated time limit.</p>
43	Transport Canada (NAC) AARDD-P	Section H, EVE.3307(b)(2)	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.	<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</del> <u>documented in the engine installation manual.</u></p>
44	Transport Canada (NAC) AARDD-P	Section H	Missing Operating limits	<p>Recommend adding the following:</p> <p><i>“Electric engine operating limitations are established as applicable, including:</i>  - <i>Maximum transient overspeed and time;</i>  - <i>Maximum transient overtorque and time, and number of overtorque occurrences;</i>  - <i>Maximum overtorque and time;</i>  - <i>Electrical power, voltage, current, frequency, and electrical power quality limits;</i>  - <i>Maximum and minimum starting and continuous temperature(s), current, voltage;</i>  - <i>Vibration limits”</i></p>
45	Transport Canada (NAC) AARDD-P	Section H, EVE.3308	Redundant definition of the engine ratings	<p>Recommend deleting the following:</p> <p>Selection of Engine Power and Thrust Ratings  (a) through (b)</p>
46	Transport Canada (NAC)	EVE.3317(e)	EVE.3317 is titled “Fire Protection” and requires the protection of the high-voltage electrical wiring and	As recommended in the comment.

## External Public Review Comment Matrix

	AARDD-L		<p>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".</p> <p>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).</p>	
47	Transport Canada (NAC) AARDD-P	Section H, EVE.3327	Max overspeed condition for demonstration compliance is missing.	<p>Recommend updating as follows:</p> <p>(a) A rotor overspeed must not result in a burst, rotor growth, or damage <u>of itself or of its windings</u> that results in a hazardous engine effect, as defined in EVE.3375(d)(2) <u>when operating in an engine for 5 minutes at the maximum overspeed condition</u>. 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></p> <p>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.</p>
48	Transport Canada (NAC) AARDD-P	Section H, EVE.3328	Missing control transitions	<p>Recommend adding the following:</p> <p><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></p>
49	Transport Canada (NAC) AARDD-P	Section H, EVE.3374	Missing back-EMF considerations	<p>Recommend updating as follows:</p> <p><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</u></i></p>

## External Public Review Comment Matrix

				<u>with the applicable continued operation.”</u>
50	Transport Canada (NAC) AARDD-P	Section H, EVE.3375(d)(1)	Minor engine effect is not as per the accepted definitions.	Recommend updating as follows:  <i>“(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)(ii), and (d)(1)(iii), and the engine complies with the operability requirements such as EVE.3373 and EVE.3389, as appropriate. <u>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.”</u></i>
51	Transport Canada (NAC) AARDD-L	EVE.3328(f)(4)	The term “local events” is vague and needs to be defined.	We recommend using in these requirements the language of Sec 33.28(d)(4) which provides a delimitation of the terminology “local events”.
52	Transport Canada (NAC) AARDD-L	EVE.3362(b)	We believe the “minimal material properties” terminology is vague and needs to be defined.	We recommend including a definition for the terminology “minimal material properties” used in this requirement.
53	Transport Canada (NAC) AARDD-L	EVE.33100(c)(3)	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.	As recommended in the comment.
54	Transport Canada (NAC) AARDD-L	EVE.33100(d)	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>	As recommended in the comment.

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55	Transport Canada (NAC) AARDD-L	EVE.33100(g)(4)	The term “local events” is vague and needs to be defined.	We recommend using in these requirements the language of Sec 33.28(d)(4) which provides a delimitation of the terminology “local events”.
56	Transport Canada (NAC) AARDD-L	Subpart H	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.	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”.
57	Transport Canada (NAC) AARDD-M	EVE.A.4	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.	Recommend rewording as follows:  <i>“This section must set forth each mandatory <u>maintenance action</u> <del>replacement time, structural inspection interval, and related structural inspection procedure</del> required for type certification.”</i>





GAMA 24-11

March 15, 2024

Directorate of Aircraft Certification  
Brazil Civil Aviation Authority (ANAC)  
Setor Commercial Sul, Quadra 09, Lote C  
Edifício Parque Cidade Corporate  
Brasília - DF

**Subject: GAMA Comments - Airworthiness Criteria for the EVE-100 eVTOL**

Dear Sir/Madam,

**Introduction**

The General Aviation Manufacturers Association (GAMA) values the opportunity to provide review and comment in support of the ANAC proposed airworthiness criteria for the EVE-100 electric vertical takeoff and lift (eVTOL) aircraft. GAMA represents over 150 of the world's leading general aviation airplane and rotorcraft manufacturers, operators, service providers, repair facilities, and fixed-based operators. GAMA's membership includes developers and manufacturers of eVTOL aircraft as well as traditionally powered and emerging VTOL.

