



Comment-response document (CRD) — Advisory Body consultation

Appendix 1 to Description of operations (DoOs) and Regulatory impact assessment (RIA)

Table of contents

1. Summary of the outcome of the AB consultation

2. Individual comments and responses

2.1. Comments on Description of operations (DoOs):

- 01. DoOs-related comments provided by AESA
- 02. DoOs-related comments provided by Airbus
- 03. DoOs-related comments provided by CANSO
- 04. DoOs-related comments provided by DGAC France
- 05. DoOs-related comments provided by EUROCONTROL
- 06. DoOs-related comments provided by IATA

2.2. Comments on Regulatory impact assessment (RIA) with Explanatory Note (EN) issues:

- 07. RIA-related comments provided by AESA
- 08. RIA-related comments provided by Airbus
- 09. RIA-related comments provided by EUROCONTROL
- 10. RIA-related comments provided by IATA
- 11. RIA-related comments provided by UK CAA

2.3. General comments:

- 12. IAPPS
- 13. LBA



Summary of the outcome of the AB consultation

The RIA and DoOs documents were consulted with the ABs from 22 July until 10 September 2016.

9 comments were received during the consultation from AESA, Airbus, CANSO, DGAC, EUROCONTROL, IATA, IAPPS, LBA, and UK CAA, specifically addressing the issues of DoOs (6) and RIA (5); 2 comments were of general nature.

DoOs: The following topics have been addressed by amending the proposed text: better description of how the Systems-Theoretic Process Analysis (STPA) methodology is used within the AWO Project; with regard to the classification of standard operations, the definitions of 'LVTO I' and 'LVTO II' are retained to ensure consistency with the definition of 'low-visibility operations' but the amended text highlights the differences with regard to the ICAO classifications; additional text clarifies how the STPA methodology is used to validate the proposed requirements; the 'hazards' and 'safety constraints' have been amended to ensure that they are complete and consistent; the improved description of LTS CAT I, OTS CAT II and SA CAT II clarifies the concept of air operations with operational credits; LTS CAT I, OTS CAT II and SA CAT II have been included in the description of system components.

Based on the detailed feedback on SA CAT I operations with operational credits (ref.: Appendix 1) of DoOs: some important issues are now better addressed, such as: a specific performance need for the pre-threshold terrain depending on the current technology of autoland systems based on the radio altimeter (RA) (which might be superseded by an adequate new technology); the interaction of crosswind limitations, runway width, time-to-alert and protection of the obstacle-free zone; and the criteria and terminology to be used for SA CAT I operations not using instrument landing system (ILS). Based on the comments on the use of EFVS/CVS as enabler for operations with the operational credits (ref.: Appendix 2 of DoOs: the criteria for establishing operations are now included in the relevant AMC, but the determination of such minima for EVS will be the responsibility of the operator (as it is the case for any other approach).

RIA: The main topics addressed by the comments were the following: text modified considering the answers to the questionnaire on the airborne equipment provided (e.g. detailed information on development/installation/etc. costs for EVS/CVS/HUDs/autoland); reference added to indicate that autoland is an important element to enable SA CAT I operations; positive impact of the introduced principles on reducing the number of visibility-related diversions was reassessed considering additional assumptions; and positive impacts for ATOs were better described by clarifying that the operator is responsible for providing the training in accordance with operational procedures and the operational approval.



Individual comments and responses

In responding to comments, a standard terminology has been applied to attest EASA's position. This terminology is as follows:

- (a) **Accepted** — EASA agrees with the comment and any proposed amendment is wholly transferred to the revised text.
- (b) **Partially accepted** — EASA either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.
- (c) **Noted** — EASA acknowledges the comment but no change to the existing text is considered necessary.
- (d) **Not accepted** — The comment or proposed amendment is not shared by EASA.

Comments on Description of operations (DoOs):

- 01. DoOs-related comments provided by AESA
- 02. DoOs-related comments provided by Airbus
- 03. DoOs-related comments provided by CANSO
- 04. DoOs-related comments provided by DGAC France
- 05. DoOs-related comments provided by EUROCONTROL
- 06. DoOs-related comments provided by IATA

Comments on Regulatory impact assessment (RIA) with Explanatory Note (EN) issues:

- 07. RIA-related comments provided by AESA
- 08. RIA-related comments provided by Airbus
- 09. RIA-related comments provided by EUROCONTROL
- 10. RIA-related comments provided by IATA
- 11. RIA-related comments provided by UK CAA

General comments:

- 12. IAPPS
- 13. LBA



01. DoOs-related comments provided by AESA

Reference	Your comments	Response (by the AWO Project Team)
4. CONCEPT OF OPERATIONS WITH OPERATIONAL CREDITS	Define SA CAT II or delete the operation. Justification: The concept of SA CAT II is not defined.	ACCEPTED A description of SA CAT II has been added to the DoOs document for the sake of completion of the overview description; however, it is not yet confirmed to be introduced as an option
	Specific operational credits should be needed in order to allow RVR under 75 m. Justification: Low-visibility taxiing and Low-visibility Take-off I & II have been classified as standard operations. The question is if operation with RVR under certain limits, should not require specific operational credits. It could not seem reasonable to accept RVR of 0 m for take off without any additional requirement, when nowadays minimum allowed is 75 m.	NOTED Additional aircraft equipment is already required for take-off in RVR below 125 m (i.e. PVD or HUD). It is unclear whether there would be any benefit in requiring an operational credit for LVTO below 75 m; nevertheless, the proposal should be further discussed.
5. DESCRIPTION OF SYSTEM COMPONENTS	In case of SA CAT I one AFM reference should be addressed. Justification: Table 5 states that Aircraft shall be certified for SA CAT I, CAT II or CAT III as well as the automatic flight guidance system, but it does not clearly require that to be specified in the AFM as it is the case for EVS/CVS.	ACCEPTED Table 5 has been updated accordingly.
	Low visibility taxiing and LVTO should need a dedicated paragraph in table 5 similar to other operations. Justification: Since LVTO I, and II are considered standard operations, they have been included in table 4, along with the well known CAT I, CAT II and CAT III operations. As consequence they could go unnoticed in relation with the more remarkable concepts of SA CAT I and EVS/CVS described in table 5. Moreover, Low-visibility taxiing that is included in table 3 as standard operation, is not even mentioned.	ACCEPTED LVTO I and II are already included in Table 5. Low-visibility taxiing will be added.
	Include the description of system	ACCEPTED



Reference	Your comments	Response (by the AWO Project Team)
	<p>components for LTS CAT I and OTS CAT II.</p> <p>Justification: In order to have a full picture of the AWO possibilities it could be convenient to include the description.</p>	<p>LTS CAT I and OTS CAT II to be included.</p>
Other observations	<p>Compare requirements for LVTO and Low-visibility taxiing between EASA and FAA/CASA.</p> <p>Justification: In order to define operational requirements for new LVTO rules a comparison between EASA and FAA/CASA should be appreciated in the same way than other operations.</p>	<p>NOTED</p> <p>This suggestion will be considered in the rulemaking task RMT.0379, but is not within the scope of the DoOs document.</p>



02. DoOs-related comments provided by Airbus

Reference	Your comments	Response (by the AWO Project Team)
1. CONTEXT	<p>STAMP/STPA Methodology</p> <p>There is no visibility on how the STAMP/STPA method is validated and applied to the SA-CAT 1 and EVS/CVS operations with operational credits . The Functional & Certification / Approval requirements for the cross-domains: Airworthiness, Air Operations and ATM/ANS / Aerodromes, are therefore derived without clear link to the methodology. For a topic of such criticality, proof of concept with real use case applied to aviation domain shall be provided before retaining STAMP/STPA method for the AWO project.</p>	<p>PARTIALLY ACCEPTED</p> <p>This Chapter has been updated to explain that the STPA methodology will be used to validate the outcome of the rulemaking task RMT.0379. Further information on the application of the methodology will be provided in Chapter 2.</p> <p>The decision to use the STPA methodology was taken at an early stage of the AWO Project. It would not be practical to switch to a different methodology at this stage.</p>
2. AWO SYSTEM DESCRIPTION	<p>Cross-domains components requirement generation process</p> <p>The traceability between the high level objectives, such as “the aircraft shall be under control and maintain adequate separation” and the certification requirements is not clearly established (Certified FMS & EVS/CVS). The final results seem more linked to people’s experience, common sense and wisdom rather than derived from the proposed methodology.</p>	<p>NOTED</p> <p>The DoOs document does not contain a full description of the STPA methodology; references are provided for readers requiring more information. The text will be updated to clarify that the methodology will be used to validate the proposed requirements rather than to derive certification specifications.</p>
	<p>The concept of operations commonly agreed for autopilot is to use a CAT 2 autopilot coupled down to 100 ft at least, ensuring a 50 ft transition with autopilot coupled together with visual reference. Hence, the existing AWO CAT 2 CS/AMCs for airborne systems should provide the reference to set an acceptable level of performance requirements and means of compliance considering the total system approach. These rules are already performance based and only minor adaptations would be needed to make them completely technology independent.</p>	<p>NOTED</p> <p>The proposed requirements will indeed be built on the existing basis.</p>



Reference	Your comments	Response (by the AWO Project Team)
	Therefore, it would be wiser to build on existing basis instead of creating a new set of performance criteria.	
	Operational capability attributes The term of “RESILIENCE” as introduced in this concept paper could be misleading. The notion of resilience in this context seems to be contradictory with the commonly used notion of safety, integrity. Therefore, it cannot be introduced in the AWO regulations without any prior explanation and interpretation. In particular, what kind of perturbations the resilience requirement is supposed to address: should it be understood as system failures or external perturbations (turbulence) or both. On this will depend the compliance demonstration strategy. The term of “FUNCTIONALITY” commonly agreed as “intended function” is now introducing the notion of resilience which is not shared and agreed. It is recommended to stay with the commonly agreed terminology for the well known AWO context.	NOTED
4. CONCEPT OF OPERATIONS WITH OPERATIONAL CREDITS	It sounds good to favour the “operational credit” instead of creating a new approach category. This allows keeping full consistency with ICAO Annex 6 .	NOTED
	The operational credit at the fringe of the standard operations (CAT 1, CAT 2, CAT 3) is enabled considering the operational performance of the total system (cross-domain risk assessment). This allows better consideration of real-life operations with different configurations of aircraft, operation and ATM / aerodrome capabilities which individually are often exceeding the minimum CAT 1 performance requirements.	NOTED
	It is best to clearly distinguish the SA CAT 1 operations from the operations with EVS/CVS. This enables to promote the use of the existing enhanced flight guidance system (e.g autoland). The dedicated operational concept of SA-CAT 1 is now quite straightforward allowing lower than standard CAT 1 minima for both DA/H and	NOTED



Reference	Your comments	Response (by the AWO Project Team)
	<p>RVR.</p> <p>More clarity has been provided regarding the approval process of the operational credits which distinguishes between the prolongation of instrument & visual segments to be addressed by the airworthiness authorities and the prolongation of the visual segment alone which depends on the meteo conditions is let to the local authorities</p>	
5. DESCRIPTION OF SYSTEM COMPONENTS	<p>Compared to the conventional methods of safety assessment, this “Description of Operations” document is an intermediate step toward the “Operational Service Environment Description” to be developed for the SA-CAT 1 and EVS/CVS operations. However, to develop a complete set of functional, safety and performance requirements at cross-domain system components level which are then transposed to the respective NPAs, there is still some work left to do:</p> <ul style="list-style-type: none"> • the environment conditions need to be defined (traffic density, aerodrome installations), • the functional requirements as presented here needs to be further consolidated and expanded to enable an understanding of the interactions between the many different systems and actors involved in these operations with operational credits. • The safety and performance requirements need to be derived from operational safety objectives using a model more representative of the physical implementation. 	<p>NOTED</p> <p>This discussion is beyond the scope of the DoOs document; it will be considered in the complete context of RMT.0379.</p>
6. COMMON DEFINITIONS OF TERMS TO BE USED	<p>Comments on Definitions made in due time via the dedicated open forum have not been taken into account and no feedback has been yet provided. These comments remain open.</p>	NOTED
APPENDIX 1. OPERATIONS WITH OPERATIONAL	<p>Focus on CAT 1 vs CAT II Operation</p> <p>The conventional methods of safety assessment (Eurocontrol SAM, SESAR SRM, ED-78A/ DO-264) are driven by the establishment of the safety criteria and not</p>	<p>NOTED</p> <p>This discussion on the safety assessment methodology is very valuable also to the AWO</p>