**GAMA General Comment**

GAMA members evaluated the proposed airworthiness criteria for the EVE-100 and have identified several recommendations for the applicable regulations. These comments represent consensus input that was achieved across GAMA's global membership of ANAC, FAA and EASA state-of-design applicants and member companies in Brazil, U.S., Europe, U.K., and Canada that are primary stakeholders for eVTOL and the proposed airworthiness criteria for the EVE-100.

**GAMA is in support of** the application of performance-based airworthiness criteria to these innovative aircraft. Specifically, GAMA applauds the approach outlined in this proposal. This collaborative and performance-based position aims to contribute to the development of robust and effective airworthiness standards for the EVE-100, aligning with industry's commitment to advancing safety and innovation in aviation.

**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.

**General Aviation Manufacturers Association**

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**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.

This notice is the first ANAC proposed airworthiness criteria for an eVTOL published for review and comment and is applicable to the EVE-100. 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, GAMA 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 extent practicable and facilitates transferability and continued operational safety support for operations worldwide.

GAMA appreciates the opportunity to review and comment on ANAC's proposed airworthiness criteria for the EVE-100 eVTOL and strongly supports this milestone which is essential in enabling the advancement of emerging technologies, including electric propulsion VTOL aircraft. We look forward to continued collaboration with ANAC in the establishment of appropriate safety standards for airworthiness, operations, licensing, and airspace to enable the safe operations and public benefits of these innovative vehicles.

Respectfully submitted,

David Dunning  
Director of Global Innovation & Policy  
General Aviation Manufacturers Association (GAMA)

Enclosure:

Appendix A: Detailed comments to ANAC proposed airworthiness criteria for the EVE-100 eVTOL

Appendix A: Detailed comments to ANAC proposed airworthiness criteria for the EVE-100 eVTOL.

These comments represent consensus input that was achieved across GAMA's global membership of ANAC, FAA and EASA state-of-design applicants and member companies in Brazil, U.S., Europe, U.K., and Canada that are primary stakeholders for eVTOL and the proposed airworthiness criteria for the EVE-100.

### **EVE.2000 – Applicability and Definitions**

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:

- These terms include "Local Events", "Essential Performance", and "Increased Performance."
- 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.
  - 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.
- 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.
- 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.

**GAMA recommends** including comprehensive definitions for these terms in the regulatory framework to enhance transparency and ensure a standardized understanding within the aviation community.

### **EVE.2105(f) – Performance Data**

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.

**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.

### **EVE.2105(g) – Performance Data**

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<sup>-9</sup> 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.

**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.

### **EVE.2115 – Takeoff Performance**

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.

**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.

### **EVE.2125(c) – Climb Information**

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.

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.

**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.

### **EVE.2135(a)(5) - Controllability**

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

**GAMA recommends** substituting the proposed text with: "in any degraded flight control system operating modes that are not demonstrated to be extremely improbable; and"

### **EVE.2240 – 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.

**GAMA recommends** that ANAC establishes explicit and unambiguous criteria for high-energy fragments to enhance the consistency and effectiveness of assessing structural durability.

### **EVE.2311 – Bird Strike**

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.

**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.

### **EVE.2435 – Powerplant Induction and Exhaust Systems**

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.

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).

### **EVE.2515 – Electrical and Electronic System Lightning Protection**

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.

**GAMA recommends** the removal of item (a)(2).

### **EVE.2555 – Installation of Recorders**

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.2600(c) – Flight crew Interface**

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.

**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.

### **EVE.3373 – Power Response**

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."

**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.

### **EVE.3375(d)(1) - Safety Analysis**

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.

**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 ***does not result in LOPC***.

### **EVE.3375(d)(2)(ii) – Safety Analysis**

Regarding EVE.3375(d)(2)(ii): The EVE-100 aircraft does not include a bleed system.

**GAMA recommends** the removal of this requirement.

### **EVE.3375(d)(2)(ix) – Safety 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).

**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.

### **EVE.3377 – Ingestion**

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.

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.

### **EVE.3394 – Containment**

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.

**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.