Reference	Your comments	Response (by the AWO Project Team)
CREDITS: SA CAT I	<p>the opposite as suggested in the section.</p> <p>The statistics for accident rate during precision approach should be taken into consideration.</p> <p>The introduction of the safety criteria for the SA CAT 1 operations defined as “more demanding CAT 1 operations” or “less demanding CAT 2 operations” provides an initial basis for the compliance demonstration work, however, the qualitative safety criteria “Compliant CAT II” operations shall be recognized as adequate and acceptable criteria for regulators regarding the “certified CAT 2” components.</p> <p>For compliance demonstration with safety criteria, the different failure modes of the ground-based navigation systems (xLS) for the CAT 1 and the CAT 2 operations shall be defined.</p> <p>The Description of Operations is not clear regarding the overall aircraft performance expected at DA/H and below for all allowed means.</p> <p>Description of system components</p> <p>The traditional methodologies of safety assessment used in the aviation community to produce a common operational concept such as ED-78A / DO-264 (EUROCAE/RTCA) and SRM (SESAR) are defining 3 main types of cross-domains requirements:</p> <ul style="list-style-type: none">• Safety and Performance Requirements• Functional Requirements• Certification / Authorization Requirements. <p>The deliverables of ED-78A/DO-264 or SRM: Operational Service Environment Description (OSED) and Safety and Performance Requirement (SPR) documents provide full traceability of the cross-domain requirements generation process.</p> <p>For the AWO Project, the traditional “industry” approach has been bypassed. The Hazard Analysis performed by EASA was conducted in an unconventional</p>	<p>Project, but it is beyond the scope of the DoOs document. The specific issues mentioned here are addressed below.</p>



Reference	Your comments	Response (by the AWO Project Team)
	manner working with a coach from a university to help EASA apply STAMP/STPA methodology. The review of the cross-domain requirements for the SA CAT 1 which emerged from this STAMP/ STPA methodology revealed a number of open questions and raised a number of issues:	
	<ul style="list-style-type: none">• HUD: it is not clear what information shall be provided by the HUD for the intended operation and what are the rationals and the performance requirements. It sounds reasonable to request that the HUD is at least certified for minimum CAT 2 operations. The same level of performance in normal, extreme and failure conditions shall be applicable to all allowed means (e.g autopilot, flight director and HUD) , as well, the acceptable means of compliance shall be equivalent.	NOTED
	<ul style="list-style-type: none">• IAP: for the air ops domain, the terminology “use of designed IAP for intended function” instead of “use of published IAP” has to be clarified. In addition, the IAP shall publish the compatibility of pre-threshold terrain with autoland system. To do so, clear criteria shall be defined used both by states (to provide compatibility assessment) and airworthiness (to certify auto-land system accordingly).	PARTIALLY ACCEPTED Table 5 has been updated to include the requirement for the pre-threshold terrain to be compatible with autoland (in cases where autoland is intended to be used). It still needs to be established how this will be achieved. Different autoland systems may have different requirements, so it is not clear whether this could be defined by Member States. SA CAT I operations do not necessarily require autoland, so pre-threshold terrain is not always required. The objective is to describe the criteria in terms of performance.



Reference	Your comments	Response (by the AWO Project Team)
	<ul style="list-style-type: none"> Aerodrome chart: for the air ops domain, the terminology “ use of suitable aerodrome for intended function” instead of “use of published terrain chart” has to be clarified. The terrain chart shall publish the compatibility of pre-threshold terrain with autoland. 	See previous response.
	<ul style="list-style-type: none"> RVR data: for the aerodrome domain, the need for RVR sensors has to be specified for consistency with air ops domain requirement. The aerodrome shall provide the RVR data. 	ACCEPTED Table 5 has been updated to include this requirement.
	<ul style="list-style-type: none"> Runway & pre-threshold terrain: the CAT 1 runway pre-threshold shall be suitable for radio altimeter but also include compatibility conditions for autoland. 	ACCEPTED Table 5 has been updated to include this requirement.
	<p>General findings</p> <ul style="list-style-type: none"> The Safety objectives not being assigned to the operational hazards, the allocation and apportionment at cross-domain components level cannot be achieved in a logical way. The operational environment is not defined (aerodrome traffic density, separation between aircraft, Missed Approach (RNAV, RNP), MET Services, etc... The functional model is merely outlined and needs to be further developed to address the CNS/ Human actors interactions (logical model). The way in which the Functional & Certification / Authorization Requirements are obtained is not established. 	<p>NOTED</p> <p>This discussion may be valuable to the AWO Project, but it is beyond the scope of the DoOs document.</p> <p>It should be noted that the the STPA methodology has not been yet fully implemented; the final requirements have not been developed or validated yet.</p>



Reference	Your comments	Response (by the AWO Project Team)
	<ul style="list-style-type: none">• The Safety & Performance Requirements are missing. Safety, Integrity and Performance attributes are not considered as key drivers for designing the system components. Performance requirements exist for CAT 2 and CAT 3 approach category, similarly, performance requirements need to be defined for SA –CAT 1 operations. The SA-CAT 1 operations with a HUD which is already certified for CAT 3 operations shall be distinguished from a “lambda” HUD that is not subject to compliance demonstration of performance requirements. As performance requirements exist for CAT 2 operations, they shall be taken as reference for SA-CAT 1 operations.• The functional requirements for Runway and pre-threshold terrain are not adequately defined. The proposal “The runway shall meet the requirements for a runway supporting CAT I operations, and the pre-threshold terrain shall be suitable for determining the DA/H with an RA” seems to cover only the requirement for DA/H determination. Additional consideration should be included for compatibility with Autoland. AIRBUS believe that some CAT I pre-threshold terrain may be compatible with SA-CAT I but not with autoland. Therefore means shall be provided to the crew to identify if autoland can be used, or not, on the SA CAT I approach chart. To do so, IAP shall publish the compatibility of pre-threshold terrain with autoland system. To do so, clear criteria shall be defined used both by states (to provide compatibility assessment) and	



Reference	Your comments	Response (by the AWO Project Team)
	airworthiness (to certify auto-land system accordingly).	
APPENDIX 2. OPERATIONS WITH OPERATIONAL CREDITS: EVS/CVS	General findings	NOTED
	<ul style="list-style-type: none"> The operational concept for EVS/CVS operations is very unclear, e.g. does this concept include two minima (EVS and natural vision minima). The concept does not define criteria for flight crew to decide to continue or go around at DA/H. Airbus also questions whether the EASA flight standards people have been involved. 	There is no proposal to change the current requirement. See AMC6 SPA.LVO.100. The text of the 'overview of EVS/CVS operations' section will be updated to clarify this.
	<ul style="list-style-type: none"> The safety criteria for EVS/CVS approach operations have to be made clearer. It is a question of whether the objective is to make it "more demanding than AIP standard operations". 	NOTED The safety criteria will be the same for all classification of operations and operational credits.
	<ul style="list-style-type: none"> The traceability between the identified high-level hazards for EVS/CVS approach operations, high-level safety constraints and the resulting system components requirements is not clearly established. 	NOTED Work on this has not been completed yet.
	<ul style="list-style-type: none"> The criteria for eligible IAPs need to be defined. 	NOTED
	The requirement for EVS/CVS being displayed on HUD needs to be made clear in the "airworthiness" section. Page 43 in the "intended use" section display on HUD is required while page 44 "EVS/CVS remarks" section, display on HUD is left to the TC or STC Holder to find out whether the EVS/CVS information have to be presented on HUD.	NOTED
	<ul style="list-style-type: none"> There are duplications between page 44 and page 45 and typo error in AFM on those same pages. 	ACCEPTED



03. DoOs-related comments provided by CANSO

Reference	Your comments	Response (by the AWO Project Team)
APPENDIX 1. OPERATIONS WITH OPERATIONAL CREDITS: SA CAT I	For the following key subject areas CANSO would like to provide the kind of proposals that we support. In some cases, especially if the proposals met existing standards of FAA or CASA we refrained from explanations.	
	General requirements With SA CAT I DH as low as 150 FT and RVR as low as 300 M, minima are within the range of CAT II operations. Also Other Than Standard CAT II operations are within range of CAT III operations.	NOTED
	Therefore, concise operational procedures for both air operators and ANSPs should be defined as well as for airport operators (ILS requirements, Sensitive Areas and downgrades of relevant equipment). In addition, it should be clearly stated whether these kinds of operations will be within the scope of CAT II, respectively CAT III operations. In other words, either presently used CAT I / II and III operations with published procedures will continue to be used by ANSPs or new operational procedures have to be implemented.	LVP will be required for all LVOs.
	Furthermore, DH shall be established with radar altimeter according to CAT II/III criteria, a	Already included.
	PATC shall be made available and	Already included.
	Single pilot operations shall not be authorized.	NOTED Justification would be appreciated..
	Maximum crosswind component shall be limited to 15 KT, tailwind component shall not exceed 10 KT.	NOTED
	In addition, CANSO would like to point out that currently our procedures allow for the substitution of RVR touch down zone values by the mid-point values up to 72 hours in case of malfunction/failure. This might be operationally beneficial for others, too.	NOTED
	Aerodromes Whenever an aerodrome or runway will be used for Lower than CAT I operations, ILS equipment, secondary power supply,	ACCEPTED



Reference	Your comments	Response (by the AWO Project Team)
	markings and lightings shall meet ICAO requirements layed down for precision approach runways.	
	Instrument landing system The glide slope angle shall be a standard 3°, the RDH shall neither exceed 60 FT nor be less than 50 FT (Aerodrome reference code 3 and 4) and the localizer course shall be aligned with the runway centre line course. The boundaries of the instrument landing system critical/sensitive areas shall be re-evaluated.	NOTED Requirements for ILS are included in Table 5. Please provide a justification for this suggestion.
	Autoland Further clarification concerning the ground based equipment and technical and operational requirements for the use of autoland during SA CAT I and Other Than Standard CAT II are necessary. The AIP lists the ILS categories for each runway. This classification only shows the maximum categories (f.ex. III/E/4). But this list should not be used in order to determine, whether an airport can support SA CAT I operations. The corresponding sensitive and critical areas (necessary for autoland) are only protected during operation of CAT II/III. Therefore in our opinion, the ANSP can not always gurantee the required ILS performance for an autocoupled landing during SA CAT I operations.	ACCEPTED Table 5 has been updated to clarify that LVPs will be required, and that for ILS operations the ILS-sensitive and ILS-critical areas shall be protected.
	Obstacle limitation surfaces The OLS system shall conform to ICAO requirements for precision approach runways, an OFZ shall be established.	ACCEPTED.
	ATC Commonly agreed ATC procedures and ATC radio phraseologies shall be established and approved.	NOTED
	Publications ICAO publications and national aeronautical information publication shall reflect these procedures. Restrictions as to the use of SA CAT I and Other Than Standard CAT II operations shall be well indicated.	NOTED



04. DoOs-related comments provided by DGAC France

Reference	Your comments	Response (by the AWO Project Team)
5. DESCRIPTION OF SYSTEM COMPONENTS	It seems that the table from the "description of operations" p.20 is not completely consistent with this new ICAO runway classification : - it should be made clearer that there is no direct match between type A operations and non-precision approach runways : those runways are only meant for type A operations with a visibility higher than 1000 m.	ACCEPTED Added to Table 5.
	in the same way, it should be made clearer that there is no direct match any more between ILS operations and precision approach runways : operations conducted with an ILS may now be classified as type A if the corresponding minima are sufficiently high	ACCEPTED Added to Table 5.
	ILS critical areas are also to be protected for such type A operations, not only for type B operations.	ACCEPTED Protection of ILS-critical area moved to 'type A' row.
	the "aerodromes" column is not exhaustive with regard to IR-ADR requirements : for example, LVP shall also be in place for LVTO II operations, as it is the case for LVTO I.	See note: <i>The requirements for approach and take-off operations are cumulative, i.e. all the requirements of a lower class of operations must be satisfied in addition to the requirements listed for the specific category, unless the item is <u>underlined</u>. Items that are <u>underlined</u> do not apply to higher classification of operations.</i>
Other observations	the link between AWO project and RMT .591 "maintaining aerodrome rules", which is going to transpose ICAO Annex 14 recent amendments and in particular the new ICAO runway classification, should be clarified.	NOTED



05. DoOs-related comments provided by EUROCONTROL

Reference	Your comments	Response (by the AWO Project Team)
0. Executive Summay	STPA is mentioned in the summary on p.1, but the rest of the doucument does not clarify how it has been/will be used in the context of the proposed operations with operational credit	ACCEPTED Additional details will be added to the main text of the document. This will explain how the STPA methodology is to be used to validate the proposed requirements.
1. CONTEXT	STPA is mentioned in the context ("future requirements will be based on the outcome of this analysis"), but the rest of the document does not clarify how it has been/will be used in the context of the proposed operations with operational credit.	ACCEPTED This Chapter has been updated to explain that the STPA methodology will be used to validate the outcome of the rulemaking task RMT.0379. Further information on the application of the STPA methodology will be provided in Chapter 2.
	This section stresses the importance of the interactions between the different components of the AWO system. However there is no reference in Table 4 on p. 20 and Table 5 on p. 25 to air traffic control procedures / rules, nor are they even mentioned anywhere in the document especially in the AWO system description. This gives the impression that the approach is not fully addressing the total system and is very much focussed on some components of the AWO operations (the pilot and its on-board system).	NOTED Table 4 contains a section for ATM/ANS, but this needs to include more information on air traffic control/air traffic procedures. The AWO Project Team would be very grateful if EUROCONTROL could propose suitable text.
2. AWO SYSTEM DESCRIPTION	Albeit several sets of comments from the EUROCONTROL Agency experts in AWO involved in the process, there remains a number of key safety concerns in this section:	
	0. System development/system operation: it is quite surprising that air traffic controllers, airport authorities, ANSPs (responsible for the provision of the landing aids,	NOTED Air traffic controllers, airport authorities, ANSPs (responsible for the provision of landing aids, lighting, etc.),



<p>lighting, etc.), the Network Manager, airlines and also training centres, are not considered in the system operation.</p>	<p>the network manager, airlines and also training centres are clearly important parts of the system and most of these appear in the 'simplified systems operation structure' of Figure 6. The text will be updated to emphasise that these entities are important parts of the systems operation structure. The intention of the 'systems development/systems operation' diagram is to illustrate the distinction between systems development and systems operation. It is a gross simplification and does not include every aspect of the system operation structure nor does it identify individual system components.</p>
<p>1. Inconsistent definitions for accidents and hazards since these definitions are different from those used by ICAO and EU. This invalidates all the material in the document until a dedicated study analyses the gap and the propagated impact from the gap effects.</p>	<p>NOT ACCEPTED</p> <p>The definitions of 'accident' and 'hazard' relate to the STPA methodology, not to ICAO definitions. A footnote has been included to clarify this.</p>
<p>2. Comprehensiveness of the methodology - it does not look correct to investigate control processes without feedback loops from the environment. This is particularly important for aviation safety.</p>	<p>ACCEPTED</p> <p>The methodology considers feedback from controlled processes. There may also be external inputs to a process, for example from the external environment. The text will be amended to explain this.</p>
<p>3. Lack of transparency and traceability from the safety constraints derived from STPA to the system components and requirements. The way the hazard analysis resulted in the requirements for operations with credit is particularly unclear and it could be potentially dangerous. The description in table 5 can be</p>	<p>ACCEPTED</p> <p>The requirements for operations have not been derived from the hazard analysis; the hazard analysis will be rather used to 'validate' the proposed requirements by identifying unsafe control actions and relating these to the</p>



applicable to any value of RVR, DA/H, MDA/H. For example, there is no justification from the hazard analysis that would prevent SA CAT I to be conducted down to 50 ft RVR.	proposed 'safety constraints'. Text will be amended to explain this.
4. Concerns from the factual results - for example, aircraft staying within the movement area during landing and take-off is a necessary but not sufficient condition for safety (otherwise aircraft could all be safely landing and departing from the taxiways)	NOT ACCEPTED No single safety constraint is a 'sufficient condition' for safety. If applied correctly, the methodology will identify a set of constraints which, taken together, constitute a sufficient set of safety constraints.
5. The hazards do not correspond to the high level safety constraints There is no hazard for uncontrolled take-off but there is S7. It is not sure where S7 comes from and this gives the impression of some "reverse engineering" of the results. S3 is quite broad and could cover the need to consider mitigations against flying objects that would not be entitled (e.g. drones in the NO Go Zone area or others). Furthermore there is no requirement that justifies that S3 is met with the new operations introduced.	ACCEPTED The hazards and safety constraints will be updated to ensure a consistent correlation. S3 is indeed broad as any collision with a flying object would have an impact on safety.
6. Similarly, there is hazard (H6) for uncontrolled taxiing (not clear if it involves air taxiing of rotorcraft) but no corresponding high-level constraint. This looks like a lack of traceability at the very top of the argumentation.	ACCEPTED The safety constraints will be updated to include 'S6: <i>The aircraft shall be under control during taxiing.</i> ' The safety constraints apply to any type of aircraft.
7. Uncontrolled take-off run and take-off - not sure if they are considered	ACCEPTED The hazards will be updated to include 'H8 uncontrolled take-off'. Some stakeholders have found this to be a useful description.
8. Not sure where the information in Table 2 (DoO, p. 13) comes from. Also not sure if the definitions of functionality and continuity (in terms of the functionality) are correctly applied to content of the table.	NOTED The aim of the section on 'operational capabilities' is to describe what the 'total system' needs to do in order to be useful (rather than just



	safe). It is not central to the Project, but some stakeholders have indicated that the section is useful.
9. The text is quite unclear especially when it talks about system/systemic/... i.e. STAMP terminology and models. It eventually turned up to be nothing than a strawman of logical models as per standard system engineering, which is not appropriate to address the total system approach in its globality especially when considering human behaviours which is a crucial component of aviation safety. The operational capabilities attributes are confusing in the context of aviation as they consider well defined terms in a completely different sense. It is totally unclear how they are used in the setting of the safety requirements.	PARTIALLY ACCEPTED The STPA methodology has been developed by notable experts in the field of safety and has been subject to rigorous peer review. It has been applied in many contexts, but this is the first time it is applied to the development of aviation regulations. The text will be amended to clarify how the methodology will be used to validate the outcome of the rulemaking task RMT.0379.
10. There is a total disconnect between Section 2 of the DoO (which describes the AWO based on STAMP leading to the identification of Accidents, Hazards and safety constraints) and Section 4/ Appendix 1 describing SA CAT I and EVS/SVS operations. Indeed, SA CAT I and EVS/SVS operations are described without consideration of section 2. Appendix 1 should show an instantiation of the “generic” AWO model (control loop) to represent SA-CAT 1 and EVS/SVS models in order to identify the weak elements of these new Systems from a safety point of view.	NOTED It would not be practical to ‘show an instantiation’ since the overall system for AWOs is considered too complex to be represented in a single diagram. A hazard analysis for SA CAT I is proposed, but this has not yet been conducted. Once conducted, this hazard analysis may be used to validate the proposed requirements. The text will be amended to explain how the STPA methodology will be used to validate the proposed requirements.
Some further comments, still at a general level since some details of the method are not understood:	NOTED
From the description it is not clear how the method handles non-linear control loops, feed-forward/ lag elements and multiple nested loops – all being common in aviation systems and operations	NOTED A detailed description of the STPA methodology is beyond the scope of the DoOs document.
Figure 3 has formatting issues that make a review difficult.	NOTED



<p>In Figure 7 brakes are represented as manual actuators. Do autobrake systems need to be considered?</p>	<p>NOTED The diagram is illustrative, not exhaustive.</p>
<p>The “Operational Capabilities” section uses non-standard descriptions “Resilience, Functionality and Continuity”. Several issues exist with these designators:</p> <ol style="list-style-type: none"> 1) The definitions are not independent, as the terms are re-used in the following definition. Thus a loss of resilience always implies a loss of functionality, which implies a loss of continuity; 2) At least the continuity definition deviates significantly from accepted usage in aviation. This may lead to confusion; 3) Relevant performance criteria for aviation, such as error growth and time-to-alert, are not contained in the three definitions. Table 2 therefore does not completely represent the AWO operation. 	<p>NOTED The section on operational capabilities is not central to the Project and has been revised several times based on feedback and discussions. Other stakeholders have indicated that the section has value.</p>
<p>A rephrasing proposal using ICAO Annex 10 definitions of Accuracy, Integrity, Availability and Continuity made during the initial drafting phase should be considered again. Table 2:</p> <ul style="list-style-type: none"> - The term trajectory should be clarified to always pertain to position, speed vector, attitude and angular rates; - The notion of “timely warnings” is only present in the functionality line, Taxiing column. It should be extended to all phases as a critical element of operations with a guidance system; - In the Resilience line, Taxiing 	<p>NOTED See previous comment.</p>



	<p>column, not only following the route, but also being able to obey visual indicators (stop bars, etc.) should be indicated</p> <p>In the continuity line, instrument segment column, a new term “reliability” is introduced. What is the definition and difference from resilience?</p>	
3. CLASSIFICATION OF STANDARD OPERATIONS	OTS CAT II does not appear on figure 8. SA CAT I appendix mentions also SA CAT II but such operation does not appear either.	ACCEPTED OTS CAT II will be included in the next revision of the document.
	It should be clarified that Table 3 are the operations considered in the AWO project and may differ from ICAO definitions.	ACCEPTED The text will be updated to highlight the differences from ICAO definitions.
	Take off In Figure 8 the CAT I box should extend to larger RVR (open at top), many ILS CAT I operations are limited to RVR 800m or above.	ACCEPTED Chart will be amended.
	– It would be useful to explain why the 75m RVR value is proposed to be removed, rather than asking stakeholders to justify keeping the current limitation. This should further be substantiated in the list of new requirements.	NOTED If the decision is taken to remove the 75 m RVR value, then a justification will be provided. At the time of drafting, the AWO Project Team was investigating whether this is necessary or appropriate.
	The general section mentions LTS CAT I, OTS CAT II and SA CAT II. None of these are described in the rest of the document and are notably not part of the descriptions in section 3. It is not clear whether these will be retained, or removed or why SA CAT II, as new operation with operational credit, is not described.	ACCEPTED LTS CAT I, OTS CAT II and SA CAT II will be included in the next revision of the document.
4. CONCEPT OF OPERATIONS WITH OPERATIONAL CREDITS	It is crucial for the establishment of the safety requirements to clarify the changes to current operation as well as the deviations from existing alike operations.	ACCEPTED The text will be amended to clarify the changes that have been proposed to current operations.
	It looks like the concept of operation is just about the definition of operational credits.	NOTED
	Not clear why CAT I/ CAT II/ CAT III	NOTED



5. DESCRIPTION OF SYSTEM COMPONENTS

are limited to ILS operations whereas they are in Appendix 1.	CAT I/II/III are not restricted to ILS operations, although there are some specific requirements when ILS is used (e.g. protection of ILS-critical area).
For CAT III operations lots of requirements are missing (and can be found in CAT II).	See note: <i>The requirements for approach and take-off operations are cumulative, i.e. all the requirements of a lower class of operations must be satisfied in addition to the requirements listed for the specific category, unless the item is <u>underlined</u>. Items that are <u>underlined</u> do not apply to higher classification of operations.</i>
Procedures are essential parts in ensuring the acceptable level of safety. There is no reference to them. LTS and OTS are not listed in Table 5.	ACCEPTED LTS CAT I, OTS CAT II and SA CAT II will be included in the next revision of the document.
As already mentioned there is no link to the safety constraints and hazards listed in section 2 (AWO System Description, p.5) and the requirements listed here. It is therefore not possible to be sure that the system is complete. The EUROCONTROL Agency recommends therefore that traceability is ensured for each safety requirement, as it is the case in any safety assessment.	NOTED Further information on the application of the STPA methodology will be provided in Chapter 2.
The table should only contain requirements and therefore the word 'should' needs to be replaced by 'shall'.	ACCEPTED The word 'shall' shall be used now in the table.
Table 4: The ATC/ANS column should contain reference to cloud-level reporting.	Please provide a reference/justification for this.
The CAT III row still contains references to IIIa and IIIb. These should be replaced by DH/RVR values.	ACCEPTED Reference to CAT IIIB has been amended.
The protection of critical and sensitive areas should be mentioned where appropriate (ATM/ATS column).	ACCEPTED Note on the protection of critical and sensitive areas has been updated.
Lights switchover time requirements should be mentioned where required	ACCEPTED Maximum switchover times



(Aerodrome column)	added to Table 5 according to Annex 14.
<p>Table 5 (DoO, pp 25-27)</p> <p>SA-CAT I line ATM/ANS column: “ground-based navigation system shall meet the Annex 10 requirements for unrestricted CAT I ILS operation”. This would exclude SBAS and be misleading for GBAS which has different requirements from ILS. Annex 10 also does not contain requirements for operations, but rather technical performance levels. Conventions used in Annex 10 specify that coverage must be guaranteed (and tested) to half of the desired DH, which is missing here. The EUROCONTROL Agency proposes to replace current text by the following sentence: “The navigation system used shall meet the Annex 10 requirements for unrestricted CAT I performance level, including coverage to 50% of the desired decision height.”</p>	<p>ACCEPTED</p> <p>Updated to emphasise that this is only applicable where a ground-based navigation system is used.</p>
The visual aids paragraph must use “shall”, not “should” (if it is prescribed for CAT I, why is it only recommended for SA CAT I?).	<p>ACCEPTED</p> <p>‘Should’ shall be amended to ‘shall’ throughout Table 5.</p>
Bullets 1, 2 and 4 of the EVS case (below) should also apply in the SA CAT I case	<p>NOT ACCEPTED</p> <p>A published IAP is required for SA CAT I operations, hence it is not necessary to additionally specify that the aerodrome is eligible.</p>
<p>SA-CAT I line Air operations column: The statement on single pilot operations seems to imply that performance of a safety assessment is optional. The EUROCONTROL Agency proposes to rephrase as follows: “Single pilot SA CAT I operations could be permitted if a safety assessment demonstrates that they can be conducted as safely as CAT I operations.”</p>	<p>NOTED</p> <p>The question of whether single-pilot operations should be permitted is still open. This is not proposed as rule text. If single-pilot operations are to be restricted, then there needs to be a justification for this.</p>
<p>EVS line ATM/ANS column: “RVR information based on sensors shall be reported below 800m visibility”.</p>	<p>NOTED</p> <p>Please provide a reference/justification for this.</p>
Definition of “instrument runway”	NOTED



DEFINITIONS OF TERMS TO BE USED	contains same issue as in Annex 6: a) Covers Type A to visibility not less than 1000m b) Covers type B with visibility down to 800m Where does Type A with visibility between 999 and 800m belong (please see DoO, p. 16, Figure 8)?	A Type A approach with visibility below 1 000 m would require a precision approach runway.
	Can an operation with operational credit (EVS/CVS) be performed to a NPA runway (lights, switchover time)?	Yes (see AMC6 SPA.LVO.100).
	“stabilised approach” definition (DoO, p. 30) also should include “control of flight path and attitude”	NOT ACCEPTED This is the existing definition from Annex I to Commission Regulation (EU) No 965/2012. There is a direct relationship between attitude and flight path, but it is the flight path of the aircraft that determines whether the approach is stable.
	It would be useful to add the ICAO definition of the movement area as well as the landing area and to update accordingly the safety constraint S6 (DoO, Table 1, p.11) so that no take off or landing can take place on the taxiways.	NOT ACCEPTED A landing or take-off on taxiway is not a ‘hazard’ (according to the STPA methodology), unless it results in proximity to other aircraft or leaving the hard surface. It may be appropriate for certain operations (e.g. helicopters).
APPENDIX 1. OPERATIONS WITH OPERATIONAL CREDITS: SA CAT I	The statement “The initial proposal is based on the aim to develop a more demanding CAT I operation” should also be included in the body of the text (DoO, Section 4 –Overview, p.4).	ACCEPTED
	The GLS definition is not yet stable at ICAO and FAA level – both “GNSS Landing System” and “GBAS Landing System” are used. The EUROCONTROL Agency proposes to only use “Ground Based Landing System (GBAS)” in the text here to be aligned with Annex 10.	NOT ACCEPTED GBAS stands for ‘ground-based augmentation system’. This is the same term used in Annex 10.



Crosswind considerations section (DoO, p.36):

Crosswind limitations, runway width and Time-to-Alert are linked and are also linked to protection of the Obstacle Free Zone.

An aircraft experiencing a guidance failure 6s prior to 150ft DH at 15kt crosswind may drift laterally before the pilot can establish visual contact. As crosswind gradients close to the ground are often significant, the drift may be significant (with crosswind 15kts at 250ft to 0kts at 150 ft, the lateral drift over the 6s CAT I TTA may be 23m). This will bring the aircraft onto the shoulder of a 30m wide runway and to the edge of the 60m OFZ. At low RVR the pilot may also mistake the runway edge lighting for the centerline lights.

It is also noted that, while they formally meet the 6s TTA requirement, the technical differences between MLS, ILS, GBAS and SBAS result in a different actual behaviour of the signal-in-space (SIS): For ILS and MLS, SIS TTA is typically much shorter than specified, for GBAS CAT I it is 3s nominal with 6s not to exceed values, while for SBAS there are physical reasons which prevent SIS TTA from being shorter than 5s. The EUROCONTROL Agency is of the opinion that experience with one system cannot easily be transferred to another.

It is noted that the FAA SA-CAT I requirements require all three of OFZ protection, 150ft runway width and 15kt crosswind limitation.

FAA also requires lighting exceeding the CAT I requirements and has experience with ILS SA CAT I operation.

NOT ACCEPTED

These are valid comments and would need to be taken into consideration during certification of equipment in order to determine the crosswind limitation that should be included in the AFM.

(An aircraft experiencing a guidance failure 6s prior to DH would be expected to discontinue the approach if not visual with the runway environment.)

15 kt is an arbitrary figure and may not be appropriate for all combinations of aircraft and airborne equipment.

NOTED

It will be further assessed whether CAT I lighting is adequate for SA CAT I approach operations. EASA is going to propose minimum requirements for CAT I runways eligible for SA CAT I operations. The idea is that missing elements of CAT II



	have to be compensated for by on-board equipment.
The proposed EASA requirements remove all three limitations and retain basic CAT I lighting requirements, although prior experience cannot be leveraged. There is no evidence that sufficient data has been collected and analysis performed before the information is provided.	NOTED See previous response.
Single-pilot operations text (DoO, p.37) should be rephrased as in comment above and a safety assessment required.	NOTED The question whether single-pilot operations should be permitted is still open. This is not proposed as rule text. If single-pilot operations are to be restricted, then there needs to be a justification for this.
In the navigation system remarks section, "MLS" should be added, "localiser performance with vertical guidance (LPV)200" should be replaced by "SBAS CAT I" (see Annex 6 text for justification) and a remark added to indicate that that coverage is required to 50% of the decision height in line with Annex 10 convention.	NOTED
Visual aids section: the 1s switchover time from Table 5 is not repeated here. Please add.	NOT ACCEPTED Already included in Table 5.
Aerodrome surfaces section: Prior discussion in the expert group has shown the desire of ICAO to operate with protection of OFS (to replace the current OFZ) for all precision approaches, even if currently recommended (rather than required) by ICAO for CAT I. Given the crosswind discussion above, it may be of safety benefit to require OFZ protection for SA CAT I operations, like FAA and CASA current practice, until further assessment has been performed. This would also ease the cohesion between the different elements of aerodrome LVO, as no distinction between CAT II and SA CAT I	ACCEPTED



	approaches would have to be made from an airport operations viewpoint. In most cases the protection of ILS CSA will automatically include protection of the OFZ.	
	At this stage it should be made very clear that key assumptions are still under debate.	NOTED
APPENDIX 2. OPERATIONS WITH OPERATIONAL CREDITS: EVS/CVS	In the contextual part, the EUROCONTROL Agency shares the view that reference to the SESAR activity and results should be made.	NOTED
	In the intended use (DoO, p.43) there is no reference to SA CAT I being used with EVS/SVS. This differs from Figure 8 (DoO, p. 16). Please align the two parts of the document and justify.	ACCEPTED The text of 'overview of EFVS/CVS operations' will be amended to emphasise that EVS could be used with any classification of approach operations.
	Section on ATS (DoO, p.48): one currently practised implementation of LVO is "Only one aircraft or vehicle movement at a time", which could cover non-controlled aerodrome needs.	NOTED It is not clear how 'only one aircraft or vehicle movement at a time' could be implemented at non-controlled aerodromes.
Other observations	Since the proposed new European operations deviate from the current US and Australian's implementations and regulations, and are not part of ICAO provisions, the EUROCONTROL Agency recommends that additional testing, verifications and studies are performed with a view to justifying those differences without compromising safety. Based on those justifications, it is hoped that promulgation as European rules and ICAO new provisions will be possible.	NOTED



06. DoOs-related comments provided by IATA

Reference	Your comments	Response (by the AWO Project Team)
3. CLASSIFICATION OF STANDARD OPERATIONS	Agree that the new IR could be the occasion to simplify the LVTO classification. However, why not consider normal T/O above 400m, LVTO below 400m? That would be more consistent with the entire proposal.	NOTED The classification of low-visibility take-off (LVTO) was considered at length. For consistency across the different domains, it was thought to be valuable to have a common definition of 'low-visibility operations', and 550 m RVR is used in this definition. This means that take-off in RVR of less than 550 m is considered a 'low-visibility operation'. Having a single classification of LVTO using 550 m would have imposed an additional burden on aircraft operators with no safety benefit, hence the definition of LVTO has been subdivided into LVTO I and LVTO II. LVTO I (between 0 and 550 m RVR) will not require an operational approval whereas LVTO II will.
5. DESCRIPTION OF SYSTEM COMPONENTS	EVS : the way of determining minima should be assessed by the regulation and be standardized by the agency, to prevent any unfair treatment by NAA.	NOTED The aircraft operator is responsible for calculating the operating minima and should publish the method to be used in the operations manual (this is an ICAO standard). The methodology used will be based on AMC to be published by EASA and will take into account the technology used, characteristics of the aerodrome and environment, flight crew training, and limitations imposed by the State of the aerodrome, etc. Use of alternative criteria would require an operator to implement an alternative means of compliance (AltMoC) and to have this approved by its NAA.
APPENDIX 1. OPERATIONS WITH OPERATIONAL	"Air Operations and Flight Crew , <i>Use of SA CAT I instrument approach procedure (IAP) on approved aerodromes.</i>	NOT ACCEPTED The assumption has been made that for European aerodromes the IAP will be designed



Reference	Your comments	Response (by the AWO Project Team)
CREDITS: SA CAT I	<p>The flight crew shall use an IAP designed and an aerodrome suitable for the intended operation. For IAP with procedure design criteria significantly deviating from PANS-OPS criteria, the air operator shall conduct an operational assessment".</p> <p>The NAA ATM should be responsible for the assessment. The operational assessment is to be defined precisely by the agency. It is hardly acceptable to give that responsibility to operators.</p>	<p>according to PANS-OPS criteria. Some aerodromes outside Europe may not follow such criteria. The intention is to facilitate the use of such aerodromes by European operators where an equivalent level of safety can be achieved. This could be achieved by the operator by conducting an operational assessment. An NAA ATM outside Europe could not be bound by the proposed EU regulations.</p>
APPENDIX 2. OPERATIONS WITH OPERATIONAL CREDITS: EVS/CVS	<p>Air Operations and Flight Crew : <i>Establishment of aerodrome operating minima</i></p> <p>The air operator shall establish aerodrome operating minima based on the approved method for operations with operational credits.</p> <p>The competent authority shall approve the method for establishing aerodrome operating minima for operations with operational credits, and shall specify the lowest minima for such operations.</p> <p>How can we consider no unfair treatment will occur between operators of 2 different countries? Shall the agency standardize the approval? It is also a matter of commonality with the other types of low visibility operations. The lower minima should be set at EASA level.</p>	<p>NOTED</p> <p>The aircraft operator is responsible for calculating the operating minima and should publish the method to be used in the operations manual (this is an ICAO standard). The methodology used will be based on AMC to be published by EASA and will take into account the technology used, characteristics of the aerodrome and environment, flight crew training, and limitations imposed by the State of the aerodrome, etc. Use of alternative criteria would require an operator to implement an alternative means of compliance (AltMoC) and to have this approved by its NAA. EASA has an obligation, under Regulation (EC) No 216/2008, to conduct standardisation inspections of competent authorities and to report the results to the European Commission.</p>
Other observations	<p>FC qualification and training : Credits for training and checking for or from other LVOs need to be assessed.</p> <p>1/ This has to be assessed immediately, and credit must be given for SA CAT 1 provided the</p>	<p>ACCEPTED</p> <p>It will be for operators to develop training programmes in order to ensure that flight crews are competent to conduct LVOs. Flight crews would need theoretical training covering the</p>



Reference	Your comments	Response (by the AWO Project Team)
	<p>PRO SOP / SRP are the same. This is the only way we can consider that the costs will be maintained at an acceptable level for operators.</p> <p>The assessment could be (e.g) : The flight crew is trained to LVOs at the lowest acceptable minima (let's imagine CAT 3 no DH with autoland).</p> <p>That training gives credit to the crew for the SA Cat I provided the PRO are the same (autoland is the same job during CAT III and SA CAT I, and we suppose EVS is equivalent as well whatever the RVRs). LVTO is always trained as well to lowest minima, and once again it gives credit for the other possibilities.</p>	<p>knowledge requirements for each type of operation, but where the skills required are common between different classifications of operation or operational credits, then there would be no need for practical training to be duplicated. Where different technologies are used for different classifications of operations (e.g. autoland vs EVS), then different training programmes would be required.</p>
	<p>Can we confirm ATQP will permit credit for training, as it does for LVOs, and then permit an annual training instead of every 6 months?</p>	<p>NOTED</p> <p>ORO.FC.245 allows for the training and checking requirements for low-visibility operations to be included in the scope of ATQP. There is no intention to change this in the context of the AWO Project.</p>



07. RIA-related comments provided by AESA

Comments provided by: José M Ramírez Ciriza — AESA (Spain) — MAB Member

AWO — Explanatory note

Reference	Your comments	Response (by the AWO Project Team)
1. Procedural information	None	
2. Explanatory Note	None	
3. References	None	
Other observations	None	
	None	

DRAFT FOR CONSULTATION



AWO — Regulatory impact assessment (RIA)

Reference	Your comments	Response (by the AWO Project Team)
1. INTRODUCTION	None	
CONTEXT	None	
OBJECTIVES OF THE RULEMAKING TASK	None	
AIM OF THIS DOCUMENT	None	
RELATED DOCUMENTS	None	
2. ISSUE ANALYSIS	None	
CURRENT DEFICIENCIES	None	
AERODROME-RELATED STATISTICS	None	
ASSESSMENT OF OCCURRENCE DATA	None	
EU SURVEY ON AWOs	None	
BASELINE SCENARIO	None	
3. POLICY OPTIONS	None	
4. ANALYSIS OF IMPACTS	None	
SAFETY IMPACT	None	
ECONOMIC IMPACT	None	
ENVIRONMENTAL IMPACT	None	
SOCIAL IMPACT	None	
IMPACT ON GA AND PROPORTIONALITY ISSUES	None	
IMPACT ON BETTER REGULATION AND HARMONISATION	None	
5. CONCLUSION	None	
6. ANNEXES		
ANNEX I: CASE STUDY 'AERODROME — COST COMPARISON BETWEEN THE ADDITIONAL COSTS FOR SUPPORTING SA CAT I AND CAT II OPERATIONS'	None	
ANNEX II: CASE STUDY 'AERODROME — ADDITIONAL COST TO	None	



Reference	Your comments	Response (by the AWO Project Team)
SUPPORT OPERATIONS USING EVS/CVS FOR OPERATIONAL CREDIT'		
ANNEX III: CASE STUDY 'INSTRUMENT APPROACH PROCEDURE (IAP) DESIGN — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'	Define SA CAT II or delete the operation. Justification: The concept of SA CAT II is not defined.	ACCEPTED This case study will be anyway cancelled due to lack of data.
ANNEX IV: CASE STUDY 'AIR OPERATOR — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'	Define SA CAT II or delete the operation. Justification: The concept of SA CAT II is not defined.	ACCEPTED SA CAT II modified in CAT II.
ANNEX V: CASE STUDY 'AIR OPERATOR — ADDITIONAL COSTS FOR OPERATIONS WITH OPERATIONAL CREDITS BASED ON EVS'	None	
ANNEX VI: CASE STUDY 'AIR OPERATOR — COSTS OF WEATHER-RELATED DIVERSIONS'	None	
ANNEX VII: AERODROME STATISTICS (A3 FORMAT)	None	
Other observations	None	



AWO — Description of operations (DoOs)

Reference	Your comments	Response (by the AWO Project Team)
1. CONTEXT	None	
2. AWO SYSTEM DESCRIPTION	None	
3. CLASSIFICATION OF STANDARD OPERATIONS	None	
4. CONCEPT OF OPERATIONS WITH OPERATIONAL CREDITS	Define SA CAT II or delete the operation. Justification: The concept of SA CAT II is not defined.	Addressed in DoOs chapter of this CRD
	Specific operational credits should be needed in order to allow RVR under 75 m. Justification: Low-visibility taxiing and Low-visibility Take-off I & II have been classified as standard operations. The question is if operation with RVR under certain limits, should not require specific operational credits. It could not seem reasonable to accept RVR of 0 m for take off without any additional requirement, when nowadays minimum allowed is 75 m.	Addressed in DoOs chapter of this CRD
5. DESCRIPTION OF SYSTEM COMPONENTS	In case of SA CAT I one AFM reference should be addressed. Justification: Table 5 states that Aircraft shall be certified for SA CAT I, CAT II or CAT III as well as the automatic flight guidance system, but it does not clearly require that to be specified in the AFM as it is the case for EVS/CVS.	Addressed in DoOs chapter of this CRD
	Low visibility taxiing and LVTO should need a dedicated paragraph in table 5 similar to other operations. Justification: Since LVTO I, and II are considered standard operations, they have been included in table 4, along with the well known CAT I, CAT II and CAT III operations. As consequence they could	Addressed in DoOs chapter of this CRD



Reference	Your comments	Response (by the AWO Project Team)
	go unnoticed in relation with the more remarkable concepts of SA CAT I and EVS/CVS described in table 5. Moreover, Low-visibility taxiing that is included in table 3 as standard operation, is not even mentioned.	
	Include the description of system components for LTS CAT I and OTS CAT II. Justification: In order to have a full picture of the AWO possibilities it could be convenient to include the description.	Addressed in DoOs chapter of this CRD
6. COMMON DEFINITIONS OF TERMS TO BE USED	None	
APPENDIX 1. OPERATIONS WITH OPERATIONAL CREDITS: SA CAT I	None	
APPENDIX 2. OPERATIONS WITH OPERATIONAL CREDITS: EVS/CVS	None	
Other observations	Compare requirements for LVTO and Low-visibility taxiing between EASA and FAA/CASA. Justification: In order to define operational requirements for new LVTO rules a comparison between EASA and FAA/CASA should be appreciated in the same way than other operations.	Addressed in DoOs chapter of this CRD



08. RIA-related comments provided by Airbus

Commenter: Joelle Monso (Airbus)

AWO — Explanatory note

Reference	Your comments	Response (by the AWO Project Team)
1. Procedural information	<ul style="list-style-type: none">• Regulatory impact assessment: the RIA was developed on the basis of a questionnaire that participating stakeholder specialists had to complete within a short deadline, which could not be met by all due to necessary internal coordination. As a result, the RIA presented in consultation 1 is incomplete (in particular it does not include the airbus business case data provided by Airbus the 7th of July 2016).• Description of operations: compared to the conventional methods of safety assessment, this “Description of Operations” is an intermediate step toward the “Operational Service Environment Description” to be developed for the SA-CAT 1 operations and the EVS/CVS approach operations. However, to develop a complete set of functional, safety and performance requirements at cross-domain components level which will be then transposed into the respective NPAs, there is still some work left to do:<ul style="list-style-type: none">○ the operational environment needs to be defined (aerodrome traffic density, separation between aircraft, missed approach (RNAV, RNP), aerodrome installations), MET Services, etc ...○ the functional requirements as presented in the DoOs	<p>NOTED</p> <p>The information provided by Airbus on 7 July 2016 has been taken into consideration and the RIA has been updated accordingly.</p>



Reference	Your comments	Response (by the AWO Project Team)
	<p>needs to be further consolidated and expanded to enable an understanding of the interactions between the many different systems and actors involved in these operations with operational credits.</p> <ul style="list-style-type: none">○ The safety and performance requirements need to be derived from operational safety objectives using a model representative of the physical implementation.○ The traceability between the high level objectives, such as “the aircraft shall be under control and maintain adequate separation” and the certification requirements is not clearly established (Certified FMS & EVS/CVS). The certification and functional requirements as presented in the DoOs seem more linked to people’s experience, common sense and wisdom rather than derived from the proposed methodology. <ul style="list-style-type: none">● Hazard assessment: as we have said from the outset, there is no visibility on how the STAMP/STPA method is validated and applied to the SA-CAT 1 operations and EVS/CVS operations with operational credits. The functional & Certification / Approval requirements for the cross-domains: Airworthiness, Air Operations and ATM/ANS / Aerodromes are therefore derived without clear link to the methodology. For a topic of such criticality, proof of concept with real use case applied to aviation domain	



Reference	Your comments	Response (by the AWO Project Team)
	<p>shall be provided before retaining STAMP/STPA method for the AWO project.</p> <ul style="list-style-type: none"> • Rule Development: As the DoOs to be taken as the common reference was not sufficiently clear to avoid differing interpretations, there is concern that the IRs, AMC/GM/CS are not harmonized and consistent. • Working method: The timeframe is extremely ambitious, considering the span and the complexity of the subject. Involved Airbus Specialists are doing their best to provide timely responses during the drafting phase, but cannot always be available to answer requests upon short notice. This difficulty is amplified by the need to coordinate the work internally within Airbus. Maybe due to the work organization using virtual meetings and a server, the Airbus Specialists have difficulty to fully see the overall consistency of the project. To be aware of face to face meeting invitation by EASA is a treasure hunt game (sic workshop on interim CS-AWO). In addition, there is no update cycle of published document on Yammer leading sometime to daily changes that do not allow a deep analysis of all the published material. 	
2. Explanatory Note	<p>2.4 Summary of the “Description of Operations”</p> <p>The interactions of the components between the different domains resulting from the STPA method are not fully taken into account. The functional model is merely outlined but it needs to be further developed to address the CNS/ Human actors interactions based on logical model more representative of the physical</p>	Addressed in DoOs chapter of this CRD



Reference	Your comments	Response (by the AWO Project Team)
	<p>implementation.</p> <p>It sounds good to favour the “operational credit” instead of creating a new approach category. This allows keeping full consistency with ICAO Annex 6.</p> <p>The concept of operations with standard minima despite the absence of some performance items normally required is not clearly defined in the DoOs.</p>	
3. References		
Other observations		



AWO — Regulatory impact assessment (RIA)

Reference	Your comments	Response (by the AWO Project Team)
1. INTRODUCTION		
CONTEXT		
OBJECTIVES OF THE RULEMAKING TASK		
AIM OF THIS DOCUMENT	We recommend to complete the case studies considering the Airbus answers to the questionnaire on the airborne equipment. In particular it has to be noted that 100% of the Airbus aircraft delivered from 2015 onward are equipped with the autoland.	ACCEPTED Relevant text has been amended.
RELATED DOCUMENTS		
2. ISSUE ANALYSIS		
CURRENT DEFICIENCIES	It is worth noting that the current rules do not sufficiently address the full potential of the autoland, which is too often associated to CAT 3 operations.	ACCEPTED Reference has been added on page 5. Autoland is an important element to enable SA CAT I operations.
AERODROME-RELATED STATISTICS		
ASSESSMENT OF OCCURRENCE DATA		
EU SURVEY ON AWOs		
BASELINE SCENARIO		
3. POLICY OPTIONS		
4. ANALYSIS OF IMPACTS		
SAFETY IMPACT		
ECONOMIC IMPACT		
ENVIRONMENTAL IMPACT		
SOCIAL IMPACT		
IMPACT ON GA AND PROPORTIONALITY ISSUES		
IMPACT ON BETTER REGULATION AND HARMONISATION		
5. CONCLUSION		



Reference	Your comments	Response (by the AWO Project Team)
6. ANNEXES		
ANNEX I: CASE STUDY 'AERODROME — COST COMPARISON BETWEEN THE ADDITIONAL COSTS FOR SUPPORTING SA CAT I AND CAT II OPERATIONS'		
ANNEX II: CASE STUDY 'AERODROME — ADDITIONAL COST TO SUPPORT OPERATIONS USING EVS/CVS FOR OPERATIONAL CREDIT'		
ANNEX III: CASE STUDY 'INSTRUMENT APPROACH PROCEDURE (IAP) DESIGN — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX IV: CASE STUDY 'AIR OPERATOR — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX V: CASE STUDY 'AIR OPERATOR — ADDITIONAL COSTS FOR OPERATIONS WITH OPERATIONAL CREDITS BASED ON EVS'		
ANNEX VI: CASE STUDY 'AIR OPERATOR — COSTS OF WEATHER-RELATED DIVERSIONS'		
ANNEX VII: AERODROME STATISTICS (A3 FORMAT)		
Other observations		



09. RIA-related comments provided by EUROCONTROL

Commenter: Jean-Marc Roussot (EUROCONTROL focal point for EU Surveys)

AWO — Explanatory note

Reference	Your comments	Response (by the AWO Project Team)
1. Procedural information	<p>In terms of process our major comments are:</p> <ul style="list-style-type: none">• Briefings and webex conferences have been organised regularly and it has been a challenge for the EUROCONTROL experts in AWO matters to join them all. However, considering the importance of the subject, the Agency managed to be represented at most of these events, contrary to many other nominated experts from the stakeholder community. Consequently, although the number of nominated people was large, not so many could participate regularly.• It should also be stressed that the AWO project, which aimed primarily at focussing on the cross sectors activity, was unfortunately organised in 3 major clusters functioning independently, at least at experts level. A first face to face meeting in June has offered an excellent opportunity to bring more people around the table.• Contrary to other RMT activities, the extremely short delay given this time for reviewing documents (from a few hours only to just a few days) did not allow the development of elaborate proposals.• The second face to face was inappropriately organised on the National Day of the State where the EUROCONTROL Agency operates its R&D centre, thus preventing a number of its experts to participate	<p>NOTED</p> <p>An EASA–EUROCONTROL meeting may be organised with the aim to capture perceived open issues.</p> <p>The 2016 AWO Workshop (2,5-day event) might be the first next opportunity to address cross-domain issues. EASA will try to reflect in this event with external experts the experience gained at weekly internal cross-domain meetings.</p> <p>As regards the focused consultation to be launched soon, we should do our best to capture and compensate for eventual missed indications from the experts community.</p> <p>EN and RIA comments: ACCEPTED.</p> <p>The Terms of Reference (ToR) and Concept Paper RMT.0379 Issue 1 on 'AWOs' were officially published on 9 December 2015 on the EASA website at http://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/tor-concept-paper-rmt0379.</p>



Reference	Your comments	Response (by the AWO Project Team)
	<p>to the event.</p> <ul style="list-style-type: none">Several comments, sent by our experts to further improve RMT document quality and remove some of the safety issues that it contained, have not been taken on board and are therefore proposed again in this CRD. <p>More specifically, on page 1 of the Explanatory Note, the Applicability section refers to the AWO concept paper and to Chapter 9, but no such document(s) is provided.</p> <p>Finally, the <u>regulatory impact assessment does not only assess the policy options but makes a recommendation on the best option according to well established criteria.</u></p> <p>Please amend accordingly the first bullet of the explanatory note (p3).</p>	<p>NOTED</p> <p>NOTED EASA would like to organise further bilateral meetings.</p>
2. Explanatory Note	<p>The explanatory note does not explain how, with the new types of operations which are not part of the existing ICAO provisions, the proposed rules can be aligned with ICAO SARPS and ICAO documents. At least a way forward to achieve that objective (given in section 2.2 on p7) should be provided.</p> <p>More detailed comments on the RIA are provided in the RIA section below but the major issue is that the proposed options do not offer really a choice in regulation but intend to justify the AWO project which should not be the purpose of a RIA. Hence, Option 0 which considers a non alignment</p>	<p>ACCEPTED Wording in EN amended.</p>



Reference	Your comments	Response (by the AWO Project Team)
	<p>with ICAO is a 'no option' by definition. Option 2, which requires a mandate, is also a 'no option': given the wide CAT II/III fleet and infrastructure capability, as well as the equipment cost, a mandate would not be justifiable in terms of overall costs. Option 1 appears therefore the only option, thus no real choice is provided in this RIA. Nevertheless within Option 1, there are 4 major actions : alignment with international standards, better European regulations and the introduction of 2 new types of operations. The first two actions are essential regarding the European regulatory framework, thus they are seen as mandatory. The two other actions require more in depth discussions but, as no mandate is requested, their cost is limited to the regulatory development. Nevertheless one could perhaps argue that EASA would be using more effectively its expert resources if it was working on operations that deliver higher benefits to Europe. But this has not been considered in the RIA, and the proposed AWO operations have not been challenged against other operations giving more weight to the RIA. Regarding the description of operations (DoO) for which more comments are provided in the appropriate section of the present CRD, the document does not, despite its title, describe at all any such operation. It only contains some elements of a safety methodology, as well as a table of requirements covering the four main areas. The EUROCONTROL Agency therefore shares the view that the following four specific points need to be addressed with appropriate expert attention:</p> <p>1/ There are strong deviations from ICAO including the hazards and accident definitions;</p> <p>2/ The set of requirements is still not fully complete nor justified at this stage. It is therefore unclear why such a document is published at this stage since it could affect confidence in the future development of rules and AMC/GM.</p>	<p>NOTED</p> <p>It will be addressed in the next main revision of the RIA taking into account additionally obtained data (considering that the development is still in progress).</p>



Reference	Your comments	Response (by the AWO Project Team)
	<p>3/ AWOHARC is not a regulator per se (p6, section 2.1, last bullet) since it is a FAA rulemaking committee and, hence, forms part of the FAA structure.</p> <p>4/ The three options identified in the RIA (p7, section 2.3) As regards aerodrome investments “60% of these CAT I aerodromes could support operations with significantly lower operating minima without major infrastructure investments”. The DoO already contains lighting power supply requirements, RA area requirements, LVP requirements, with OFZ and runway width requirements being commented on. In this context it would be useful to indicate which infrastructure investments are referred to here.</p>	
3. References	It would be valuable to reference the SESAR work on EVS/ CVS which provides useful material on aerodromes requirements for such type of operations and contributed to the development of the operational description.	ACCEPTED Reference will be made to the SESAR work on EVS/ CVS, which provides useful material on aerodrome requirements for such type of operations.
Other observations	The work, be it in the explanatory note, the RIA or the description of operation, does not make clear that the SA CAT I operations in particular deviates from the SA CAT I operations currently in operation in the US and in Australia. The EUROCONTROL Agency is of the opinion that such deviation would require additional justifications / studies / simulations / ICAO agreement that have not been presented nor envisaged at this stage in the document.	NOTED



AWO — Regulatory impact assessment (RIA)

Reference	Your comments	Response (by the AWO Project Team)
0. Executive Summary	<p>Please see in section 'Policy options' below the EUROCONTROL Agency comments on the identified options as presented in RIA p1.</p> <p>The statement "Lower minima would also benefit ANSP's by offering more flexibility in selecting the most efficient arrival patterns to maximise arrival rates in reduced visibility conditions" is not substantiated elsewhere in the document. For this reason it should be deleted.</p>	<p>NOTED</p> <p>Kept for the time being as it is considered to be self-explanatory.</p>
1. INTRODUCTION	<p>Given the fact that only one option can be retained, a very light argumentation seems sufficient. The commented document could have therefore been reduced to a few pages. Nevertheless the EUROCONTROL Agency points that the thorough analysis made by its AWO experts on the potential operational benefit for the network has not been fully taken into account.</p>	<p>NOTED</p>
CONTEXT		
OBJECTIVES OF THE RULEMAKING TASK	<p>There are no issues 'outlined above', i.e. in the Context part (p 4). Please amend existing text.</p> <p>As alignment with ICAO is a specific objective of this project, it cannot be considered as an option in the regulatory options assessment and selection.</p> <p>Moreover, referring to the third item (p 4): the current formulation does not reflect the fact that harmonisation with ICAO SARPS is an obligation for ICAO member states.</p>	<p>ACCEPTED</p> <p>Changed to 'below'.</p> <p>The proposed options could fulfil an objective to a different extent. ICAO SARPs are not mandatorily fully transposed into national law.</p>
AIM OF THIS DOCUMENT		
RELATED DOCUMENTS		
2. ISSUE ANALYSIS		
CURRENT DEFICIENCIES	<p>The current deficiencies are about the existing rules, which is key. However the document lacks the description of the operational issues and benefits that are expected from the RMT. The description would help introduce the various areas</p>	<p>NOTED</p> <p>Descriptions are provided in the 'Description of operations' (DoOs) document.</p>



Reference	Your comments	Response (by the AWO Project Team)
	against which the operations are assessed (safety, environment , economy, etc.) and justify better the introduction of these new types of operations.	
AERODROME-RELATED STATISTICS	<p>The EUROCONTROL Agency is of the opinion that measuring the number of instrument approach procedures is misleading. Instead, measuring the number of affected runway ends would be more relevant. Moreover, it is to be noted that one runway end may be part of multiple procedures (MLS, ILS CAT I, ILS CAT II/III, SBAS and/or GBAS), thus creating the risk of double counting.</p> <p>Navigation aid labelling:</p> <ol style="list-style-type: none">1) MLS is CAT III2) The document is not clear as to whether the number of GLS is about procedures or Navaids. In case the number of GLS is about Navaids, they should be referred to as GBAS, not GLS. <p>Please see previous comment made on infrastructure investment at aerodromes. How are “major investments” (P.7) or “significant infrastructure investments” (P.8) defined?</p> <p>P.7: “... could use SA CAT I as a backup solution in case CAT II/III facilities are downgraded or fail.” Please delete “or fail”.</p> <p>If the navaid fails, the approach is not available for any minima. In this case another navaid will need a separate approach procedure and related infrastructure.</p> <p>Although a reduced number of deviations and lower minima should become possible with SA CAT I and SVS/CVS operations at a number of aerodromes in Europe, the assumptions made in the document concerning these new systems are too optimistic. For example thunderstorms are a major cause of deviation due to weather. They have not been taken into account when assessing the impact of deviation due to weather. The EUROCONTROL Agency confirms that it conducted an in depth analysis to help the development of this RIA. The percentages of airports which would potentially benefit from those operations is</p>	<p>ACCEPTED</p> <p>Wording amended.</p>



Reference	Your comments	Response (by the AWO Project Team)
	<p>not substantiated. Nor is there any reference to the impact of the geographical location of the airport.</p> <p>There is also no information regarding the existing fleet or impact of non European operators in the case of a mandate.</p> <p>Due to the proposed options, as discussed above, any analysis - in depth or not, would conduct to the selection of the same regulatory option. The EUROCONTROL Agency believes that this is an intrinsic shortcoming of the method and that it is worth being reviewed.</p>	
ASSESSMENT OF OCCURRENCE DATA	<p>The argument used for weather-related diversions is incomplete. The weather-related diversions include wind-related diversions, visibility-related diversions and other causes of diversions. A EUROCONTROL study based on 18 months of data (please see also comments on Annex VI) attributes much lower numbers to visibility-related diversions. An extension of this study to cloudbases between 100 and 200ft and RVR between 200m and 550m indicated that, over all European aerodromes, approximately 12 diversions per year (about 2% of all weather-related diversions) are due to visibility limitations where operational credit is relevant. For this reason the number of diversions, i.e. 1.808, would have to be replaced by a figure of about 60 diversions in the 2011-2015 timeframe where operational credit could have made a difference.</p> <p>Note 9 on p.8 is related to go-arounds and should be moved one line lower.</p>	<p>ACCEPTED</p> <p>Note 9 changed.</p>
EU SURVEY ON AWOs		
BASELINE SCENARIO		
3. POLICY OPTIONS	<p>The choice of a baseline scenario without alignment with ICAO SARPS is not in line with the obligations of ICAO member states. Mandatory ICAO alignment should be part of all three scenarios.</p> <p>Only option 1 can be considered as a real option. This therefore makes the RIA of little</p>	<p>NOTED</p> <p>Considering the role of ICAO SARPs; regulatory material is typically always developed in line with the ICAO SARPs however, it might well be that alignment would not provide the best option for</p>



Reference	Your comments	Response (by the AWO Project Team)
	value. The RIA would have been more convincing and conclusive if one of the options had involved CAT II/III capability, notably the GNSS CAT II/III capability. It is not clear what type of mandate is being proposed in section 2 (p.10), in particular whether this is a local or regional mandate.	industry, and through the case of temporary notified differences alignment might be achieved through the adequate modification of the ICAO regulatory material.
4. ANALYSIS OF IMPACTS	The analysis is a mixture of economic/operational/pretended safety impact assessments. However it is so far a set of statements without supporting evidence.	NOT ACCEPTED Evidence is present in the case studies and it has been added in the main text. Evidence has been requested but sometimes feedback obtained was poor.
SAFETY IMPACT	It does not seem possible to validate any claims of (absence of) safety impacts without having the support of an explicit and documented safety assessment. Option 0, overall system (p.11): safety benefits from improved system performance can only be expected if operational minima stay unchanged. If minima are lowered, it can be expected that an equivalent level of safety is achieved at these lower minima. Option 0, which allows new systems, but does not allow lower minima, may increase safety, while options 1 and 2 maintain safety at the lower minima. This argument is already used in the overall system section. The safety benefit is also attributed to pilot and ATCO's better situational awareness. But the situational awareness is not used to lower the operating minima. Furthermore, safety records have shown undoubtedly that the increase of automation has enhanced significantly aviation safety levels. The EUROCONTROL Agency is therefore of the opinion that the RIA should justify why more manual operations would be safer than automated systems.	NOTED To be taken into consideration as overall view. Conclusions of the hazard identification and risk assessment activities, which are in progress, should provide appropriate answers.
ECONOMIC IMPACT	Benefit (option 1 and 2) to air operators must be corrected in line with comments on Occurrence data previously mentioned and Annex VI below. The benefit of shorter routings cannot be claimed unless further measures, such as the approach ban, improvements in the ICAO flight plan and METAR coding, are	NOTED New assumptions have been considered in the revised calculation, also taking into account this comment.




Reference	Your comments	Response (by the AWO Project Team)
	<p>considered. The total cost saving will have to be corrected downward (an initial estimate of the reduction is about 2% of the currently stated value).</p> <p>In the ANSP section (Option 1 and 2) “significant investment” in infrastructure and data systems (e.g. lighting power switchover, LVP, METAR, RA area, flight plan processing) would need to be further defined.</p> <p>Once again, it would have been valuable to include GNSS CAT II/III in the comparison.</p>	
ENVIRONMENTAL IMPACT	Here also, it would have been valuable to include GNSS CAT II/III in the comparison.	NOTED
SOCIAL IMPACT	The argumentation seems biased and weak because any other technology would bring the same benefits. Moreover, the reason why there is a social impact in bringing less automation in the cockpit should be explained. The reason for this request for explanation from the EUROCONTROL Agency stems from the observation of an indisputable trend, namely the generalisation of automation, e.g. fully autonomous air vehicles without pilot or, at least, air vehicles still with pilots but with a different role.	NOTED
IMPACT ON GA AND PROPORTIONALITY ISSUES	For EVS/CVS, the number of go-arounds will really depend on the quality of the system to operate under actual all-weather conditions. The RIA is not addressing this uncertainty at all, nor does it refer to the special requirement of table 5 (DoO, pp. 25-27) that would mitigate that risk.	NOTED
IMPACT ON BETTER REGULATION AND HARMONISATION	The introduction of SA CAT I creates a deviation from the ICAO provisions. The way this deviation is to be addressed in terms of harmonisation between Europe and ICAO would therefore need to be discussed.	NOTED The intention of the task is to develop new regulatory framework enabling the use of adequate technology and which should become part of the ICAO regulatory system (as envisaged in the project development for the second half of 2017).
5. CONCLUSION	The safety promotion actions are proposed in the conclusion with no justification. The table on p. 24 must be adapted in line with the comments above.	ACCEPTED Statement on page 25 has been deleted.



Reference	Your comments	Response (by the AWO Project Team)
6. ANNEXES		
ANNEX I: CASE STUDY 'AERODROME — COST COMPARISON BETWEEN THE ADDITIONAL COSTS FOR SUPPORTING SA CAT I AND CAT II OPERATIONS'	Annex I on RIA p. 25: it would have been a useful case if a CAT II option had been considered. The reason why this case is made for is unclear. It does not seem to bring much added value to justify option 1.	ACCEPTED Case study has been deleted.
ANNEX II: CASE STUDY 'AERODROME — ADDITIONAL COST TO SUPPORT OPERATIONS USING EVS/CVS FOR OPERATIONAL CREDIT'		
ANNEX III: CASE STUDY 'INSTRUMENT APPROACH PROCEDURE (IAP) DESIGN — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX IV: CASE STUDY 'AIR OPERATOR — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'	Throughout this Annex, CAT, SA CAT I, CAT II, SA CAT II are used in a confusing manner. Part of the Annex seems to suffer from “cut-and paste” use. In its present form Annex IV is not clear enough to understand fully the operations targeted by this new regulation.	
ANNEX V: CASE STUDY 'AIR OPERATOR — ADDITIONAL COSTS FOR OPERATIONS	One instance of “SA CAT II operations” on RIA p. 31 (middle of the page) will have to be replaced by “EVS operations”	ACCEPTED



Reference	Your comments	Response (by the AWO Project Team)																												
WITH OPERATIONAL CREDITS BASED ON EVS'																														
ANNEX VI: CASE STUDY 'AIR OPERATOR — COSTS OF WEATHER-RELATED DIVERSIONS'	<p>Additional analysis was performed after initial review of the RIA and has led to the EUROCONTROL document “Airport weather-related diversions2.pdf”, published on the yammer site. The analysis concludes that SA CAT I relevant conditions were present in 1-3 diversions per year. Extending the study to all operational conditions relevant for operational credit, this number – after extrapolation to all ECAC airports, rises to about 12 relevant diversions per year (the study ran over 18 months), which represents about 2,12% of all weather related diversions. A summary table similar to those shown in the attached document can be found below.</p> <table><tr><th></th><th>EDDF</th><th>EHAM</th><th>EGLL</th><th>LTBA</th><th>LSZH</th><th>Total (extrapolation)</th></tr><tr><td>Weather diversions where: 200ft>Cloudbase>=100ft 550>=RVR>200m</td><td>1</td><td>0</td><td>0</td><td>0</td><td>4</td><td>16,06</td></tr><tr><td>Total number weather diversions</td><td>49</td><td>87</td><td>25</td><td>43</td><td>32</td><td>758</td></tr><tr><td>Percentage</td><td>2,04</td><td>0,00</td><td>0,00</td><td>0,00</td><td>12,50</td><td>2,12</td></tr></table> <p>Figure 2 on RIA p. 33 should be updated accordingly: 16 instead of 758 total diversions, with the financial figures updated accordingly. The final amount should be significantly below 1 MEUR.</p>		EDDF	EHAM	EGLL	LTBA	LSZH	Total (extrapolation)	Weather diversions where: 200ft>Cloudbase>=100ft 550>=RVR>200m	1	0	0	0	4	16,06	Total number weather diversions	49	87	25	43	32	758	Percentage	2,04	0,00	0,00	0,00	12,50	2,12	<p>NOTED</p> <p>New assumptions have been considered in the revised calculation, also taking into account this comment.</p>
	EDDF	EHAM	EGLL	LTBA	LSZH	Total (extrapolation)																								
Weather diversions where: 200ft>Cloudbase>=100ft 550>=RVR>200m	1	0	0	0	4	16,06																								
Total number weather diversions	49	87	25	43	32	758																								
Percentage	2,04	0,00	0,00	0,00	12,50	2,12																								
ANNEX VII: AERODROME STATISTICS (A3 FORMAT)	<p>There are differences in affected runway ends between the presented data and EUROCONTROL data. All significant differences are already contained in our comments to section 2.</p>																													
Other observations	<p>The EUROCONTROL Agency had proposed a more in depth analysis of the deviations in the network dues to All weather operations. Please find attached the file containing the</p> <div><p>Airport weather-related dive</p></div> <p>conclusions of the analysis.</p>																													



10. RIA-related comments provided by IATA

Commenter: IATA

The new proposal has the advantage to bring in Europe some procedures already in use in different parts of the world (e.g. US and Australia).

On a tech side:

Concerns are expressed about the possibility to authorize AUTOLand without requesting a complete RWY protection area in order to prevent LLZ disturbance and possible Loss Of Control at touchdown in bad weather conditions.

Therefore, IATA strongly recommend to **require airports with SA CAT 1 to activate in all cases RWY protection area to prevent any disturbance and possible LOC-I or lateral RWY excursion.**

Same concern could be raised concerning Obstacle free zone (OFZ) that are not required for CAT 1 operations.

EASA response — IATA comments: NOTED

EASA accepts the IATA recommendation to protect ILS signal for SA CAT I approach operations. Furthermore, the establishment of OFZ will be required for CAT I runways supporting SA CAT I approach operations.

In a general manner, requesting the SPA, and give the responsibility to operators is a good idea, provided the conditions for the approval do not depend on NAA but are **standardized**. This is not the case, and most of the airport certification is to be handed over to air operators.

Response:

The aerodrome will be certified for the type of operations based on the design characteristics, infrastructure available, and operational procedures. EASA intends to provide a minimum set of requirements for aerodromes to support such operations. Missing elements have to be compensated for by on-board systems and operational procedures of the aircraft operator.

p46 of DoOs, the Air operator should specify a method for establishing minima. Should we consider the risk is high to have great differences between two different operators on the same RWY ?

As well, p47 : the operator is to establish the balked landing procedure ? Shouldn't be the Airport authority/NAA responsibility for new SA CAT 1 ?

Response:

The aerodrome operator has to establish the OFZ, which includes the balked landing surface.

And we hope we shall not authorize LVPs to not controlled airports, as it is supposed to be further assessed (p48).

Response: NOTED

LVTO (p17) : if we consider LVTO below 550m, it is going to be more simple. That's good. Therefore, why the double classification LVTO I and LVTO II. LVTO is unique, and minima should be performance based. No need to build further classification.



Response:

From the aerodrome operator and ATS provider point of view, any take-off operation below an RVR of 550 m is considered as LVTO. For the purpose of air operations, the difference is that LVTO II requires specific authorisation.

Crew training side:

The Air operator is responsible for the initial and recurrent training. Ok. let's do it. But how? and how much ?

I) The amount of training considered by the RIA p 29 is.... optimistic. If we have to provide a complete and recurrent training for the SA CAT 1, it will take more than 20' per pilot twice a year, considering the high number of different operations to be trained (usual LVOs, SA CAT 1, LVTO1 and 2, balked landing etc).

II) Credit for training and checking for or from other LVO's need to be assessed (DoOs p37) NOW !

I is therefore proposed the following:

The flight crew is trained to LVOs at the lowest acceptable minima (let's imagine CAT 3 no DH with autoland).

That training gives credit to the crew for the SA Cat I **provided the PRO are the same** (autoland is the same job during CAT III and SA CAT I, and we suppose EVS is equivalent as well whatever the RVRs).

LVTO is always trained as well to lowest minima, and once again it gives credit for the other possibilities.



AWO — Explanatory note

Reference	Your comments	Response (by the AWO Project Team)
1. Procedural information		
2. Explanatory Note		
3. References		
Other observations		

DRAFT FOR CONSULTATION



AWO — Regulatory impact assessment (RIA)

Reference	Your comments	Response (by the AWO Project Team)
1. INTRODUCTION		
CONTEXT		
OBJECTIVES OF THE RULEMAKING TASK		
AIM OF THIS DOCUMENT		
RELATED DOCUMENTS		
2. ISSUE ANALYSIS		
CURRENT DEFICIENCIES	<p>The deficiencies outlined by the RIA do consider new equipment, but are not considering future technical developments.</p> <p>It would be profitable to give enough space for the next gen equipment by including a provision in the IR for any tech improvement in the future on the basis of NAA agreement.</p>	<p>NOTED</p> <p>The primary objective of the AWO Project is to enable new technologies and to avoid future amendments to implementing rules as a result of new technologies/new types of operations entering the market.</p> <p>Therefore, the new requirements in SPA.LVO generally enable operations with credits.</p>
AERODROME-RELATED STATISTICS		



Reference	Your comments	Response (by the AWO Project Team)
ASSESSMENT OF OCCURRENCE DATA	<p>1/ Along with given data, it would be appreciated to have, for diversion figures, the cases where the new SA CAT1 would have prevented diversion. E.g.: with a weather report stating RVR 100m or ceiling 100ft, the SA CAT 1 would have been no help.</p> <p>2/ According to options given, most accidents could be considered as the result of a continued approach without sufficient references.</p> <p>The use of new systems is likely to reduce the acceptable RVR/ceiling, but do not address the main safety subject: Go around will always have to be performed in case of insufficient visual clues.</p>	<p>NOTED</p> <p>The quality of the current set of data does not allow to draw further reliable conclusions, at least for the moment.</p> <p>NOTED</p> <p>Addressed in the new training requirements.</p> <p>Needs clarifications.</p>
EU SURVEY ON AWOs		
BASELINE SCENARIO		
3. POLICY OPTIONS		
4. ANALYSIS OF IMPACTS		
SAFETY IMPACT		



Reference	Your comments	Response (by the AWO Project Team)
ECONOMIC IMPACT	<p>Is it really a need for the industry in Europe? Regarding the cost of equipment per aircraft and the training cost for flight crews, what are the benefits to be expected?</p> <p>Without the figures requested above (how many diversion would have been prevented with SA CAT1), the economic impact is hardly evaluable and the 33+ M€ given as example is not relevant.</p>	<p>NOTED</p> <p>The main objective is to enable it while markets will tell whether there is a need or not. The results from the AWO Project show that there will be positive impacts for industry.</p> <p>The costs of diversion prevented have been modified considering new assumptions.</p>
ENVIRONMENTAL IMPACT		
SOCIAL IMPACT		
IMPACT ON GA AND PROPORTIONALITY ISSUES		
IMPACT ON BETTER REGULATION AND HARMONISATION		
5. CONCLUSION	As long as we can address the points of attention drawn in the present CRD, we do agree that option 1 is preferable.	
6. ANNEXES		



Reference	Your comments	Response (by the AWO Project Team)
ANNEX I: CASE STUDY 'AERODROME — COST COMPARISON BETWEEN THE ADDITIONAL COSTS FOR SUPPORTING SA CAT I AND CAT II OPERATIONS'		
ANNEX II: CASE STUDY 'AERODROME — ADDITIONAL COST TO SUPPORT OPERATIONS USING EVS/CVS FOR OPERATIONAL CREDIT'		
ANNEX III: CASE STUDY 'INSTRUMENT APPROACH PROCEDURE (IAP) DESIGN — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		



Reference	Your comments	Response (by the AWO Project Team)
ANNEX IV: CASE STUDY 'AIR OPERATOR — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'	<p>Agree on the position stating that it is possible to consider the training as similar for operators conducting both CAT II/III and SA CAT I ops (Autoland procedure, e.g.).</p> <p>However, that hypothesis can only be sustained if credits are given. And, for the time being, this is not the case. Therefore, the subject of training credits is to be addressed ASAP, and in any case before the IR is issued.</p> <p>In the case an operator would have to set up new operations, the amount of initial training given seems optimistic</p> <p>e.g : CAT II/III operations at major ATOs require usually a 15h training, including CBT (2h) and FFS (3h) (roughly +50% compared to the values given by RIA).</p>	<p>NOTED</p> <p>The AMC and GM to be developed may provide credits as appropriate.</p> <p>NOTED</p> <p>Calculations were based on assumptions</p>



AWO Project

Reference	Your comments	Response (by the AWO Project Team)
ANNEX V: CASE STUDY 'AIR OPERATOR — ADDITIONAL COSTS FOR OPERATIONS WITH OPERATIONAL CREDITS BASED ON EVS'		
ANNEX VI: CASE STUDY 'AIR OPERATOR — COSTS OF WEATHER-RELATED DIVERSIONS'	As stated before, it is impossible to evaluate the benefits of SA CAT 1 as long as we cannot evaluate how many diversion would really have been prevented.	NOTED
ANNEX VII: AERODROME STATISTICS (A3 FORMAT)		
Other observations		



11. RIA-related comments provided by UK CAA

Commenter: UK CAA

AWO — Explanatory note

Reference	Your comments	Response (by the AWO Project Team)
1. Procedural information		
2. Explanatory Note		
3. References		
Other observations		

DRAFT FOR CONSULTATION



AWO — Regulatory impact assessment (RIA)

Reference	Your comments	Response (by the AWO Project Team)
1. INTRODUCTION		
CONTEXT		
OBJECTIVES OF THE RULEMAKING TASK		
AIM OF THIS DOCUMENT		
RELATED DOCUMENTS		
2. ISSUE ANALYSIS		
CURRENT DEFICIENCIES		
AERODROME-RELATED STATISTICS		
ASSESSMENT OF OCCURRENCE DATA		
EU SURVEY ON AWOs		
BASELINE SCENARIO		
3. POLICY OPTIONS		
4. ANALYSIS OF IMPACTS		
SAFETY IMPACT		
ECONOMIC IMPACT	If investment in retrofit equipment (EVS/HUD) is required, this would be an additional cost.	NOTED The paragraph has been deleted in order to streamline the text.
1) "If the technology to be used for SA CAT I operations is different to that used for CAT II (for example, HUD rather than autoland), then the costs for commencing SA CAT I operations would be similar to those for an operator not conducting CAT II operations."	Not if the operator is responsible for providing the training, OM and obtaining the operational approval.	NOTED Text has been amended.
2) ATOs may benefit from potential additional revenues by expanding training for new technologies.	Not with LPV 200	NOT ACCEPTED DoOs would allow SA CAT I also for LPV 200.



Reference	Your comments	Response (by the AWO Project Team)
<p>3) Aerodromes which currently support only CAT I approach operations to a DA/H of 200 ft and an RVR of 550 m could support approach operations down to a DA/H of 150 ft.</p> <p>4) For operations using EVS, the aerodrome should provide additional information on the AIP concerning the status of LED lights.</p>	Perhaps incandescent lighting preferred?	<p>NOTED</p> <p>The current systems are working with incandescent lights. The aerodrome operator should publish information in the AIP concerning the parts of the airfield lighting system which are using LED, so the air operator will be aware of whether EVS can be used.</p>
ENVIRONMENTAL IMPACT		
SOCIAL IMPACT		
IMPACT ON GA AND PROPORTIONALITY ISSUES		
IMPACT ON BETTER REGULATION AND HARMONISATION		
5. CONCLUSION		
6. ANNEXES		
ANNEX I: CASE STUDY 'AERODROME — COST COMPARISON BETWEEN THE ADDITIONAL COSTS FOR SUPPORTING SA CAT I AND CAT II OPERATIONS'		
ANNEX II: CASE STUDY 'AERODROME — ADDITIONAL COST TO SUPPORT OPERATIONS USING EVS/CVS FOR OPERATIONAL CREDIT'		
ANNEX III: CASE STUDY 'INSTRUMENT APPROACH PROCEDURE (IAP) DESIGN — COST COMPARISON		



AWO Project

Reference	Your comments	Response (by the AWO Project Team)
BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX IV: CASE STUDY 'AIR OPERATOR — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX V: CASE STUDY 'AIR OPERATOR — ADDITIONAL COSTS FOR OPERATIONS WITH OPERATIONAL CREDITS BASED ON EVS'		
ANNEX VI: CASE STUDY 'AIR OPERATOR — COSTS OF WEATHER-RELATED DIVERSIONS'		
ANNEX VII: AERODROME STATISTICS (A3 FORMAT)		
Other observations		



12. Comments provided by IAAPS

IAAPS supports the **policy option 1** as explained in the RIA, which means:

- Option 1: Enable the use of new vision and flight guidance system, and ensure consistency of the AWO rules across all domains, as well as with ICAO and other States.
- IAAPS concludes that Option 1 provides the best combination of safety and efficiency benefits and ensures the option to make use of new technologies in future.
- It could be an essential credit of option 1, that a common reference document ensures the consistency of AWO rules for all domains and get in line with ICAO Standards.
- Furthermore IAAPS sees operational and economic potential in developing rules and regulations for the voluntary use of new vision and flight guidance systems.
- For the time being IAAPS does not make use of these technologies.

Nevertheless IAAPS promotes the intention to enable new technologies for the benefit of air safety and creation of significant environmental benefits.

Response: ACCEPTED



13. Comments provided by LBA

AWO — Explanatory note

Reference	Your comments	Response (by the AWO Project Team)
1. Procedural information		
2. Explanatory Note		
3. References		
Other observations	<p>Please note that the dedicated AWO specialist of the LBA has already been involved in the AWO RMG activities. From a flight ops perspective we can therefore confirm our principle acceptance of the available outcome of this RMT although we could not review in deep the comprehensive documents submitted by EASA for focussed consultation.</p> <p>Referring to the planned introduction of this new concept please consider the overall load of responsible bodies and stakeholders which already have to cope with other performed or ongoing changes and application dates in the flight ops domain especially in 2016 and 2017.</p>	ACCEPTED

AWO — Regulatory impact assessment (RIA)

Reference	Your comments	Response (by the AWO Project Team)
1. INTRODUCTION		
CONTEXT		
OBJECTIVES OF THE RULEMAKING TASK		
AIM OF THIS DOCUMENT		
RELATED DOCUMENTS		
2. ISSUE ANALYSIS		



AWO Project

Reference	Your comments	Response (by the AWO Project Team)
CURRENT DEFICIENCIES		
AERODROME-RELATED STATISTICS		
ASSESSMENT OF OCCURRENCE DATA		
EU SURVEY ON AWOs		
BASELINE SCENARIO		
3. POLICY OPTIONS		
4. ANALYSIS OF IMPACTS		
SAFETY IMPACT		
ECONOMIC IMPACT		
ENVIRONMENTAL IMPACT		
SOCIAL IMPACT		
IMPACT ON GA AND PROPORTIONALITY ISSUES		
IMPACT ON BETTER REGULATION AND HARMONISATION		
5. CONCLUSION		
6. ANNEXES		
ANNEX I: CASE STUDY 'AERODROME — COST COMPARISON BETWEEN THE ADDITIONAL COSTS FOR SUPPORTING SA CAT I AND CAT II OPERATIONS'		
ANNEX II: CASE STUDY 'AERODROME — ADDITIONAL COST TO SUPPORT OPERATIONS USING EVS/CVS FOR OPERATIONAL CREDIT'		
ANNEX III: CASE STUDY 'INSTRUMENT APPROACH PROCEDURE (IAP) DESIGN — COST COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX IV: CASE STUDY 'AIR OPERATOR — COST		



AWO Project

Reference	Your comments	Response (by the AWO Project Team)
COMPARISON BETWEEN SA CAT I AND SA CAT II OPERATIONS'		
ANNEX V: CASE STUDY 'AIR OPERATOR — ADDITIONAL COSTS FOR OPERATIONS WITH OPERATIONAL CREDITS BASED ON EVS'		
ANNEX VI: CASE STUDY 'AIR OPERATOR — COSTS OF WEATHER-RELATED DIVERSIONS'		
ANNEX VII: AERODROME STATISTICS (A3 FORMAT)		
Other observations	See our general comments on page 3 of this document.	



AWO — Description of operations (DoOs)

Reference	Your comments	Response (by the AWO Project Team)
1. CONTEXT		
2. AWO SYSTEM DESCRIPTION		
3. CLASSIFICATION OF STANDARD OPERATIONS		
4. CONCEPT OF OPERATIONS WITH OPERATIONAL CREDITS		
5. DESCRIPTION OF SYSTEM COMPONENTS		
6. COMMON DEFINITIONS OF TERMS TO BE USED		
APPENDIX 1. OPERATIONS WITH OPERATIONAL CREDITS: SA CAT I		
APPENDIX 2. OPERATIONS WITH OPERATIONAL CREDITS: EVS/CVS		
Other observations	See our general comments on page 3 of this document.	